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The Philippine Review of Economics

SPECIAL ISSUE IN HONOR OF BENITO J. LEGARDA

Issue Editors — **Emmanuel F. Esguerra, Diwa C. Guinigundo**

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A joint publication of the
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and the **Philippine Economic Society**

The Philippine Review of Economics

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and the Philippine Economic Society (PES)

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Benito J Legarda
(August 6, 1926 - August 26, 2020)

The truth, according to Beniting

In his novel *Baudolino*, Umberto Eco argues that literary worlds are exempt from any concepts about truth because the literary discourse "cannot be true or false, it can only be valid in relation to its own premises." In the case of Dr. Benito "Beniting" J. Legarda, truth is just a matter of fact, as in historical fact.

For we do not live in a literary world.

For instance, his comment about the venerable Fr. Horacio de la Costa's assignment in Rome for many years in the service of the Society of Jesus (SJ) is typical Beniting, a statement of historical fact with some economic assessment of what is foregone: "It deprived us of much work that could have seen the light of day. Perhaps the Order felt that charity begins at home."

Legarda helped guide public policy with his early and abundant exposure in the West. He admitted as a historical fact, and realized together with other young economists and statisticians from the government, private corporates, and the academe, that the growing Philippine economy after the war badly needed the production of critical statistics. The Philippines barely had a semblance of this body of numbers to guide public policy. One way of championing this cause was through the formation of the Philippine Statistical Association (PSA) in 1951, 70 years ago.

Two other Central Bank of the Philippines (CBP) officials were with Legarda as co-founders: Dr Enrique T. Virata, the first director of the Department of Economic Research, and his successor, Dr. Horacio C. Lava. Legarda was to succeed as director after Fanny Cortes Garcia.

In many informal conversations with his economic research staff at the CBP, he would narrate that there was limited discussion, much less debate, about the imperatives of economic thought to help guide the difficult task of nation-building. Politics was, without a doubt, dominant. Eleven years after the founding of the PSA, the Philippine Economic Society (PES) was formed from the original informal association called Social Economy Association composed of Legarda, Amado Castro, Quirico Camus Jr., Jose G. Fernandez Jr., and Armand Fabella, all graduates of what Gerardo P. Sicat called the "ancient university in Cambridge, Massachusetts, USA."

Legarda was the third president after Fabella and Castro, after serving as editor of PES' *Philippine Economic Journal* (PEJ) for a few years. In many of his recollections of these years with his staff at the central bank, Legarda would always stress what he believed to be the solution to many problems of Philippine society: economics. The truth was he contributed to the solution by strengthening the role of economics and the economics profession and its practitioners. Legarda helped by demonstrating the need for building institutions that produced statistics, performed economic planning and economic research, and project development and management.

Invariably wide was Legarda's economic understanding; his intellectual pocket was deep. His *After the Galleons: Foreign Trade, Economic Change, and Entrepreneurship in the Nineteenth-Century Philippines* (1999), a revised version of his doctoral dissertation at Harvard, demonstrated that the Philippines was a sub-optimal colony. The galleon trade did not transform the Philippine economy beyond being an entrepot of goods produced outside the Philippines like silk from China and gems and precious stones from India, a situation that resonates even today when Manila continues to be a transshipment point.

Legarda argued in his book that after the galleon trade ceased in 1815 for the Philippines, Manila started to nurture foreign trade with a domestic base. Economic change happened, and entrepreneurship began to blossom. As Legarda nicely put it: " The nineteenth-century Philippine economy did not start from scratch. The preceding Age of Transshipment dated back to pre-Hispanic times, and, during the centuries when it was in effect, a process of administrative unification and geographic consolidation took place that laid the groundwork for the rise of national consciousness."

This economic history book was considered by no less than Fr. de la Costa as "a patch of solid ground in a mushy landscape." Legarda, in more ways than one, was also an able chronicler of the other key historical contexts in the Philippines. His *The Hills of Sampaloc: The Opening Actions of the Philippine American War* (2001), *Occupation '42* (2003), and *Occupation: The Later Years* (2007) are important additions to the literature.

Truth to Beniting Legarda are the trivial things during the two imperial occupations. In his books on the Japanese occupation based on his columns, for instance, Legarda documented that such consisted of the oppressive Japanese army; economic hardship; modes of transport after all automobiles were confiscated; tales of those who lived through the war.

But it was precisely those little things about the war, trivial to many, that comprised the truth of the period and the season, and to Fr. Miguel Bernad, in his commentary of Beniting's books, "that from a cosmopolitan perspective, are no longer trivial." Indeed, Fr. Bernad was very right; little things cast long shadows.

Beniting Legarda's rare contribution was to cast the light on important timelines of our history from some economic perspective. But the truth is, his devotion to economic history and culture, to be consistent with his forthright assessment of de la Costa's foregone contributions to Philippine learning, ate up his finite time from another equally important facet of his professional life as an economist: his contribution to economic research and monetary policymaking.

We are poorer by what Beniting could have written on monetary policy and its contemporary trends and dynamics.

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Benito Legarda, Jr.: in his own words and an appreciation

Gerardo P. Sicat*
University of the Philippines

1. Introduction

This remembrance is written in two parts.

In the first part, Dr. Benito Legarda Jr. writes *mostly in his own words*. We engaged in numerous exchanges by correspondence that he initiated as reactions to my weekly column on economic and social issues and other topics in the *Philippine Star*. In these exchanges, he parlayed his knowledge and perspectives as an economist, economic historian, and Filipino. Included in this section is the text of a short talk he delivered on the occasion of the launch of a book I wrote about another man of stature, former Prime Minister and Finance Minister Cesar E. A. Virata. Despite some references to me and my own work (for which I apologize to the reader), it is reproduced in full because in this talk, he reveals so much little-known biographical information about himself *in his own words.*

The second part of this essay is my own appreciation of him. We were long-time professional contemporaries in our service in the government and post-retirement. We worked almost in the same milieu and contemporary environment, although in different capacities and institutions.

Benito Legarda Jr., who lived up to the ripe old age of 94 years, will be remembered long as an economic historian par excellence, a central banker, and a Philippine cultural icon. He belongs to the important group of early post-independence Filipino economists and historians.

2. Mostly in his own words

Sometime in 2013 during a lunch gathering of former colleagues in the government, Benito Legarda surprised me by asking what happened to my column of two weeks before in *Philippine Star*. That was a unique day when I did not submit a column for publication. That was how I got to learn that he usually read and paid attention to my column. He began to write me comments on my column soon after he took part in the public launch of my book on Cesar Virata in 2014, where he spoke.

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He read my column with a critical eye, possibly for his mental diversion. When he got agitated by something I wrote with which he disagreed or which he thought needed further elaboration, or simply to correct me, he would react by e-mail. Topics that interested him were those on economic policy, especially those in which he had some role, direct or indirect, in the past. For instance, this would happen when my topic was on monetary policy, economic history, or Jose Rizal. In all cases, it was probably because something I wrote awakened his senses or caused him some mental disquiet.

2.1. End of correspondence

It would be useful to start from the end of the correspondence for its own revelations.

On June 26, 2020, during the height of the pandemic, I suddenly received an interesting mail from him. He wrote:

> "You may be interested in the following incident. Jobo Fernandez[1] told me in the early 50's that when the communists were about to win in China, Chinese industries were looking for countries of refuge. Jobo told me the whole Shanghai electrical industry led by Steve Cheng was ready to come to the Philippines, but was rebuffed by our authorities fearing foreign domination. You will recall that in the mid-50's the nationalist slogan was 'Loans not investments.' You have yourself commented on the constitutional antipathy to equity investments as a major factor in our unsatisfactory growth."

When Legarda wrote me, it was often to correct me or add a nuance or disagreement to what I had written. But this note was different. It was pure volunteer of information that I had not sought from him. It was not a reaction to what I had written recently.

The content was dynamite, for he had known I had been a major advocate of the need to get more foreign direct investments to stimulate the economy. The information could have been taken from notes that he had kept over the years, for it contained a definite name and a reference to an actual group of industries. It was old, not new, information. He must have a trove of them along with important memoranda on economic issues that, over time, could be lost to common wisdom. And this information is one of them.

I must have asked myself, why the sudden information? Was he reviewing old notes that he himself would have wanted to write about and now could not? Was he on the path of writing valuable memoirs that old men of affairs would want to

[1] In the reproduction of the correspondence, I do not edit references to informal names, to create the sense of familiarity and true tone. I prepare, instead, a short Dramatis personnae that is placed at the end of the article. Such a list identifies the names mentioned as well as introduces relevant background information on the persons involved. Needless to say, I confine the list of names to only a few significant characters to the discussion.

reveal but could not now complete because the end was near? Was this a legacy that he was imparting to me?

In admiration and thanks, I wrote back [June 26, 2020]: "This is very interesting. Many thanks to you."

Instead of ending there, however, I decided to be more forward in engaging him more fully. So that perhaps he might further open up, I invited him indirectly to write me back. Since the pandemic had caused hardships on senior citizens more than on younger people, I continued in the spirit of camaraderie: "But how have you been? With COVID-19, we have to be careful. I have found more time exercising as an activity inside the confines of my house and I have discovered other interesting pursuits besides. For one, my reading has broadened, my interests are much wider, and although I go out every now and then to get medicine and food, being in a state of being shut-inside the house becomes an enabler of other useful activities."

Then, I further added: "Did you see my last June 17 column on Rizal (about European influences on his novels, *Noli* and *Fili*)? Unfortunately the letter "f" was corrupted digitally. Words such as fill, official, finish, etc. became words as in a crossword puzzle, so that they became "?ill, o?icial, ?inish. etc."

There was no answer from him for several days. But on July 1, I received an intriguing short letter that was not responsive. He simply wrote back, "I read all your columns." That was all! It was a very cryptic answer, and I was disappointed in that he did not answer or add any more comments despite my openings. I asked myself, what could be the matter?

From my viewpoint, his reply was a non-reply. He could have said, characteristically, something more about Rizal's intellectual mentors. Or complained about the "f" errors that made the piece less understandable if he was reading me in the digital edition. [I found out later that the paper's printed edition was perfectly published.]

But the next week [July 8, 2020], I was jolted by a vigorous letter saying, in reaction to my column that summarized many factors that led to the long-term decline of Filipino human capital relative to other high-growth countries. "Your column today well lists the different sources of postwar inflows. This historical part is OK. However, the paragraph following is a pure theory inapplicable thereto. An equilibrium exchange rate will balance receipts and disbursements, but that is under normal circumstances. Our postwar conditions were not normal at all. Production was recovering, but there was a huge pent-up demand from three years of complete deprivation. Somewhere, you have written that our postwar productive capacity was only 30 percent of prewar. Set that against a 300 percent flood of accumulated demand. A free exchange rate would have been badly skewed and inflationary, and a transition period of controls was needed."

I regret I did not react to this letter quickly enough. I would have had a good answer.[2] I must have thought of answering it, but I was momentarily taking care of other matters that required my attention. It is said that in the final throes of mortal combat with fate, a person could gather sufficient strength to prepare for one great and final battle. Was that such a moment in his case?

That was the last letter I would ever get from him. For shortly, Benito Legarda Jr. would become a victim of the COVID-19 pandemic.

2.2. The correspondence

To provide proper context, the date of the correspondence is recorded in brackets. This then links the topic under discussion to the relative time of the published column-essay in the *Philippine Star* that caused him to write. Salutations and courtesies are omitted. The correspondence is arranged by topics, not chronology. Some interesting one-liners of his letters are included, for they convey a specific thought. I did not fail to thank him. This correspondence represents more than 90 percent of the exchange.

I believe that he would have enjoyed having the exchange brought into public view. He never objected to my publishing some of his comments in my column before. Perhaps he would agree with me that present and future economists would find the exchange to be a lively evidence that the profession in our time is alive and well. It also reveals much about Benito Legarda. It showed him as a substantial intellectual. His range of topics was wide and diverse, his knowledge deep. He gave his opinions quickly. Our exchanges showed that we did not agree all the time. In fact, the reason for his outbursts often was to voice a disagreement. Though I had indeed published one or two of his comments before, he also knew fully well that columnists have little free space on which to devote what is reserved for articulation of their ideas in exchange for the opinions of their readers.

The raw correspondence is left with minimal editing to capture the essence of the moment. A double-slash, //, is used to separate paragraphs.

2.2.1. How to federalize

BLJ (Benito Legarda Jr): I read with interest your column of 17 August [2018] on proposed federal states, and agree that the 12-state proposal wrongly bases the federal states on administrative regions. However, I believe your use of geography as a basis is also defective. // Both methods would give us, in effect, lifeless mannequins that need an externally operated mechanism to function. I

[2] I could have answered that during the period in question, the country could not use exchange rate devaluation, because under the treaty with the US, we could not alter the peso exchange rate. I was simply making the point that a change in the peso rate would reduce imports and perhaps stimulate some export supply response, which could have reduced larger payments imbalances as a counter-factual that happened to other countries that adjusted their exchange rates immediately after the war.

believe that states should have an inherent life of their own, based on culture, which is expressed in language. Thus I would go for states of unequal size based on ethno-linguistic criteria. // These would have their own dynamic, and being of unequal size would call for a bicameral legislature wherein, as in the USA, the smaller states have equal representation in the upper house. In my scheme, some states would be obvious—Ilocos, the Tagalog region, Pampanga, Bicol, the Waray region, the Hiligaynon region, the Cebuano provinces, Palawan. // "Borderlands" would be Cagayan, Cordillera and Pangasinan-Zambales in Luzon and the Kiniraya-Aklanon region in Panay. Should they be separate states or melded into the larger ones? // Bangsamoro does not have to be one state. It could be split among the old sultanates of Jolo, Maranao and Maguindanao. // I believe an ethno-linguistic basis would be a better foundation for federalism, which is defined as a system of enumerated powers. [Aug. 17, 2018]

GS (Gerardo Sicat): … I have been aware of the linguistic and other cultural reasons for a federation. One could go too far in creating cultural identities in a nation, and therefore more "states of the republic." …Yugoslavia's break-up into countries was inevitable because it had been marred by highly accented socio-cultural factors that provoked break-up or "balkanization". // I believe we should promote more unity within fewer state boundaries so that there is more cohesion arising from culture as a binding element of nationhood. I think of Ilocanos as not being confined mainly in the Ilocos for they are in our midst, in Manila, as everywhere in the country and also heavily represented even in Mindanao, for instance. Those from Cebu are also all over the place. And so we can say this of Pampangueños or Tagalogs, etc. // Our experience with a national language is only one dimension of the growing unity over time among Filipinos in the country. Though it has been too Tagalog-based (and that is a flaw in its earlier construction), any Filipino traveler can now be understood in this language from Batanes to Tawi-Tawi. Years of development through the national medium of the spoken and written Filipino have united us more as a people than we probably are willing to admit because of pride in our own dialects. (Of course other factors like politics tend to break us apart.) Within a larger geographic state that has the many advantages of scale economies, each of our potential federal states under my plan would have much more capacity for growth. The running of state governments would also be more economical. // Anyway, this is how I will argue this case when I get the chance to come back again to the topic. Thank you for your thought-provoking points which, of course, should be the teaser for an extended argument. I admit, however, that any other reason for differentiation would be, for many, a good reason for creating a new and separate state within the prospective federal republic.

2.2.2. Labor markets and "endo"[3]

BLJ: You have written a couple of columns on endo and the current efforts … to terminate it. But it is only a symptom of the real malady, namely rigid employment laws in a labor-surplus economy. Business cannot separate employees without having to clear with the Dept. of Labor. Rather than go through tedious and lengthy bureaucratic hassles, they prefer to just make temporary hires. To minimize endo, relax the rigidity. You have been a strong advocate of labor-intensive modes of production, and you should bat strongly for such real reform. [Oct. 20, 2016]

GS: As always, many thanks for your comments as well as critical reading. [Oct. 21, 2016]

2.2.3. John Power[4] *and industrial employment policy*

BLJ: [My one meeting with John Power] was not a very cheerful encounter. It was a meeting at the Central Bank presided over by, I think, Blas Ople, so it must have been about employment. After Power spoke, I spoke up, probably outlining the Central Bank's position. He kept interrupting me, and I rather sharply reminded him that he had had his turn and it was now my turn, and (to) be good enough not to interrupt. He may have been a good academic economist, but diplomacy was not one of his strong suits. Wasn't he a football player in college? That may explain his propensity to tackle. Also, didn't he marry a rather pretty UP student…? Academics have a different approach than us policy types. [Oct. 4, 2017]

GS: Some people admire others for the correctness or sharpness of their ideas and contributions. Others remember people more for their looks and behavior. The ideal is that good ideas be contributed by gentle and polite people. We live in the real world, not one of fashion! John I was told had music as his previous background. If that was true, then he tackled by pushing his beliefs more than through a conscious effort to embarrass. [Oct. 6, 2017]

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[3] The word "endo" is journalistic jingo which means "end of contract". The subject is very important in discussions of labor market policies in the Philippines. As a result of high minimum wages and other protective labor regulations, the practice of short-term labor contracts became an alternative employment practice that avoided some of the cost-increasing policies. Thus, big companies also started the practice of sub-contracting their labor hires through specialized enterprises that provided the labor to operating enterprises. Such a system helped to stabilize labor costs but also caused labor unions to oppose the practice. They demanded that labor sub-contracting be ended. Short term employment contracts among small and large firms became a common practice as a way of avoiding the high cost of permanent labor hiring.

[4] John Power and I wrote the book published by Oxford University Press, 1970, *The Philippines: Trade and Industrialization Policy*. See Power and Sicat [1971].

2.2.4. Prices after the Second World War (early years of independence)

BLJ. Aside from the price rise, don't forget the abrupt price fall when the war was over. Those commodities like coconut oil were affected to the point of bankruptcy. [Nov. 14, 2018]

GS. Thanks again for your thought. The drop in prices after the war was also the same. I was thinking of the wartime but the postwar time experience was as relevant! [Nov. 16, 2018]

2.2.5. Fiscal and monetary policy, 1950s

BLJ: Your overview of economic policy in the 1950s is incomplete unless you factor in fiscal policy, whose weakness allowed domestic demand to put pressure on the external sector. There was a worldwide over reliance on monetary policy as against fiscal policy. [Nov. 13, 2019]

GS: Many thanks as usual. [Nov. 14, 2019]

2.2.6. Rice industry and Philippine trade, Spanish times

BLJ. I should add a detail that would be of interest at the present time when there is news of rice importation of one million tons. During most of the Spanish period the Philippines was a rice exporter, mostly to China, but also at time to California and Cuba. When local prices rose (owing to shortages in China) the authorities would ban rice exports in order to prevent price from rising. [Jan. 7, 2019]

2.2.7. Martial law and economic technocrats

BLJ. Your column today is certainly a contribution to our economic history. It was an unprecedented (and unrepeated) concentration of economic know-how and it was non-political. // What you next have to narrate is how the technocrats reacted to the abolition of the legislature, the imprisonment of political rivals, and the suppression of free speech. You also have to explain why, despite all this economic brainpower, the Marcos regime wound up in economic chaos. Are you ready to point a finger at the villains (or villainess, as the case may be)? [Sept. 6, 2017]

GS. Many thanks for your reaction to my paper. Perhaps I might take you up on your challenge one day. But I thought I had given much thought to the problems in a lot of previous writings. The situation is not as simple as a black and white morality play. The political system was rotten then and there were threats to the state that were not known to ordinary mortals like us. In the heat of the moment in assessing the past, many have forgotten that there were also good things that had happened. The 1983 crisis was a disaster for all of us. Some of the 1987 remedies were as unfortunate. All these require explaining. I have tried to do this in some of my essays in my column and in long works. // Incidentally, your

note reminded me of the last one you wrote about Amado [Castro]. The School was in full force during the wake for him. Many spoke during the wake. I spoke for more than ten minutes about his role in the life of the school and how he has changed my own life. [Sept. 8, 2017]

2.2.8. Marcos, martial law and consequence

BLJ: Just a few details for better perspective. Martial law came into effect at midnight of 22 Sept. 1972 and was announced 23 Sept., 21 Sept. is a paper date to indulge Marcos' fetish for the number 7 and its multiples. // You mention the lifting of martial law on 17 June 1981 as if it were a genuine thing. In fact he could still pass decrees without going through the Batasan Pambansa, which was correctly perceived as a rubber stamp.// Ninoy's assassination came after martial law was "lifted", and his funeral was not allowed to be covered by a still muzzled press. //In mentioning the overseas resistance movement, don't forget the longest lasting figure, Raul Manglapus. //Finally, Marcos' primary mistake was not merely the lack of orderly succession, but the complete destruction of our civil liberties and our constitutional framework, with freedom of speech not only suppressed but independent press entities not only censored but completely shut down and only crony papers permitted, just like the Japanese. [Sept 24, 1914]

2.2.9. Amado Castro, economist

BLJ. I was abroad when I received the sad news of Amado's passing. Our colleague Henry Rosovsky was saddened to the point of depression. Shouldn't the UP and UAP [University of Asia and the Pacific, where he taught after retirement] economics faculties get up a Festschrift in his honor? [June 27, 2017]
[**Note**: The Festschrift happened, see December 2017 issue of the *Philippine Review of Economics*.]

2.2.10. On the choice of governor of the Bangko Sentral ng Pilipinas

[Note: With the retirement of Gov. Amando Tetangco of the BSP [whose stewardship was considered successful for the improvement of Philippine macrofundamentals during the early part of the 2000s], I discussed the various candidates for the position. This elicited a comment from him.]

BLJ. You omitted mention of ex-Pres. Macapagal Arroyo as a CB Gov. She is being pushed by Speaker Pantaleon Alvarez, to remove a threat to his position. Towards the end of your column. [Feb. 24, 2017]

GS. Thanks for your comment. If I had more ammo, and of course more space, I would have commented on the political infighting that seems to take place.

2.2.11. Jose Rizal biographies

[Note: I wrote several columns assessing the biographies of Jose Rizal by various writers, Spaniards, Americans, Filipinos. Retana was the first biographer of Jose Rizal. A Rizal contemporary and a Spanish journalist as well, Retana was a stern critic who turned into an admirer after the martyr's execution.]

BLJ. I am surprised you did not mention the first Rizal biography by Retana (as well as the abbreviated version in Catalan.) [Jan. 22, 2020]

GS. Read the first part [that is, my early essay]. Wenceslao Retana was mentioned prominently in the first piece. Thanks to know you still follow me. [Jan. 22, 2020]

BLJ. Good to know. I was out of town at the time of your first column and therefore I missed it. [Jan. 23, 2020]

[Note: The starting point of this long exchange which brought in Jeffrey G. Williamson is the following commentary when Legarda commented on my article on Jose Rizal's ideas and ideals [Jan. 2, 2019]. Then the debate shifts to factor costs, wage rates in particular, and other issues during colonial Spanish times.]:

2.2.12. Jose Rizal and his ideas and ideals

BLJ. I read with interest your column on Rizal's ideas. As an admirer of our national hero I do not disagree with what you say about the influence of the Enlightenment. However, we in our day can afford to put him in clearer context. In his time Rizal wrote critically and even scathingly about the country's situation, as he was trying to correct the abuses of his time. //With historical perspective we can afford to mention some positive factors of the time. Let me cite a few examples; //1. The Philippines had the highest wages in East Asia at the end of the 19th century, higher even than industrial Japan (which would pull ahead later). This you can find in one of retired Harvard Professor Jeffrey G. Williamson's works. //2. The educational system was second only to Japan's, according to Swedish economist Gunnar Myrdal. Our former Education Secretary Anding [Alejandro] Roces had noted that literacy in the Philippines was higher than in the mother country, Spain. //3. Economic progress was building up a Filipino middle class. As pointed out by Dr. T. H. Pardo de Tavera. Nick Joaquin had termed the Philippine Revolution the revolt of the ilustrados, not the revolt of the masses as called by a UP historian[5] (the masses would later be led by Sakay). Somewhere I have read that of the 18 generals in the Philippine Revolution, 17 were ilustrados and only one (Kalentong) was proletarian. //Rizal's family belonged to this

[5] He was referring to Teodoro Agoncillo, author of the *Revolt of the Masses* [1956], a book on Andres Bonifacio, the leader of the Katipunan. He did not agree with the radical left interpretation of history that many UP historians advocate.

prosperous, educated middle class, which gave him the platform for launching his critique of the abuses of his time. //With these positive features, can one really say that Spain's policies in the Philippines were harsher than in Cuba and Puerto Rico?// Rizal was not only analytical, he was prophetic (as my high school teacher Ricardo Pimentel, S.J. remarked). His essay on the Philippines in 100 years was futuristic for its time, and the climax of *El Filibusterismo* reads almost like an advance script of what happened at the beginning of our revolution.

GS: Your recent comments are very interesting and need an extended discussion. Though I discuss different issues this week, I will have time to address the ones that you made concerning Rizal and Spain and the colonies. [Jan. 7, 2019]

2.2.13. Economic history: Spanish colonial policies, trade and exchange rates, wage rates

GS: Sorry for being a bit tardy in replying to your last note. Now that Jeff has been brought into the fray, the discussion becomes more interesting. // I did check Jeff's book on *Trade and Poverty* [2011] which contained much historical data on globalization, including some on Asian countries and did not encounter data on wages. So I figured you were referring to his article in *PRE* on inequality and the Philippine long term development record. Much of it was really on twentieth century developments. There was little hard data on factor costs, including wages, during the 19th century in that paper. About five or ten years ago, in my spare time, I became interested in factor issues during colonial times. In fact, I tried to look for data on prices of goods and services and on exchange rates for the pesos during Rizal's contemporaneous period. I did look at Amado's dissertation at the UPSE library and failed to get more. I might in fact have also looked at your *Galleon* book and Philippine trade. I was disappointed. Without trips to the capitals in Madrid, Paris, Rome, and London on comparative prices, such data would be impossible to analyze and construct. In any case, even such efforts would have produced a lot of frustrating data outcomes. // When Jeff [Williamson] began work on Philippine historical data, he was most focused on historical data during American times because that was where he could find hard data. I heard him talk about these issues and his work was enlightening. Most of Jeff's data were anchored on the Philippine censuses of the American period. Those were the base lines of whatever series on prices and production circulated during the American period. In these, his analytical mind applied on Philippine data enabled him to build some series on prices and costs. Jeff's data on the Philippines were mainly during the American period, meaning they began mainly after 1902. // If he could have found data before the American period (19th century), the linkage of those economic series would have been heavily biased by the two to one peso to dollar exchange rate fixed upon the American occupation (in view of the strong US dollar during this period, America's growth also showed on the exchange rate front). So, I figured that if Jeff had any such data and they did get

linked to the 20th century data, the numbers that would be returned to us would be highly biased to report high factor costs (high wages, due to exchange rate distortions). So, I would have argued along those lines: Philippine wage costs would have been upward biased due to exchange rate conversion. It seems in fact that Jeff has not found any wage data that came close to giving us a good basis of prices and wages at the close of the Spanish period.// You seem to believe that Spanish policies toward the Philippines have led to good economic and social results. I do not agree with that. Like the policies with respect to all the Asian colonies of the European powers, the policies were mainly exploitative so that the results for the country at the end of Spanish rule were not superior to those of our neighbors. The Spaniards did not do much to uplift us educationally (in the sense of widespread efforts to educate us). In terms of commerce, the Spaniards were not imaginative enough to put commerce ahead of colonial policy, unlike the British and the Dutch and others at least. Of course, the activities of American trading companies along with the British and other Europeans were designed mainly to take advantage of the China trade. Along that route, Philippine trade expansion had been helped and had helped a little in the growth of some of our agricultural industries, notably sugar, coconut and abaca. The trade flows (both ways) between the Philippines and the rest of the world probably did not compare well with other Asian territories that were more exposed to Western exploitation in terms of trade and commercial exploitations (i.e., to globalization pressures). // So, I figured from this reasoning that the Philippines could not have had high wages over all our neighbors at the end of the Spanish period. In fact, we probably could have been, at best, average, which meant, being considered dirt poor like all the other Asians impoverished by centuries of exploitation. It was the expansion of foreign trade with all the industrial powers and the growing economies that influenced great movements in trade, domestic production, and changes in prices and factor costs. // Perhaps Jeff Williamson has thoughts on these comments. I will learn a lot from that as well as from your reactions. **[**Jan. 24, 2019]

JGW (Jeffrey G. Williamson) **[**to **BLJ,** copy to **GS].** Noel [Emmanuel] de Dios tipped me off about the Legarda-Sicat dispute and I promise to chase down my wage data today.

BLJ [to **JGW**]. No, you don't cite those figures in your *PRE* article, which is why Gerry is skeptical about them.

BLJ [to **GS].** You may take exception on the basis of one Williamson article, but he did publish a table somewhere which showed Philippine non-agricultural wages as being above those of other East Asian countries. // As to the educational level, you can take exception to Gunnar Myrdal and Anding Roces, not to me. // As for the cautionary "slim data", a "fat" datum is that our giant neighbor Indonesia's literacy rate when the Dutch left in 1948 was 8 percent, a level we had long ago passed back in the 19th century. // As for Spain's policies in the Philippine being harsher than in Cuba and Puerto Rico, you rightly cite Rizal's observation

that those two countries were already represented in the Spanish Cortes while we were not, although we were at one time represented in the Cortes by Ventura de los Reyes, but this representation was suspended. I was questioning whether internal policies were harsher than in those two countries. Frankly, I don't know, perhaps you have some basis for comparison. [Jan. 24, 2019]

JGW. I think this is the source by me you recall: "Globalization, Factor Prices and Living Standards in Asia Before 1940," in A. J. H. Latham and H. Kawakatsu (eds.), *Asia Pacific Dynamism 1500-2000*. London: Routledge, 2000, pp. 13-45. // There has been a lot more recent work on comparative Asian living standards 19th and 20th centuries, but the Philippines is usually missing from the group. However, everyone believes that Philippine urban common labor living standards were only exceeded by Japan circa 1940. Didn't Harry Oshima offer plenty of evidence of that when he was at the UP in the 60s and 70s?

BLJ. Our discussion has certainly expanded with the entry of Jeff W. At this point I am just awaiting the retrieval of his wage data. // You complain of the rate of exchange in the data for the 19th century. In my *After the galleons*, page 274, there is a table of exchange rates 1829-1874 (1874 is when the peso started depreciating.) // As to the Anglo–American firms being designed to take advantage of the China Trade, this is not so. Abaca, a principal export, was *sui generis* and developed in response to American demand. Sugar went in large part to the UK, whose first consul in 1834 had to certify that Philippine sugar was not produced by slave labor. Tobacco went mainly to Spain.// I do not know what you mean by the term "exploitative". The other European colonies sent their exports mainly to their metropoles, but Spain was a poor fourth in the Philippine export trade ranking fourth after the UK, US and China. // In 1879 a Spanish writer ruefully observed that from the commercial point of view, the Philippines was an Anglo-Chinese colony with a Spanish flag. It did not follow the common pattern of the colony as complementary to the metropole. // As to social results, you have not taken account of Gunnar Myrdal's finding that the Philippines ranked second only to Japan in educational level, and Anding Roces' observation that literacy in the Philippines was higher than in Spain. Various Anglo-American writers described the easy association of Filipinos with other ethnic groups—Sir John Bowring, Frederic Sawyer, William Gifford Palgrave and the American naval officer John White. Sir John Bowring, ex-governor of Hong Kong, visited Rizal's uncle, Jose Alberto, in his home. Frederic Sawyer at the end of the century wrote, 'The islands were badly governed by Spain, yet the Spaniards and natives lived together in great harmony, and I do not know where I could find a colony in which the Europeans mixed as much socially with the natives.' // You reproach the Spanish with not having the imagination to put commerce ahead of colonial policy like the British and the Dutch. But this is why the Spanish achieved higher educational levels in the Philippines. The British and the Dutch concentrated on commerce and did not deal with education (really exploitative), while Spain from

the beginning gave at least as much importance to evangelization and taught the people to read in order to learn the catechism. This was all consistent with higher wage levels.

JGW. Wonderful and very thoughtful comments, Gerry. Let me see if I can offer a useful reply. // It's absolutely true: the data we need to document PHL inequality and living standards is only available – so far – from the first census onwards (with a big gap for the 1940s). But even what we have has been poorly exploited. In my senior years, I've been trying to provoke young Philippine scholars to do more, but with little success since they are not rewarded for such work. Maybe a team of old folks should do it? But we'd need funding and research assistance. // I think your concern about exchange rates is relevant only if the researcher fails to exploit relative costs and living standard methods. The latter has led to an exploding economic historical literature on comparative living standards for the colonial US, Latin America, Asia and Africa. Even slave economies like the American South (Lindert and Williamson, Princeton 2016) and Jamaica (Burnard, Panza and Williamson attached). There is absolutely no reason why this could not be done for the PHL colonial periods under both Spain and the US.// The Jamaica paper also illustrates how what are called social tables (STs) can be constructed to document earnings or income inequality, something I presented at a UPSE seminar a few years back called "Ancient Inequality". At that seminar, Prince Cruz introduced himself and said he'd fiddled with Philippine STs (but never answered my emails) and so has Erwin Tiongson for his family's province circa 1750 (around that time Spanish authorities did an occupational and income census of Spain and it seemed likely that the imperialists would have done the same for their colonies, and Erwin found it to be true, but then the World Bank got in his way). // In short, there are immense research opportunities for PHL economists to do exciting historical research on the PHL that would speak to present issues. [Jan. 26, 2019]

JGW. A wonderful debate, gentlemen. // There should be a monthly economic history seminar meeting at UP (involving UPSE, UP History, Ateneo-Political Science, and leading thinkers like you guys)…. I wish I was there to participate and to teach a graduate course in economic history like those offered at Stanford, Berkeley, UCLA, Davis, Northwestern, Michigan, Ohio State, Rutgers, Harvard, Yale, and Princeton.

[Postscript to the debate, by GS: In short, comparative Philippine data on living standards and costs are extrapolations of Philippine conditions traceable to the US colonial period data (1898 onwards). Data for periods before could be backward extrapolations to the time of Spanish colonial rule as there were no good data corresponding to that period. But that method extracts information for an entirely different colonial policy—the American colonial period—which is the issue under debate. Gunnar Myrdal must have used such data for his *Asian Drama* book. Also, the data on wages did not arrive, for they were indirect estimates,

based on extrapolations of factor costs that were further based on proxy data as explained already. Such data also would have had exchange rate conversion issues that could be eliminated by purchasing-power-parity calculations. As Professor Jeffrey Williamson suggests, to construct social tables (STs) is a promising future research effort to deal with the issue at hand.]

2.3. The Minister and I, by Benito Legarda, Jr.[6]

Cesar Virata and I worked together when he was Finance Minister and later Prime Minister, and I was variously Deputy Governor for Research at the Central Bank of the Philippines, adviser at the Ministry of Finance and Alternate Executive Director at the International Monetary Fund.

My connection with the Viratas went back long before that. After getting my MA in 1950. I was coming home via Europe with my parents and sister, and in Rome were invited to go to a night club by Ambassador Proceso Sebastian.

Among his guests were Central Bank Governor Miguel Cuaderno, with then CB Research head Leonides Virata, Cesar's uncle. The latter asked me what I had studied, and when I said "Economics", he asked me to report to him in Manila.

It took some time for bureaucratic formalities to be completed, but in December 1951 I joined the Central Bank's Department of Economic Research for what would turn out to be my life's work.

In 1980, I took early retirement from the Central Bank. In my international activities, I had come to know the Southeast Asian central banks (having helped organize the Southeast Asian Central Bank Governors Conference or SEACEN) as well as the monetary officials in Latin America.

Cesar did not allow me to go quietly to the private sector, but talked me into becoming an adviser in the Ministry of Finance.

Then he offered me another life-changing move: to become Alternate Executive Director of the International Monetary Fund in Washington DC This allowed my wife to retire from her pediatric practice, and gave my daughter educational opportunities that led her to Harvard and later to medical school and anesthesiology. My wife and I were happy for her, but bore the emotional burden of separation when we returned home and she made her own life in the USA

Gerry Sicat's biography of Cesar is so voluminous that my wife, when she saw me lugging it around, asked if it was a phone book. Rather than review the work, I would like to focus on something in which I worked closely with Cesar, namely, economic diplomacy, to which Gerry devotes a separate chapter.

Gerry attributes Cesar's impact in this field to the high regard in which he was held by high officials of other countries. I would add to this the respect he commanded in the officialdom of the Fund and the World Bank.

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[6] Remarks delivered on the occasion of the book launch of my biography of Cesar Virata at the University of the Philippines Executive House on August 22, 2014.

I would also add his strong advocacy of Third World interests vis-a-vis those of the developed countries of the First World.

This was an uphill struggle waged partly in the UN Conference on Trade and Development or UNCTAD. He sent me to Geneva to chair a sub-committee of UNCTAD, where this was quite evident. At the Cancun economic summit in 1981, when I was already an Alternate Executive Director in the IMF, Cesar instructed me to join him there. The role he assigned me was to circulate among the delegates to gauge the cross-currents of opinion. I could do this because I knew some of the middle-level career diplomats who had been stationed in Manila, the Latin American officials with whom we had worked closely (I shall say more about this later), and the secretary of the Brandt Commission on North-South problems who had been my classmate in graduate school.

This last one described to me how, whenever the Commission members would arrive at an impasse, language would be devised that attained, in his words, a higher level of pomposity. There seemed to be a willingness to compromise on language rather than on substance.

Our main efforts in North-South dialogue were made in the Group of 24 that met at the semi-annual meetings of the Bank and Fund. We represented Southeast Asia. The Group had to keep insisting on the interests of the Third World. It had to do so despite its own mixed composition, with some members being oil-exporting countries whose financial ideas were closer to the First World than the Third World. There were also personal differences. At the Helsinki spring meeting in 1982, when I chaired the Group at the officials level, there was an altercation between a crusty old South Asian and a brash young South American delegate which I had to smooth over by talking to each one separately and promoting an amicable settlement. In this Group Ernest Leung was particularly active.

In his book, Gerry describes the internal regime of the Bank and the Fund, with countries' quotas (and, therefore, voting power) calculated on the basis of certain factors such as population, GDP, level of trade, reserve holdings, etc. Under this system, some small European countries with high trade levels had rather high quotas and could act almost alone.

We had to belong to certain country groupings. When we came on the scene in the Fund we were with an Arab-Middle Eastern group and in the Bank with a Latin-American group.

Our Fund Executive Director was a shrewd operator who could arrange things in the rare cases when we had problems. His alternate was quite junior to him.

Our older predecessors had made no effort to get us to participate in the governance of the international financial organisms. This was something that Cesar departed from when he assumed office.

In the Fund Gerry describes the various moves that were made. We wanted to form a Southeast Asian Group, but as Gerry indicates this was frustrated by the Indonesian insistence that it occupy the Fund seat permanently.

Failing to get the rotation we wanted, Cesar got us into the Australia-New Zealand group, which had just expelled South Africa and welcomed our joining them. Although the Executive Director was reserved for Australia, we had a turn as Alternate Executive Director and as Technical Assistants. It was a learning experience for us to be exposed to the tough-minded British Treasury Tradition that was followed—(I understand from today's BSP officials that we are now in a South East Asian group where rotation is followed.)

In the World Bank, we had, from the earliest years, been part of a Latin-American group headed by Brazil which had a lock on the Fund Executive Director and left the World Bank post open. During our years of passivity this had been continuously occupied by Colombia, which however had a smaller quota than ours. Our new interest in Bank governance meant that we had to negotiate our way in.

The Latin American connection was beneficial to us because, in effect, we entered an Executive Board discussion with three votes in our pocket. The group met for caucuses before Fund-Bank annual meetings, and Cesar took pains to attend, and even to ride on sometimes cramped economy chartered flights for the delegates. Thus he became both liked and respected.

When we began negotiating for a turn at the directorship, we had one advantage: our votes ensured the viability of the constituency. Without us, they were endangered. Since most of the Latin officials were not fluent in English, we carried on our talks in Spanish, with myself speaking for Cesar. When I had to consult him, we would speak quietly in Tagalog as not to give away our position. Eventually we got our turn at the directorship.

There was a further ramification. The time came to elect a chairman of the World Bank's Development Committee. We represented Southeast Asia in the Group of 24, but as usual our South East Asian colleagues were ambivalent or disunited. The Latin Americans, however, rallied behind Cesar, perhaps glad that they did not have to choose from among themselves and compete for primacy. So Cesar, who speaks no Spanish, was elected chairman of the Development Committee as Latin America's candidate.

I seldom discussed domestic economic issues with Cesar, but in Cancun, in the privacy of his hotel room, I asked him: Why, with all the heavy investments being made, were the results so skimpy?

His answer: Bad projects.

"But which projects are bad?"

"Name them, they are bad."

Present at this meeting was Minister Roberto Ongpin, who nodded his head in agreement although he was reputed to be the sponsor of the projects.

Gerry can write at great length on analytical or administrative matters, but also shows an unsuspected capacity for fast paced narrative in discussing the end-game of the Marcos dictatorship—the event we commemorated yesterday, August 21st, the most dastardly political crime in Philippine history, the murder at the airport of Benigno "Ninoy" Aquino; and the EDSA Revolution of 1986.

Gerry recounts what is not generally remembered, namely, Cesar's Istanbul statement that "There were elements in the government that could be involved in Ninoy's assassination." Marcos was unhappy about this, and Cesar was asked twice to retract the statement and twice refused. The lead he gave was not followed, and to this day the mastermind remains unidentified.

Gerry writes, "The fate of Marcos' hold on political power had been sealed"[497]. Why did Cesar stay on? Crisis had turned into chaos, but if anybody could restore some semblance of order it was he. Quietly, he and newly appointed Central. Bank (CB) Governor Jose B. "Jobo" Fernandez set about to put things in order. These entailed many painful fiscal and other measures.

When the Cory Aquino government took over, the transfer of financial administration was relatively smooth, with Jobo retained as CB Governor, and Cesar's trusted assistants holding the fort at Finance. Jobo told me when it was over that it was thanks to Cesar that we were able to straighten out our economic policy.

Jobo lamented that this was not commonly realized. But over time it has become more apparent, and Cesar has retained an unblemished reputation for personal integrity both internationally and nationally. And I am among those honored to be counted among his friends.

3. An appreciation

Benito Legarda Jr. is not a singular phenomenon. He should be appreciated in the context of the milieu in which he lived. Hence, there are more characters involved in his journey of accomplishments.

3.1. Central banker

I first encountered Legarda when Amado A. Castro, my professor then in International Trade, invited him to deliver a talk on Philippine development issues in 1956 in his UP class. He was a self-assured speaker on a topic which he articulated well. The time was one of ferment on the problems of the peso exchange rate. He spoke of the implications of such policies on the manner in which business behavior and economic outcomes happened. Industrialization was happening and local entrepreneurs were making headway.

Benito Legarda was for controls. He explained how the flow of incomes was affected by the exchange controls and import policies of the period. Domestic entrepreneurs were putting their money in industries that were favored by these policies and the country was managing to shift away from imports of nonessentials. On the whole and through these policies, the country's earnings of dollars that were derived from agriculture and other primary industries were being funneled consciously through government policy to stimulate the growth of domestic industry.

He was essentially defending the current policy of the central bank, which was then headed by Miguel Cuaderno, its first governor. The central bank followed the prevailing economic orthodoxy employed by central banks of many developing countries. Faced with scarce dollars and balance of payments shortages, these institutions employed exchange controls to manage international trade and economic policy. These measures, it turned out, stimulated some domestic industries to develop while preventing the inflow of imports that were not considered of high priority.

This talk happened shortly after he had come back from his final formal studies with his Harvard PhD in 1955. He joined the Central Bank in 1951 and worked for two years before returning to graduate school. The Central Bank was founded in 1948 and opened for business at the start of 1949. By his own admission, central banking was to be "my life's work".[7]

At the Central Bank, he worked in the department of economic research which was the nerve center for economic policy analysis and advice in that institution. This was the department of the bank where most of the economists were assigned to respond to the policy needs and the operational work of the institution. This was where he would become in his time the institution's premier economist.

Ultimately, the research department prepared the bank's annual economic reports, supervised compilation of statistics for bank use and published them for public dissemination. The department, therefore, was an internal research engine for the benefit of the Monetary Board, and for the operational needs of the institution. In such an office, it was natural that those working in it would function as researchers to help undertake economic analysis and render advice on economic policy issues.

The period of Legarda's service in the Central Bank spanned the presidencies of Elpidio Quirino, Ramon Magsaysay, Carlos P. Garcia, Diosdado Macapagal and Ferdinand Marcos. This covered the governorships of Miguel Cuaderno (1949-1960), Andres Castillo (1961-1967), Alfonso Calalang (1968-1969), and Gregorio Licaros (1970-1981).

The period covered many aspects of early economic development in the country. The growth of the financial and the banking system, of national and community or rural banking, of supervised credit. It saw the period of predominant expansion and growth of the government financial institutions, principally the DBP (Development Bank of the Philippines) and the PNB (Philippine National Bank), of agricultural credit institutions at the national and community levels. From a macroeconomic viewpoint, it was one of periodic booms and busts, some of the shocks provided by domestic political developments (such as election outcomes) and, of course, external developments. These episodes were accented by reliance on exchange and import controls, Filipino First industrialization

[7] See above, in his article, "The Minister and I."

and protectionism, decontrol, inflation, banking crises, energy crisis, balance of payments and debt crises. From an economic policy perspective, it was one of challenging issues and flux.

The early central bank was steep in orthodoxy. Under Cuaderno and his immediate successors, they built the CB as an image and complement of the country's development strategy of import substitution, based on an inward-looking approach to economic development. The economic orthodoxy then relied on the need for economic controls to achieve desired development objectives by allocating scarce foreign exchange to toward prioritized investments and raw materials needs, relying on export earnings (coming mainly from primary exports of agriculture, natural resources and agro-industry).

An important example of this orthodoxy was in the matter of the anti-usury law. This policy from of early US colonial times in the country set the ceiling on interest rates charged in the economy to 12 percent. In times of moderate inflation, the anti-usury law protects borrowers without hampering good policy. But the period of post-independence economic developments was anything but volatile prices. After the early deflationary period before exchange and import controls set in, inflationary tendencies would dominate the postwar experience. Under such a general picture, the anti-usury law was a defective bar on economic policy based on interest rates. But of course, the Central Bank's key policy instrument was the interest rate. The interest rate could not become a critical policy to help allocate resources between domestic saving and spending (both for consumption and investment) as long as the key economic policy was dominated by low-interest rate policies. Such a policy domain was vetted by formal policies of low interest rate lending to encourage credit use by favored enterprises, by an over-valued exchange rate policy that was determined by exchange rate controls and import controls, and by other industrial and development policies related to money and credit.

When I became chairman of the National Economic Council, one of the key policy issues that I tried to influence early in my tenure was the reform of the anti-usury law. I created an inter-agency task force that included the Central Bank. The key official from the Central Bank who was the embodiment of the interest rate orthodoxy then was the deputy governor, Amado Briñas, who defended the existing policies. One of the first presidential decrees that led to the reform of the anti-usury law during the martial law economic reforms in late 1973 was the decree that abolished the ceiling on lending rates. There was no doubt that helpful support of that amendment came in part from Benito Legarda's support of the reform.

Another example of the orthodoxy probably started from the nationalistic belief that Filipino-owned banks formed the bastion of a good development strategy. As a result, the early Central Bank, probably under political signals from national leadership, developed a commercial banking system that was essentially inward-looking, like that of the industrial strategy of import substitution of those days.

Under this essentially Filipino First strategy, the number of commercial banks owned mainly by Filipinos grew in numbers. It was easy to become a banker. On the agricultural and rural side, the promotion of rural banking through the expansion of rural banks in many provinces happened. The flow of credit for agriculture and industry was initiated by the government banks—DBP, PNB, ACA (Agricultural Credit Administration)—managed of course by the central bank's support of credit policies. The commercial banks expanded only through access to international banking as correspondent banks of foreign banks. And foreign banks were limited only to the Citibank (then the First National City Bank), the Standard Chartered Bank, Hong Kong and Shanghai Bank, and the Bank of America. Foreign trade, therefore, worked through a system of the large government banks, the four foreign banks, and correspondent banking with small Filipino owned banks.

Under this setup, the country's banking system was also constricted by its relatively insular nature. The financial system, including the banks, supported the inward-looking approach to industrial development strategy, Filipino First nationalism. It was only in the mid-1970s that serious reform of the domestic banking system took place when the Monetary Board[8] decided to require an expansion of the capitalization of the commercial banks and to allow the establishment of universal banking. Essentially, this required the entry of foreign banks because the local banks that were too small, most being family-owned, and could not arrange a capital buildup were either forced to merge with other banks or to accept foreign bank equity. Even then, this expansion had to be done in gradual steps and on a voluntary basis on the part of the banks. Only limited foreign equity was allowed and only an orderly entry of foreign banks was arranged so that this was distributed, for balance, among international banks from the US, Japan, Europe and ASEAN.

In this work, staff from the Department of Economic Research was heavily involved. Hearings were conducted with the stakeholders in the banking system, with experts from various sectors of the economy. Armand Fabella was involved as consultant and, of course, Benito Legarda Jr was the chief worker from the central bank. Such reform work also involved support and advice from the multilateral institutions, principally the IMF and the World Bank.

Legarda was essentially as high staff officer and adviser, not policy-maker. But his contacts within the system of technical discussion were on a high order of access. Deep in a hierarchical bureaucracy, much of the work of any good

[8] By this time, the Monetary Board had been reformed to make the Central Bank governor the chairman, with members of the board reconstituted retaining the Finance minister and including the NEDA director-general, and the Board of Investments chairman as ex-officio members, and also Cesar Zalamea, appointed member from the private sector. The financial reforms involving essentially the Central Bank during this period are described in my biography of Cesar Virata through four decades of Philippine economic history [Sicat 2014: chapter 9].

technician is in the form of oral and written communication, Thus, reports, memoranda, and the analyses imbedded in them mattered. Until we get a good record of the economic affairs of those years, and lacking in-depth studies and records of major issues, it is not possible to get a good picture of individual contributions. He was a junior economist in the early Cuaderno years; by the time he returned in 1955 to rejoin the Central Bank, he was already considered the premier economist of the bank at the Economic Research Department. Indeed, he had become the substantial senior economist at the bank from that time on.

Once Benito Legarda became the assistant director of the central bank's research department, despite the fact that he had seniors above him in the hierarchy—in the persons of Fanny Cortes Garcia and Escolastica Bince—he would become the most recognizable economist at the Central Bank. Leonides Virata who organized the department during the Central Bank's early years had long since left for the private sector.

By the 1970s, he had become Deputy Governor in charge of the economic research department. Central bankers are bankers cum regulators, finance and treasury specialists. At that point, he had become the most senior career official considered next-in-line, among others of course. When Gov. Gregorio Licaros resigned in 1982 as governor of the Central Bank, however, succession went to Jaime Laya. President Marcos had chosen his relatively young budget minister who had also been briefly deputy governor of the Central Bank. At that critical point in time, Benito Legarda, then 58 years of age, was already alternate executive director serving the interests of the Latin American bloc (which included Philippines) at the IMF's Board; he was certainly also an option for serious appointment for governor. Sometime later, a sudden economic crisis that shook the country in 1984 called for another turnover of the governorship to happen. At that juncture, the man of the hour was private banker, Jose (Jobo) Fernandez, a personal friend and cousin of Legarda. Thus, the most-wanted prize that any career central banker could have wished for evaded him. Instead of moving to the private sector, an offer to join the Finance Ministry as economic adviser enabled him to continue involvement with government, this time working mainly in the Embassy in Washington DC Some of the work involved support of Philippine interests in the IMF where he stood as alternate executive director, for a term, appointed from his perch at Finance, representing the Latin bloc to which the Philippines was aligned. (He describes part of this work in his short essay, "The Minister and I".

As recounted by him in "The Minister and I", Legarda did extensive work in support of Philippine international diplomacy during the negotiations of North-South dialogues under UNCTAD (United Nations Conference on Trade and Development) and in the Development Committee of the World Bank while assisting Cesar Virata in this role as Finance Minister. This was excellent support of the Philippine positions in international meetings. This was an outgrowth

of his work in the Central Bank. Much of the negotiations being done with the international agencies that involved the Central Bank involved the Department of Economic Research where he worked as lead honcho.

3.2. The Philippine Economic Society

The quote[9] below was how Benito Legarda described the beginnings of the Philippine Economic Society.

> "The Philippine Economic Society is the formal outgrowth of a discussion group which was formed by several economists in 1956 and for a few years went by the name of Social Economy Association. The members of this informal group were for the most part young men who were beginning careers in the academic world, in government and in business. The major concrete achievement of this group was the study of joint international business ventures in 1958, as a research project for Columbia University. ... At that time, as at present, there was a fertile field for more popular sort of economic discussion and controversy in the daily and weekly papers, but there was no forum where economic issues were discussed regularly on a professional level."

The first two postwar Filipino PhDs in economics were Amado A, Castro and Benito Legarda Jr., who both received their degrees from Harvard University.[10] Castro, of UP, returned to the country in 1954; Legarda in 1955 went back to his job at the Central Bank. Other early economists were Armand Fabella who received an undergraduate degree in Economics from Harvard and took graduate studies at the London School of Economics, and Sixto Roxas who had a master's from Fordham. The leaders were mainly new US-educated postwar graduates of economics who studied and returned home. There were also MBA-types among them. Outside of work, they became active in the Jaycees, writing opinion columns in newspapers on business and economic issues. All of these young professionals were already making a name for themselves in their respective engagements—in academe, in government, and/or in the private sector.

The decision to form the Philippine Economic Society was cemented after the visit to Manila of a team of officials from the International Economic Association headed by its president, Howard S. Ellis, and its secretary-general, E.A.G. Robinson. Armand Fabella, who was the enthusiastic organizer, got the group together, set up the articles of incorporation. They decided to organize the Society

[9] This was taken from the foreword he wrote as editor of the *Philippine Economic Journal*, when the first issue came out. Further elaboration of the beginnings can also be found in my own article, "The early years of the Philippine Economic Society", [Sicat 1974] in the same journal.

[10] There was, probably (because he could have been a prewar graduate) another postwar Ph.D. who arrived in the country ahead of Dr. Castro. But he had a degree in agricultural economics, which in those days was often classed more with other sciences associated with agriculture. Moreover, Dr. Amando Dalisay was principally with the Los Baños group and had little interaction with the Economics group that grew out of Diliman and the metropolis that was Manila.

by electing Fabella the president, Castro, the vice president, and Roxas the secretary-treasurer. Michael McPhelin, SJ, another PhD-educated economist from Harvard University who was in the Ateneo faculty, was a member of the Society's executive council. The post of editor of the *Philippine Economic Journal* (PEJ) was assigned to Benito Legarda.

An informal rule that the organizers agreed upon was that the presidency of the Society was to be held only for one term with election being made annually. They foresaw that the profession of economists would grow in numbers from professionals who worked in the universities and research institutions, from the government agencies, and from various parts of the private sector—finance, industry, commerce, and even from international institutions. The founders decided that two officers of the Society that would have longer terms were the Secretary-Treasurer, to keep records and finances over time, and the editor of the journal that was to be published by the Society. Soon after, however, Sixto Roxas, who rose to national prominence under the presidency of Diosdado Macapagal, had to yield the post of Secretary-Treasurer to Quirico Camus, who served the Society for at least a decade. But the presidency of the Society would turnover every year.

Within three years in succession, the presidencies changed from Fabella to Castro to Legarda. The last informal rule the founders adopted at the birth of the Society turned out to be a wise decision. It allowed for change as well as continuity. No leader could feign demand for continued stay-in as president by membership demand. Some learned societies, like the earlier Philippine historical societies, suffered declines in membership and followership because of the failure to change leadership. Experience showed that lack of turnover in leadership either encouraged schism among the members or a collapse of the project because of the growth of alternate clubs.

In fact, the founders guessed rightly that the future would open to an expanding field of members from a growing profession and that the Society was a vehicle to harness them together. Within the first half decade, the growth of the society's population of highly qualified professional economists would increase. At the lead was the birth of the University of the Philippines School of Economics, where several economists would return from their studies with a PhD (and the schools where they studied noted): Jose Encarnacion, Jr. (1961, Princeton), Agustin Kintanar Jr. (1962, Yale); Richard Hooley (1962, Columbia); and myself (1963, MIT). And the School would prosper in numbers as later generations of economists emerged partly because it was the leading educational institution for them in the country. Edita Tan (1967, UC Berkeley) would join four years later. By the early 1970s, more economists at the School would trickle in to beef up the faculty. Led by Mahar Mangahas (1970, Chicago), Romeo Bautista (1970, Yale) and Gonzalo Jurado (1970, Wisconsin), a long train of second generation economists who had trained at the School's master's program and of other graduate universities in the US would follow.

There were also a number of economists who would return to their institutions from their studies and other engagements. Placido Mapa, Jr. (1962, Harvard) would return to the country in the banking sector. Also, Bernardo Villegas (1963, Harvard) would go back to La Salle by 1964 from a further year in Barcelona, Spain.

3.3. The Philippine Economic Journal

The journal was important to the image of a professional society. For that signified that there is an active society and that it could support the publication of a journal. In the first issue of the *Philippine Economic Journal* (PEJ), the founding editor of the journal, who signed his studies then under the name Benito Legarda y Fernandez [Legarda 1962], wrote in a foreword:

> "The Society launches this Journal at an exciting period in our history. The country is on the march economically, socially and politically. We are living through an era which promises to be a watershed in modern Philippine economic history and which has already been labelled in responsible circles the take-off into industrialization. Considerable progress has been made in the past, and the future holds even greater promise, but serious problems must still be faced and overcome. At such a time, there is more need than ever for a professional journal where economists interested in the Philippines can record their thoughts, impressions, and expectations, and where they can display the fruits of their research. Such a publication would, it is hoped, tend to raise the general level of economic teaching and discussion, and make substantial contribution to knowledge."

The first words under the masthead of the PEJ on its first page were those of Howard S. Ellis, of the University of California, who was the president of the International Economic Association, who wrote a message welcoming the journal. In the second paragraph of that short message, he said: "It was my privilege to be an academic visitor at the University of the Philippines in April 1960; and it has also been my privilege more recently, as an officer of the International Economic Association, to help to welcome the Philippine Economic Society as the latest accretion to the list of thirty-odd member organizations. It is still greater honor to participate in this introduction of this new journal to the fellowship of economists throughout the world."

The three years of Legarda's editorship of the journal showed a mobilization of contributions from economists at the Central Bank and at the University of the Philippines and some collaborative efforts from professionals within a broader social discipline. Some of the contributions were scholars working from abroad who were apparently known to him personally.

The first issue contained articles by the founders themselves: "Higher education in the Philippine setting", by Armand V. Fabella; "Foreign exchange decontrol and the redirection of income flows", by Legarda; "Necessary condition

for the take-off", by Gabriel Y. Itchon of the Central Bank; a review article on the book of Frank Golay, *The Philippines: Public policy and economic development* by Amado A. Castro; and two short notes, one by Jose Encarnacion Jr., of UP ("An export tax as an economic stabilizer"), and by Michael McPhelin, SJ, of Ateneo de Manila on the US aid program in the Philippines.

In later issues, he was able to draw on more steady contributions from UP economists Richard W. Hooley, Agustin Kintanar, this author, and from statistician Tito A. Mijares; agricultural economists from UP Los Baños like Orlando Sacay and Nathaniel Tablante; tax analysts from the government like Angel Q. Yoingco and Ruben F. Trinidad; also from Edgardo P. Zialcita, Roberto Y. Garcia, and Ramon Tiaoqui, his colleagues at the Central Bank.

Legarda's circle of peers in economic history and in the broader social sciences were also recruited by him to contribute to the PEJ. In the three years of his editorship, he was able to extract participation from them. Some of these scholars were economists, sociologists, historians. The list, both included, foreign and Philippine-based scholars and Filipino scholars, among others: Thomas R. McHale (who wrote on religion and development); William Henry Scott (Sagada rice growing); Edgar Wickberg (a review of a book on the Chinese in the Philippines); Augusto Caesar Espiritu and Mary Hollnsteiner (comments on McHale); Serafin D. Quiason (UP historian, on English country trade with Manila prior to 1708); and Alfonso Felix Jr. (a practicing lawyer contesting with McHale, Espiritu and Hollnsteiner on religion and development).

He also took care to make use of his command of economic history by writing incisive book reviews on recent publications. In volume 2, number 1 of the PEJ, he reviewed a Yale University publication edited by Thomas R. McHale and Mary C. McHale entitled *Early American-Philippine trade: the journal of Nathaniel Bowditch in Manila, 1796*. He knew this subject well and had used it in his research on *After the galleons.* Nathaniel Bowditch was an American scientist who took a voyage on an American vessel that traveled the Philippine-American trade route. He kept a journal with extensive sections that dealt with his visit to Manila. This, as Legarda observed in his six page review, represented the earliest American description of the Philippines by a Yankee. Also, in volume 1, number 2 of the PEJ, 1962, he reviewed a book by Pierre Chaunu. *Les Philippines et Pacifique des Ibériques: introduction méthologique et indices d'activité*. He began his five page review thus: "This book is a major addition to the almost barren field of Philippine economic history largely because it combines history, theory and statistics systematically, in contrast to the predominantly narrative, descriptive or episodic efforts which have heretofore characterized this line of study."

Benito Legarda was the editor of the PEJ for three years. By the third year, the PES as an organization had, as of December 15, 1963, 124 members on record. In 1964, he had already succeeded to the presidency of the Society. Increasing responsibilities in his work at the Central Bank pressed him to seek relief from

the editorship. His colleagues in the executive board yielded to the request. That was how I became the second editor of the PEJ which I carried out for the next 10 years, until 1974.

What is important next is to clear up why the *Philippine Economic Journal*, the journal of the Philippine Economic Society, disappeared from the annals of the Society or is now called the *Philippine Review of Economics,* its successor. This point might be minor history today but it deserves a footnote of explanation or else it will forever remain untold and become a black box in the annals of the Society.[11] Another footnote, perhaps more important to Legarda's legacy because it affected the central bank, is the date of the founding of that institution after its reorganization in 1993.[12]

3.4. Economic history and history in general

His doctoral dissertation study was a topic in economic history: Philippine trade and economic expansion during the nineteenth century. Returning to work at the Central Bank, it became clear that further immersion on his part in economic history would now be eclipsed by daily exposure to current economic issues of monetary problems and economic development policies. Thus, economic history was to become simply a digression if not a distraction. At best, it could be indulged as an avocation to make the leisure hours more productive. Memberships in professional societies, contacts with friends with a similar bent and other scholars was a solution.

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[11] When I returned in 1998 to the UP School of Economics from 13 years of absence working abroad, at the World Bank, I discovered that the PEJ had fallen on hard times. There was more rapid turnover of editorships after Mahar Mangahas (the third editor, who had done a good job of sustaining its pace as a professional publication) had left the post. The journal had difficulty coming out on schedule, and visibly, quality which should have been improving over time had dropped. The main reason could have been that the economic and political crisis of the 1980s had affected almost everything in the country, the Society's journal included. To remedy the problem, I suggested to Ruperto Alonzo, who was then the president of the Philippine Economic Society and who was also from the School, that the editorship of the journal be transferred to an institution steeped in economic research. This could be the UP School of Economics. Also, it was within the mandate of the Philippine Center for Economic Development (PCED) to assist the journal as an activity of the School. Ruping Alonzo succeeded in getting the Society's Executive Committee to accept this suggestion. This led to an agreement between the Society and the UP School of Economics that the journal of the Society would be a joint publication of the Society and the UP School of Economics. As part of the agreement, the name of the journal was changed to *Philippine Review of Economics*. I was against this change. I cited the case of Oxford Economic Papers that had adopted a new numbering series to accommodate the disruption of its publication during war years. However, the Society went on with the name change to *Philippine Review of Economics* from that point in time. That as a publication, it did not make a correction, the *Review* represented a continuity (or discontinuity?) from the *PEJ*. This gap in information needs to be corrected. The new *Review,* I am happy to say, has thrived and is along the path of sustainability as a journal for the Society.

[12] When the Philippine central bank was restructured in 1993 as an aftermath of the country's economic crisis of the mid-1980s, it was renamed Bangko Sentral ng Pilipinas (BSP). Then the bank management under Governor Gabriel Singson reset the founding to 1993 and even redesigned a new logo for the bank. As I argued in my column on that particular point, it was an egregious error that tried to reverse history. Governor Amando Tetangco set the matter right by returning to 1948. See "The Philippine central bank", reprinted in Sicat [2013: 138-143].

Early in his career as central banker, he took a keen interest in old Philippine churches that were built during the Spanish colonial times. He therefore decided to write about his observations on these churches especially those found in the Ilocos region. He published the study in a journal published by the Ateneo de Manila.[13] That work helped to stimulate more interest in local church history (and consequently, church tourism) around the country. Late in his golden years, he would return to this topic. He would expand it into a more historically nuanced discussion of the many churches around the country along architectural and other cultural aspects. Built during the Spanish colonial times, the churches embodied the various influences of religion, different cultures (both local and foreign), and the availability of building resources within the locality. This study is embodied in a concise but well-illustrated coffee table book full of recent color photographs of these churches published posthumously by the Ortigas Foundation.[14]

Economic history and central banking at least could intersect in an interesting way in the story of how economies grow. An idea that Benito Legarda thought interesting was to have a museum that provided a narrative of how commodity money like useful products, metals, gold and jewelry like gold trinkets evolved into coinage and other forms of money and how different kinds of paper money developed as means of payment in all economies. It was Benito Legarda who suggested to Governor Gregorio Licaros the idea of a money museum. Thus, the Money Museum was born in 1974. The museum assembled displays of artifacts that filled a cohesive story of how money evolved in use in the country. Such historical panorama helps to spice up international and local conferences on finance and economic development that were often sponsored in Manila. The museum was built in a historically hallowed place—the tiny and old Spanish fort of San Antonio Abad—that was itself located within the Central Bank's headquarters on Roxas Boulevard

The museum project must have brought him personal happiness not only because it became a reality. Governor Licaros appointed Angelita Ganzon de Legarda, his wife, as the museum's first director. She was a medical practitioner but she was, additionally, an expert in numismatics, the collection of coins and other things monetary. Legarda consciously did not participate in the operational activities of the museum, but he was prudent to suggest acquisitions for the museum to enhance its collection.

Benito Legarda Jr.'s masterwork in economic history grew out of his dissertation, *After the galleons: foreign trade, economic change and entrepreneurship in the nineteenth-century Philippines*. The study remained unpublished for four and half decades until 1999 when the Ateneo de Manila University Press published it in cooperation with the University of Wisconsin-Madison Center for Southeast Asian Studies. When he engaged himself in the

[13] See Legarda [1960: 121-158].
[14] See Legarda [2020].

project of revision of the original study, he found out that the effort took more time than he had planned. The revised version became more than one of just sprucing up the original study. He confessed in the preface to the book that it had "considerably more detail" than the original work. The bibliography added a massive update of new writing on the subject matter of the book.

Legarda received advice and supervision from Alexander Gerschenkron and, later, John King Fairbank when he wrote the study as a graduate student. These two were the substantial historical authorities on his subject matter in the university. The former was then the university's economic historian in residence and the latter an authority on East Asian history at the history department. His research was carried out along Joseph Schumpeter's line of research on entrepreneurship and economic development.

When he decided to prepare the study for publication, he got encouragement from an old friend Henry Rosovsky (an economist and then Harvard graduate dean of Arts and Sciences) and from Jeffrey G. Williamson, the reigning Harvard economic historian in the 1990s.

As I wrote these lines, I recalled during my graduate student years at MIT—perhaps in 1960—having read an article of Legarda in a Harvard journal on entrepreneurial explorations. Not finding this article in the expanded bibliography of *After the galleons,* I asked the UP Economics Library to track it down. The article was found.[15] It was a section lifted from his dissertation. The acknowledgement in the footnote to his parents and the Central Bank's Monetary Board also solved a quandary on my part. Wisely, Legarda was able to shift part of the cost of his graduate studies from his parents to his employer even if it was not a bothersome problem for his family since the Central Bank could support graduate studies for promising staff and he became eminently qualified.

That journal piece was about American trading entrepreneurs plying the China-Philippine trade routes. The article introduced the topic as follows: "In the nineteenth century, roughly between 1820 and 1870, the Philippines was transformed from a subsistence economy to an agricultural export economy." This observation was repeated in another article from his doctoral study, this time published in the Philippines[16] in the now defunct periodical, *Solidarity, a* periodical of the La Solidardidad bookstore that writer F. Sionil Jose owned. In the heady early days of the 1960s, Filipino writers like Legarda, Onofre D. Corpuz and others supported such publications with their articles.

During the 1990s, after he had moved back to the Philippines from his life in Washington DC he went on with a career in public writing on important episodes in Philippine history. His vehicle for this was facilitated by contributing historical columns to periodicals like the *Philippines Free Press*. This led to works on his

[15] See Legarda [1957].
[16] See Legarda [1967].

family memoirs during the Japanese occupation, the emergence of the Philippine-American war, and various writings on history and on Jose Rizal.[17] He stopped writing his regular columns on history as he began to surpass the octogenarian phase of his life.

It is but one step away from details of history to special knowledge about ancient maps. Benito Legarda was also naturally adept on the subject of Philippine ancient maps. He had collected old maps about the country since the 1960s. He was one of the few reliable authorities on Philippine historical maps. Specifically and along with Jaime Laya, Albert Montilla, Peter Geldart, and Rudolf Lietz, he was one whose opinion was sought and respected.[18]

3.5. More than economics

In the Washington DC area, a Potomac Facebook exchange noted Benito Legarda's passing with a well-researched and admiring notice. [19] I pick a few items from this notice to build upon the subject of Legarda's origin and long-time association with the world of music.

Benito Legarda Jr. came from a family who served the Philippine government with distinction in the early years of American colonial rule. His great-grandfather, after whom he was also named, was an early Resident Commissioner in the US and was a mentor to the younger Manuel L. Quezon who assumed the same position in 1909. Benito's roots in Washington DC continued to his youthful years, for he took his undergraduate degree from Georgetown University before he went to Harvard for his graduate studies leading to the PhD. His family was highly endowed both on the paternal and maternal sides.

From the maternal side, Benito's great-grandfather Benito was a Tuason; his own father Benito (a junior to this great-grandfather relation) was a Roces. In turn, Benito's mother's maiden surname was Fernandez. The Legarda, Tuason, Roces, and Fernandez families belonged to long established land-holding and well-to-do clans in the country. The Roces kin dominated the journalistic industry in the country during the American colonial period, having owned the *Manila Times* for decades and highly invested in cinemas during their early heyday. The Tuason

[17] This led to publications that I have not seen in print but have read in parts in the print media periodicals: *The Hills of Sampaloc* [2001]; *Occupation* 1942 [2003]; *Occupation: the Later Years* [2007]; and *Eight Rizalian Miniatures* [2011].

[18] I owe this information to my son, Hans Sicat, a banker and an enthusiast and supporter of Philippine ancient map collection. I also sought confirmation from Jaime Laya, who did not contradict the information about himself and Legarda but made note of the fact that the last three mentioned names are active members of the Philippine Map Collectors Society.

[19] I received this information from my daughter, Jenny Sicat Crabbe, who is the current president of the Washington International Club, whose members include individuals associated with the diplomatic and academic community, including the Philippine embassy. She forwarded to me the Facebook entry mentioned above. It turned out it was written by Erwin Tiongson, an economist with Philippine roots who is a professor in Georgetown University. I build upon some information from this note to close this section on music.

family was a great land-holding family in the Quezon City area among others. Thus, among others, Benito was a relation of Alejandro Roces (a former secretary of education) and of Jobo Fernandez (banker and former central bank governor).

The Legarda family was highly connected to the cultural scene in the Philippines. His mother, Trinidad F. Legarda who was later appointed ambassador in the foreign service, was the benefactor and long-time supporter of the Manila Symphony Orchestra from the pre-war period. Soon after the liberation of Manila, on May 9, 1945, the orchestra reconvened surviving members of that orchestra and played a public concert in Santa Cruz Church. Herbert Zipper, Dachau survivor and the MSO's conductor of those years and early liberation period played with "whatever instruments they managed to borrow or preserve through the war years and played what we can only imagine must have been very moving versions of Beethoven's Eroica and Dvorak's New World Symphony. The program started at 7:20 pm and within minutes, the concert proper was underway, with the first thundering chords of the mighty Eroica signaling the start of a new era for the country". These were Benito Legarda, Jr.'s own recollection of the event, writing in 2005 from his own family memoirs of the Japanese occupation during the Second World War. There was a photo of that event published in the June 4, 1945 issue of *Life Magazine*. It showed him, the gangly young man in white suit, in the front row, second from right from an audience on the grounds of the church. That audience was composed of hundreds of Filipinos and Americans many of whom had endured the war period and of others who had taken part in Manila's liberation from the enemy.[20]

Benito Legarda had the good fortune to be born to a family steeped in service to country and to do good deeds. Certainly, it is easy to find the likes of young men sent to universities by their rich parents hoping to instill in them some ambition to make them useful citizens. In my life, I have seen many such young men squander their opportunities in pursuit of adventurous pleasures while in their studies. There were some born from such comfortable circumstances who were paragons of seriousness and direction. Benito's journey was steeped in pursuit of his educational goals. By 1948, he finished his bachelor's degree in social sciences at Georgetown University in Washington DC and in 1950, his MA at Harvard. After a two-year break from work in the Philippine central bank, he continued and finished his Economics PhD also at Harvard.

Among his contemporaries, there were some such young men of the rich who brought credit to themselves and served their country well. Among the contemporary economists of my time, Armand Fabella and Placido Mapa Jr. meet this criterion. There may be a few more—of which I am not familiar. But if we go to those who took shorter courses that led, for instance, to MBA degrees, there might exist a longer train of names.

[20] This paragraph was emphasized in the Potomac Facebook piece of Erwin Tiongson.

In general, however, the generations of economists that followed the Philippine post-independence period included many young men who found their way to American and other universities for graduate studies who could not have reached their educational goals without scholarship or financial assistance of some sort. These economists and professionals belong to the larger legions who obtained further educational opportunities because they owed part of it to external financial support and scholarships. Very likely, many such programs were tied up to government-run programs that were supported by donors of development aid to improve government capacity. In this, the availability of development assistance (both bilateral and multilateral) was important in the uplift of institutions and individual scholars. In some cases, they had the luck to be associated with institutions that received support from the likes of Rockefeller and Ford Foundations. Many more were associated with government training programs, such as those supported by USAID and other bilateral programs, multilateral scholarships, including Colombo grants. Still others from open and targeted grants from the Smith-Mundt and Fulbright programs that were relatively abundant in the early days of independence.

On his way toward his own personal development, Benito Legarda had met many Filipino students who were on scholarships financed by such programs, not family finances. His contemporaries at Harvard, Amado Castro and Onofre D. Corpuz were on such programs of scholarships. Perhaps all the University of the Philippines economists and others who have obtained distinction in their own field of studies in the university and elsewhere during the postwar era were certainly products of such programs.

An interesting side to Benito Legarda's life is the influence of music. He was born to a family that was almost umbilically-tied to the musical history of the symphony orchestra in the country. We recall that his mother was the president and patroness of the Manila Symphony Orchestra, before the war and during early independence.

His friendship with Amado Castro of UP probably got stronger, beyond economics, through their common love for music. So when Amado once pressed his own belief that the three Bs of music (Bach, Beethoven, Brahms) should really be four Bs (to include Berlioz), he went along. This was how he said it: "Having performed at the Harvard Glee Club and the Boston Symphony under Berliozian authority Charles Munch, I heartily agreed. Amado's musical path at Harvard differed from mine. (Through the glee club-Boston symphony connection) I got to do major works by Amado's four Bs in music. Amado pursued a more low-key path by joining the Saint Paul's parish choir and got the proper way of doing Gregorian chant." [Legarda 2017:178]

This brings me to my last thought, which to some extent, takes us again to economics or the politics of scarce resources. In the 1960s, the Philippine musical scene was dominated by the presence of a well-regarded Manila Symphony Orchestra in Manila. It seemed then that Manila was more musically advanced in that time than Singapore, Hong Kong, and Taipei. For then, Manila had the finest regional symphony orchestra. Rapid economic development over the postwar decades and a larger growth of the cultural budgets in these places must have accounted for the seismic change in musical scene and our relative decline.

During the first decade of the 2000s, Benito Legarda and Amado Castro would be seen as inseparable company as Manila's symphony orchestra seasons took place. There were two separate seasons held at different times during the year for two symphony orchestras—the Manila Symphony Orchestra and the Philippine Philharmonic Orchestra.

I had felt that it was unfortunate that Manila had two orchestras essentially competing for the same limited concert crowd and patrons when we could have a bigger season and a deeper reach into the community with one really good orchestra. Big cities usually have more musical talents and musical clubs but they have only one dominant orchestra. This setup led to a very vibrant cultural scene.

I did succeed one time to ask Benito Legarda the question why there were two orchestras, why there seemed to be a cleavage of the orchestra scene into two orchestras, having in mind what I had just said. Perhaps he heard me well. But perhaps too, in our old age, he did not hear me well, or I might have failed to ask the question well. He answered me that he and Amado would exchange season ticket invitations to the programs of the two orchestras. Amado had season tickets for the Philharmonic and he, for the Manila Symphony.

Perhaps, part of his answer to my question was imbedded in what he wrote in his memorial to Amado Castro in this journal, in which he said: "Many years or even decades ago, I had gotten Amado to serve on the board of the Manila Symphony… and we remained on the board until its president, my aunt… passed away in 1969. Thereafter a new leadership took over and Amado and I both bowed out of the picture." [ibid.]

I had wished, however, that he fully understood my question and that, with his tomes of knowledge of the Philippine musical world, he could have added clarity to the situation.

On the other hand, perhaps it was wise that there was no further elaboration. For I hold a view that the advance of the orchestral scene in the country, with two orchestras vying for the same limited concert crowd and patronage, reminded me very much of our economic progress in the course of decades. While we started well ahead of our neighbors at the beginning of the growth process or in musical initial conditions, for a number of reasons—some of which we could not control—today, we are following the footprints of their trail.

And this proposition would only have provoked a new and big discussion.

Dramatis personae ("Mostly in his own words"):

BLJ. Benito Legarda Jr.

GS, Gerry. Gerardo Sicat, author.

Amado. Amado A. Castro, Professor of Economics, UP; founding dean, UP School of Economics, in 1965; long-time friend of Legarda

Cesar. Cesar Virata, former Prime Minister Philippines, former Minister/ Secretary of Finance

Jobo. Jose B. Fernandez, Former governor, Central Bank of the Philippines

Jaime C. Laya, former governor, Central Bank of the Philippines,

Gregorio Licaros, former governor, Central Bank of the Philippines

Blas Ople, former Minister/ Secretary of Labor, Philippines

Jeff. Jeffrey G. Williamson, former Professor of Economic History, Harvard University; former visiting professor, UP School of Economics

John Power. Former visiting professor, UP School of Economics

Michael McPhelin, SJ, professor of Economics, Ateneo University during the 1960s to the 1970s.

Henry Rosovsky, Harvard professor of Economics and former dean of the Graduate School of Arts and Sciences in that university; a mutual friend and cohort of Amado Castro and of Legarda as graduate students.

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Dr. Benito Legarda, Jr. as economic diplomat

Cesar E.A. Virata*

I first met Benito Legarda—Beneting as he was known by friends—as a member of the Junior Chamber of Commerce of the Philippines, the Jaycees. After graduating with a PhD from Harvard University, upon the encouragement of Leonides Virata who met him in Rome, he joined the Department of Economic Research (DER) of the Central Bank of the Philippines (CBP). He started as an economist but he was to climb the career ladder to end up Deputy Governor until his retirement. It was Leonides Virata, who was the first Central Bank head of the DER and who happened to be my uncle, who told me about him.

In 1956, I resigned from my regular faculty position at the University of the Philippines to join SyCip Gorres Velayo and Co. to be part of its Management Services Division. This Division is similar to those of major auditing partnerships in the United States and Europe, which was in the early stage of formation. In 1958, Wash SyCip and Fred Velayo encouraged a few of us to join the Jaycees as part of our management development. That's when I met Beneting and Amado Castro, who was my economics instructor. As perhaps an interesting aside, that was also when Henry Sy, Sr. the owner of a shoe store in Carriedo Street called Shoe Mart, joined the Jaycees.

As Jaycees, we were required to join three or four committees so I joined the Economics, Government, and Youth Development Committees. Beneting joined the Economics and Government Committees. The Economics Committee met every week and published a column in the *Manila Times* on Wednesdays about what was discussed there. We would meet every Friday for lunch at Alba's Restaurant to discuss the draft column which was earlier prepared by the chair and edited on Monday in time for the Wednesday publication. Some of the topics included Philippine Long Distance Telephone Company (PLDT) and the country's poor telephone service, the entry of Filoil with Gulf in the oil refinery and gas distribution business, and the application of a US cement company to put up a cement plant that was to be located in a coastal area in contrast to Filipino-owned cement plants which were located inland.

The Government Committee published its column every two weeks in the *Manila Chronicle*. Usually, we discussed the business aspects in the Economics Committee. Some regulatory and policy issues affecting PLDT and the Government Telephone System (GTS) also became the subject matter of the Government column. We also discussed the competition policy regarding local and foreign investors. One good example was the banana business that was started in Mindanao.

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In these committees, both Beneting and Amado were very vocal about their opinions and that's how I got to know Beneting better.

My official relationship with Beneting began when I moved from the Board of Investments and was appointed Secretary of Finance on February 9, 1970. As such, I became ex-officio Presiding Officer of the Monetary Board of the Central Bank.

As head of the DER of the Central Bank, Beneting attended Monetary Board meetings. Beneting, of course, had been very aware of what was happening at the Central Bank. On my first day in office, I had only learned about the news that day from Deputy Governor Amado Briñas. Governor Licaros was on a mission abroad trying to reschedule the CBP's debt with the foreign banks because there were not enough foreign exchange reserves to service the maturing debt of the Central Bank. Deputy Governor Briñas handed me a photocopy of the government signed Letter of Intent (LOI) to the International Monetary Fund (IMF) for a Stand-By Agreement which included the reform of the foreign exchange system. I had been completely out of the loop on this matter. The only thing the IMF mission member had asked me when I was still Chairman of the Board of Investments was whether the copper mining industry was still profitable under the exchange rate of ₱3.90 to $US1. I replied it was.

I learned that Governor Licaros would only be back in eight days and I was concerned about a possible leak that might occur since the Central Bank was preparing the various circulars to implement the agreement with the IMF. Beneting told me later that he had a large group of staff members of the Central Bank prepare circulars in the belief that the Monetary Board was going to institute exchange and import controls, but at the same time he had gathered a select group to secretly prepare the circulars implementing the refloat of the exchange rate. That was how he was able to secure the information and prevent leaks that would have created disorder in the foreign exchange market.

I decided not to go to the Central Bank to avoid suspicion that an unusual change was about to occur. I was prepared to declare a bank holiday in the event of a leak. Fortunately, thanks to Beneting's strategy, there were no leaks. I moved the Monetary Board meeting originally scheduled on a Wednesday to Friday to give time for it to review and edit the circulars that were to be issued on Monday, and if needed the Central Bank supervisory group would have time to close the books of the banking system on Friday and Saturday so that no additional transactions could be made after official business hours.

On Friday at four o'clock in the afternoon I informed the President that the Monetary Board was going to refloat the exchange rate in accordance with the signed LOI to the IMF. I told him that I did not know at what rate the peso-to-dollar rate would settle. I asked him if he was ready to meet the consequences of the decision. He paused for a short while and he told me that if it was the best way to solve the problem then we should go ahead. From Malacañang, I went to the Central Bank to preside over the Monetary Board meeting for the first time. The agenda included the LOI to the IMF, the draft circulars to implement

the LOI that had been prepared by Beneting and his group, the circulars revoking the fixed rate of exchange, and the press release. I had one objection to the terms of the LOI and this was about allowing all luxury imports, which included high priced cars; I thought that that would not sit well with the general public who would not appreciate seeing the wealthy still enjoying luxuries while they would be burdened by the high prices of imports and inflation. As it happened, activists demonstrated and stones were thrown at the President after his State of the Nation address. We communicated this change to the IMF immediately so that they could make the announcement that the Philippine exchange rate had been refloated. Mr. D. Savkar, the IMF Director for Asia & Pacific, commented that the ink was not yet dry on the document and already I was changing it. But they agreed with the change. The Monetary Board met once again on Saturday to do a final edit of the circular and, although the Philippine banks had known the Monetary Board decision by then through their correspondent banks, on Monday the bank officials received the circulars.

The rate eventually settled at ₱6.45 to US$1. All this Beneting was privy to. Anticipating the inflation that would occur out of windfall profits, I went to the President to recommend that we impose an export tax of 20 percent. I told him that only he had the power to muster the support of all stakeholders on all that needed to be done to dampen inflation. Runaway inflation would have negated the positive effects of the float as an incentive to process export products and encourage domestic production while discouraging imports, thus correcting the balance of payments deficit. Thus, he called a meeting of all the sectors affected—the business sector, legislative leaders, bankers, cabinet members, and even some from the judiciary. The President explained the reasons for the Monetary Board action and appealed strongly for the adoption and passage of the export tax. As a result, there was general agreement among the conferees on the measures to be undertaken. The Department of Finance and the Tariff Commission together with the House of Representatives and the Senate Committee Chairs were tasked to prepare the implementing bills.

It was the Central Bank, through its Economics and Supervision departments, that monitored the exchange rate, the prices of commodities, inflation rate, and the changes in imports and exports.[1] For a time, it also put up a Debt Management Statistics unit to compile statistics on central bank indebtedness. This was to spin off to Debt Restructuring Office and the Trade Facility Office to handle central bank debt restructuring and trade facility obligations, respectively. There was also a Management of External Debt Department to look after the country's overall external obligations. As head of the DER of the Central Bank, Beneting was deeply involved in all of these.

[1] See Valdepeñas [2009]. In particular, see Chapter 3 by Dakila, Delloro and Redoblado [2009:182-184] and Chapter 4 by Suratos and Cintura [2009:209-211, 212-223]. I am not aware whether Dr. Benito Legarda, Jr. was consulted by the editor.

The Central Bank examined the banks' capital position as far as external debt obligations were concerned as well as the accounts of the companies with foreign exposure. The reports were forwarded to the Monetary Board on a weekly basis, which led to the formation of a study group to reform the central banking system. This study resulted in the adoption of the Directors, Officers, Shareholders and Related Interest (DOSRI) rule, prohibition in lending without sufficient collateral, the stoppage of the Treasurer of the Philippines from depositing government funds with the private banks to augment their working capital, and the stoppage of the issuance of new banking licenses. Increased capitalization was required and it allowed mergers including investment by foreign banks up to 40 percent of the capital of domestic banks. The Central Bank also mandated the increase of private bank board members to 15 to avoid loss of face during the merger or increase in investments of shareholders' groups. In addition, the Central Bank asked the IMF to form an international study group to update it on current and future developments.

Meanwhile government budgetary hearings were ongoing. The total budget for 1971 was ₱4 billion—₱3B for salaries and wages, maintenance, debt service and the remaining ₱1B for infrastructure—school buildings, roads and bridges and irrigation. The population at that time was 36 million growing at 3.3 percent per annum. Thus, the budget allocation per person was ₱110 per annum. The total budget was incredibly small and the legislature did not even introduce any revenue measures—not even expanding coverage of withholding taxes. Clearly, there was no funding for development.

As Secretary of Finance, I concluded that there was no chance to develop the country under such severe budgetary constraints and that a development budget was badly needed supported by international assistance. The legislative branch should also be pressured to pass revenue measures to serve as counterpart funds. We discussed with the World Bank (WB) the formation of a Consultative Group for the Philippines under the chairmanship of the WB, which was readily approved by their Executive Board. I invited Beneting to join the Consultative group meetings because we also met with bankers the day after the governmental meetings. It was good to have a high-ranking Central Banker explain its position on the matter.

In all these and succeeding WB and IMF related meetings, I valued Beneting's presence—not only because of his professional expertise but also because of his ability to speak Spanish. He was of immeasurable help in private talks and in meetings with bankers from Latin America and other Spanish-speaking nations—especially since we were grouped together with Latin America in the WB. He was helpful in my election as chairman of the WB Development Committee in 1976 after the term of the African minister ended. Its counterpart at the IMF was the Interim Committee. The Development Committee is composed of finance ministers of developing countries and ministers in charge of development assistance in the case of developed countries. The Asian and Latin group led in the nomination of the Philippines for chairmanship so it was an easy win. Two years later, I was re-elected chairman.

In 1971, at the behest of CB Governor Licaros, the IMF formed an International Banking Survey Commission that included representatives from the IMF. Reforming the Central Bank and banking regulations were urgent issues because of political developments, globalization, and new demands from business such as longer-term funding. It was chaired by Armand Fabella and co-chaired by San Lin, a Burmese economist, head of the Asia Department of the IMF. The former Director General Ernesto Fernandez Hurtado of the Bank of Mexico, Edward Dervichan, a banker from Belgium, who had broad experience in foreign exchange transactions, and Kanesa Thasan from Sri Lanka, who was the IMF representative in-charge of the Philippines, sat as members of the Commission. The Philippine panel included Jose B. Fernandez, President of the Bankers Association of the Philippines, and Deputy Governor Amado Briñas, whose alternate was Benito Legarda, Jr., Special Assistant to the Governor. Towards the end of 1972, the study group submitted its report which contained 99 recommendations to achieving five reform objectives:[2] 1) stopping the proliferation of more commercial banks, letting existing banks grow bigger and more efficient by establishing more branches; 2) simplifying the classification of banking institutions from five to three; 3) expanding authority of the Central Bank not just over the monetary system but over the entire financial and credit system; 4) redefining Central Bank primary responsibility as maintaining monetary stability; and 5) granting the Central Bank more flexibility in exercising its powers to maintain monetary stability. These recommendations were approved by the Monetary Board and submitted to the President for enactment.

Martial Law was declared on September 21, 1972 and the Constitutional Convention submitted its proposed 1973 Constitution for ratification to the President who issued a decree that barangay assemblies would ratify the 1973 Constitution. In 1973, the Philippines started to prepare to host the WB/IMF annual meetings in 1976. The CB focal point was the construction of the Philippine International Convention Center. There was no international convention facility in Asia except hotels and the International Conference Hall in New Delhi. In Manila, English was widely spoken; people were hospitable; and there were many opportunities for delegates to enjoy the beauty of the islands before and after the annual meetings. This was to be a big boost to promoting tourism. The conference would bring high-level officials and their staff and help promote investments. All told, it was a good project because of its multiple business effects.

Unfortunately, in 1973, the oil-producing exporting countries formed a cartel, the Organization of the Petroleum Exporting Countries (OPEC), which increased oil prices from US$2 to US$7 a barrel at once. The Iran/Iraq war followed, and progressive price increases took effect up to US$36[3] in 1981. This caused worldwide inflation and at the same time low-income developing countries which relied on imported oil for energy requirements suffered from currency depreciation. In the US, the federal funds rate was increased by the Federal

[2] Landingin [2017:173-187].

[3] In terms of the current dollar price of oil, this would be over US $80 per barrel.

Reserve Board from the usual five percent to six percent up to 22 percent to solve their inflation problem brought about by the way they financed the Vietnam war which ended in 1975 upon the withdrawal of American troops. The parallel increases of oil prices and the lending rate of international banks which reached 25 percent—were knock-out punches for countries importing oil and borrowing foreign exchange for their requirements. What a contrast with the federal funds rate at present of 0.25 percent and the negative rates in some countries in Europe.

The Philippines was 95 percent dependent on fuel oil for its energy requirements in 1973. The Muslim problem in Mindanao was another factor to consider. The OPEC decided to cut our oil allocation by 25 percent due to our problems in Mindanao so we had to resort to rationing.

Alternative energy sources were more expensive before 1973 because building dams took at least four years, exploring for geothermal areas was not easy and was a new process, and nuclear power plants required a long preparation to make them operational under international standards.

Considering these factors, it was decided that the Philippines should shift to coal (which was plentiful, cheaper and not dependent on Middle East politics), geothermal, nuclear, and mixture of alcohol and gasoline as energy sources in order to reduce the country's dependence on oil to about 50 percent. Direct solar energy was used for drying palay, peanuts, coffee, meat, fish, laundry and hay, not the way of solar panels generating electricity. This major shift required new capital outlays either by borrowing or attracting foreign investment.

The sudden changes in the world economy resulted in worldwide inflation and recession but at the same time the OPEC members accumulated cash which they deposited in western banks in Europe and in the United States. Since the western banks were awash with deposits from the OPEC, they required as a condition for lending large amounts a guarantee by either a government financial institution or a sovereign guarantee. The foreign banks did not like to lend directly to corporations because of the documentation requirements. The bankers also said that corporations can disappear but sovereigns do not. DBP and PNB extended guarantees to their clients until they exhausted their guaranteeing powers. The Philippine Guarantee Corporation was subsequently formed to provide guarantees to corporate borrowers. The Central Bank also borrowed to relend to the private sector because the Governor believed that it was part of their obligation to provide foreign exchange for the essential requirements of the private sector. This led to the rapid rise of public external debt.

In hindsight, the chart[4] below shows how the oil price increase affected the exchange rate, inflation, and the GDP. The rise in the federal funds rate resulted in defaults of countries due to withdrawal of funds and/or termination of bank lines.

[4] Statistics were obtained from Guinigundo and Cacnio [2019:30-43], Dakila, Alvarez, and Oliva [2019:83-84], Santiago [2019:109], Fonacier [2019:129], and Mañalac, Marcelo, and Guerrero [2019:205-206, 207-208, and 217].

Figure 1. Major Philippine economic indicators from 1965-1985

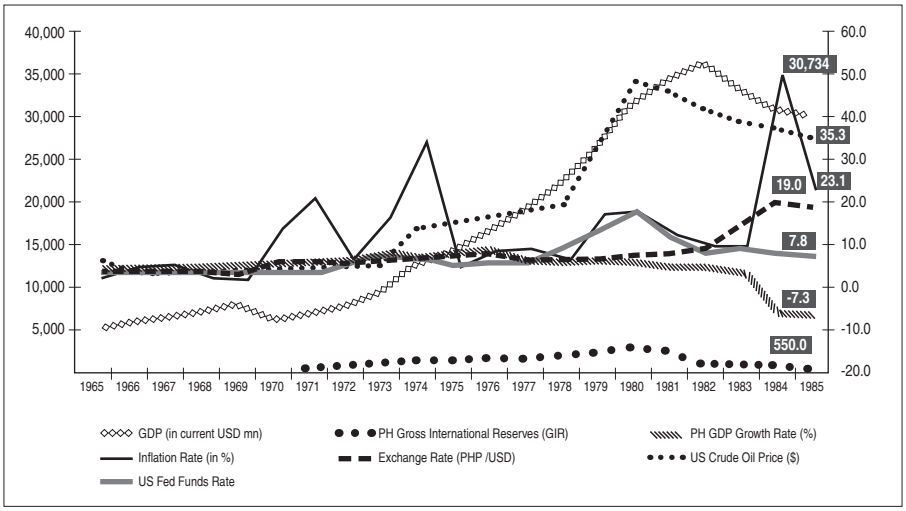
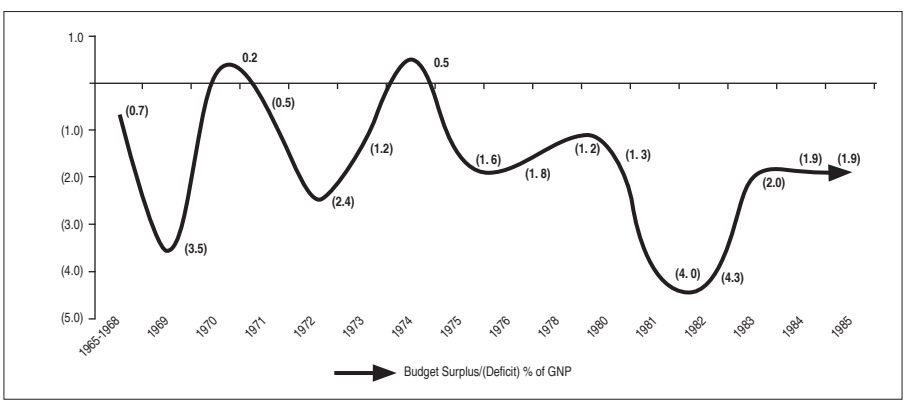


Figure 2. Yearly budget surplus/(deficit) from 1965-1985 (percentage of GNP)



Because of the magnitude of world problems, many international meetings were held to find solutions to problems of guarantees, defaults, cross border transactions, development assistance and poverty alleviation, and to discuss recovery measures.

With this as a background, I was elected Chairman of the Development Committee of the WB/IMF during the 1976 meeting in Manila. The main objective for the Development Committee was to introduce policy reforms in order to increase the development assistance to low income developing countries and to reduce protectionism of developed countries. With the OPEC move, things changed. Because of their excess cash, the OPEC countries now sided with the developed countries in the Development Committee which made it harder to get development assistance.

There was resistance against reducing protectionism in the developed countries because they considered the oil price increase as a world tax. Furthermore, the high-income countries also increased their tariff on imported goods so that the agricultural exports of developing countries were levied additional taxes. These countervailing actions resulted in world recession. It was during these meetings that I found Beneting's ability to speak Spanish vital in interpreting the Philippines' positions on varied issues to his friends and getting the support of the Latin American countries and Mexico.

I believed that the Philippine presence in the Executive Directors' Office to be a necessity since the Philippines availed itself of the facilities of both the WB and the IMF repeatedly. We needed to send relatively senior people to be appointed to that office. The IMF annual missions to member countries had four basic review objectives: 1) the financing of budget deficits; 2) the appropriateness of the exchange rate; 3) the stability of the banking system; and 4) policy reforms, such as on trade and industrial policies, financial policies on credit, and appropriate interest rates levels.

We were not comfortable with joining the ASEAN group at that time in both the WB and IMF because Indonesia had wanted the leadership of the ASEAN group for a long time and we were concerned that the presentation of Philippine interests could be overshadowed by several ASEAN countries which were producers of oil and gas. Therefore, we stayed with the Latin American group where the system of rotation in the leadership of the Executive office was fair.

In the IMF, we used our voting weight to find a place with different groups such as the Republic of China (Taiwan), South Vietnam and South Korea group and we proposed Dr. Placido Mapa, Jr. to be the Executive Director of that group for two years before the People's Republic of China claimed the seat. We then transferred to the Australian group when South Africa was ousted from the group because of the apartheid issue. The Philippines held the position of alternate executive director for the Australian group. At the same time, we were supported by the Latin American group during the Executive Board discussions about the Philippine situation. I recommended Beneting to hold that position but it was given to Dr. Antonio Romualdez. I appointed him instead as Finance Attaché in Washington DC. There he could keep me informed on all matters pertaining to both the WB and the IMF and other geopolitical problems. One example was when the IMF country review mission would confer with the Budget Minister asking about payroll adjustments due to inflation. The IMF considered such moves as reinforcing the forces of inflation like what happened in Brazil. However, when it came to the salaries of the IMF officers and staff, during IMF budget deliberations in the IMF Board, they would demand that their own compensation be adjusted to US inflation even though they enjoyed exemption from income tax. We were able to point out this difference in views because an inflation-adjusted payroll would result in higher charges for developing countries accessing IMF facilities.

As Minister of Finance, I was invited to be a member of international committees such as the Bretton Woods Committee, the Group of 30, the Institute of International Finance, the Rockefeller Tripartite Commission for Asia, the UN Economic Commission for Asia, and I became chairman of the Group of 24 Developing Countries. The WB and the IMF, the Asian Development Bank, the International Fund for Agriculture Development, and the Davos Forum also had their own meetings on special issues. The banking associations in the Philippines and the ASEAN had their annual meetings as well. Then there were invitations for lectures from universities here and abroad and presentations before press groupings in Washington DC and New York and Tokyo, bankers' international summer courses in Switzerland and invitations from US international banks and Eximbanks. All these required research and formulation of proposals regarding current and future issues. Beneting, together with my staff in the Ministry of Finance who had been exposed to international developments, such as Juanita Amatong, Ernest Leung, Victor Macalincag, Romeo Bernardo, and Cynthia Santos would do the research, compile their comments, or prepare replies or speeches and report those to me.

The problems, of course, continued. The defaults of Mexico in August of 1982 followed by Brazil, Argentina, and Chile were contagious. The Philippines suffered even as the public borrowing of the national government were long-term funds for development. The needs of the private sector, which were guaranteed by government financial institutions, bloated the total public debt. We tried to reschedule the maturities in March 1983 but this was rejected by the banks and we were told to wait for their decision after the WB and IMF meetings in Washington D.C. Considering that the banks were terminating their lines with the CB, I requested the head bank to provide us with funding to be able to clear with the Federal Reserve in New York on a daily basis. The international commercial banks chose to call a moratorium on October 17, 1983.

Before and after that date, other events took place. Benigno Aquino, Jr. was killed upon his return from abroad. The misreporting of the Treasurer of the Central Bank about an unsigned loan overstated the reserve position of the bank.[5] Preparations for the negotiations were made. International lawyers were hired and supporting teams abroad and locally were also formed. Jaime C. Laya resigned and Jose B. Fernandez was appointed Governor of the Central Bank. The Philippines had to secure a standby agreement with the IMF and additional support from the WB as a prerequisite for negotiation with the international banks, numbering 485.

The IMF was very strict about formulating its standby agreement so the government budget was slashed to bare essentials, not even enough to pursue the projects approved by the Consultative Group. This resulted in the Philippine GDP contracting by about ten percent for two years.

[5] See National Historical Commission of the Philippines [NHCP 2020:14].

The exchange rate went up to about ₱20 to US$1. Before the negotiated funds were credited to the Central Bank, we were concerned with the low international reserves so the government and the CBP ordered the surrender of all foreign exchange holdings of the banks in exchange for pesos. We wanted the foreign exchanges to be allocated to the high priority needs of the people.

All banks then were holding pesos and we were concerned about inflation so the CBP issued bills that fetched a very high interest rate good enough to bring the pesos back to the CBP. These were called "Jobo Bills". Because of this operation, domestic inflation subsided immediately.

During the debt negotiations, Governor Fernandez decided to stay in New York and call on both the US and European banks, whereas I stayed in Manila and called on Asian and Pacific and Australian banks. I had to go to New York several times to join the negotiations for better terms. The negotiations lasted up to May 1985 so the signing of the agreement with 485 banks was done in New York. There were a few banks that did not want to sign unless the Meralco debt was guaranteed by the Government.[6] In that case I had to call the President to get his approval to guarantee, which was given immediately. The agreement included new money from the banks and the release of loans from the WB and the IMF. At that time, the US did not disburse the rental payment for the use of the bases since they had decided to challenge President Marcos' administration.[7] Subsequently, during the investigations of the Marcos wealth in the US, I was asked by prosecutors why I was demanding payment, so I replied that as Minister of Finance it was my duty to collect what was due the Philippines.

Year 1986 marked the end of my government service and Beneting's as well. We had travelled a long, difficult road together. I got him as a consultant from the Central Bank. All throughout our journey together, not only had he been an invaluable help in the performance of my duties, but he had been a good traveling companion as well with his extensive knowledge of the history and culture of many countries and his love of music.

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[6] See Paterno [2014:73].
[7] See NHCP [2020:159].

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Economist, historian, and patriot: Benito J. Legarda 1926-2020

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One afternoon about twenty-five years ago, there was a knock on my Harvard office door, and Benito Legarda walked into my life. Ben had written his Harvard economics PhD thesis in the early-mid 1950s and then launched his career in central banking and financial policy. Meanwhile, his thesis on nineteenth-century Philippine trade and development was resting comfortably in the archives, where it was soon discovered by scholars and eventually became widely cited. Upon "retirement" some forty years later, Ben had the good fortune to meet up with Henry Rosovsky, a well-known quantitative economic historian who was famous for his Kuznets-like seminal work on Japan. By the 1990s and their meeting, Rosovsky had been chairman of Harvard's economics department, dean of Harvard's Faculty of Arts and Sciences, and had become the retired doyen of the Harvard community. Ben told me that Rosovsky had advised him about retirement life: "Now that you're retired, Ben, why don't you return to academic research? Indeed, why don't you revise your thesis for publication? And if you decide to do so, you should go knock on Jeff Williamson's door. I hear he has interests in the Philippines that stretch back to his participation in a Ford Foundation teaching program at the University of the Philippines School of Economics in the late 1960s." Thus, the knock on my door some twenty-five years ago.

It was a perfect marriage. I was then leading a team of quantitative economic historians analyzing the first global century stretching between the 1820s and World War I (Hatton and Williamson [1998; 2005]; O'Rourke and Williamson [1999]; Williamson [2006; 2011]; Bordo, Taylor and Williamson [2006]). Ben's now well-known *After the galleons* [1999] book fit right in with the comparative assessment of the first global century then ongoing. All I had to do to help transform the thesis to the book was to guide Ben to the more recent literature and offer a few tips on handling the data. As a very skilled writer, Ben had no trouble doing the rest. Oddly enough, I, the younger man, was playing the teacher's role. I say "oddly" only because of our age difference. But more to the point, I was soon the student since I learned so much about Philippine economic history from

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Ben and thereafter was pleased to cite *After the galleons* in my work dealing with Asian trade and development in the long nineteenth century.

As readers of this short note all know, Benito Legarda's commitment to Philippine history never wavered. Nor did his patriotism, as his subsequent autobiographical memoirs of the Pacific War and Japanese occupation attest. But I was even more impressed by Ben's continued efforts to cultivate a greater interest in the past in young Filipino economists.

In his absence, let me try to carry Ben's torch a little bit farther. To begin with, the young economist should know that the Philippine half-century between 1913 and 1960 is better documented than almost all Asian, African, and Middle Eastern nations due to the American imperialist introduction of what turned out to be excellent, detailed, and greatly underutilized censuses as well as extensive American occupational documents on agriculture, manufacturing, mining, transportation, health, education, prices, wages, labor markets and much more. Furthermore, the published censuses are detailed by barrio and municipality for all provinces.

The young economist should also note that the Philippines was subjected to much huge policy (including independence) and market shocks across the twentieth century, just the thing to help the economist assess causal impact. With the introduction of public primary schooling around World War I, who gained? Which families and which regions benefitted most: rich or poor? Did the rising supply of educated labor lower the white-collar skill premium, the gap between manual skilled and common labor, and earnings inequality two decades or so later? How do the interwar results compare with postwar results before the emigration boom in the 1960s and afterward? Indeed, did those interwar and immediate postwar investments in public schooling contribute to the emigration boom itself? And what about health? We have the mortality, sickness, and disease data as well as anthropometric evidence. So, who gained the most from the public health investments in the interwar and immediate postwar decades? Rich families or poor ones? Rich regions or poor ones? And how will the answers compare with the most recent decades? And what about some long-run evidence on the demographic transition across the twentieth century? Has the Philippines undergone different demographic behavior than the rest of Asia? If so, why? And what about terms of trade shocks induced by world market conditions? Everywhere in what we call the Third World, a relative commodity price boom favored the Third World across the late nineteenth century and up to World War I (In the Philippine case, sugar, tobacco, hemp, and coconut oil). That long-run commodity price boom turned into a massive bust across the interwar years. How did Philippine commodity-producing regions fare compared with their East Asian neighbors and elsewhere? How does this experience compare with the Korean War years or the years from the 1990s to the Great Recession? How has Philippine inequality behaved over the century since 1913? Did the Philippines undergo the same

"great leveling" (in the Philippine case, it could be measured only by earnings inequality) that rich countries did between World War I and the 1970s? Has it undergone the same steep rise in inequality since then as the rich countries? If its experience has been different, why is that so? And what about regional inequality? Did the American investments in health and education reduce per capita income gaps between provinces in the years before independence? (True, there are no provincial per capita gross domestic product estimates for the years before 1960, but the censuses have the provincial data to construct human development indices indices.) Have the last seven decades since independence seen less? If so, why so?

Answers to these questions would be especially timely given that economic historians are already busy collecting the evidence to answer them for China and the rest of East Asia.

There is no shortage of evidence for the Philippines out there. Why don't we have the answers? If age and mortality were not realities, I believe Ben would be leading the charge. We will miss his voice, but his legacy will live on.

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The nexus of nationalism and internationalism: the journey of a "diplomat" after the galleons

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After the galleons, Benito J. Legarda's masterpiece on socioeconomic transformation after the galleon trade, has enriched our knowledge of the semi-open colonial economy in the 19th-century Philippine Islands, which witnessed the rise of nationalism at the end of that century. In this paper, I shed new light on the nature of the Ilustrados' nationalism and their international activism by revisiting the life of the country's "first diplomat", Felipe Agoncillo, who battled in vain to achieve independence through a diplomatic channel. While class politics tends to be a focal point of the scholarly debate over the Ilustrados' nationalism, this paper highlights the international dimensions of their advocacy. Agoncillo's mission in the United States and Europe seems a reasonable option from our perspective, which has been shaped by the norm of modern diplomacy, but it was a risky adventure considering the overwhelming influence of imperialism. Why did Agoncillo conclude they had to send a mission? What kinds of negotiation strategies did they have? Combining Legarda's global insights on the Philippines' colonial economy with Agoncillo's ideational and actual travel, this paper reveals how Philippine nationalism and internationalism created a nexus whose legacy exists in current Philippine diplomacy, one of whose achievements was the award of the arbitration case over the South China Sea in 2016.

JEL classification: N40, N45, F50, F54, F68
Keywords: nationalism, internationalism, Felipe Agoncillo, diplomacy

1. Introduction

Benito J. Legarda's masterpiece on socioeconomic transformation after the galleon trade has enriched our knowledge of the Philippines' colonial economy, which witnessed the rise of Philippine nationalism at the end of the 19th century [Legarda 1999]. The enlightened ones (i.e., the Ilustrados) were the pioneers

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of Philippine nationalism but are often blamed for their "betrayal" in the midst of the Philippine Revolution (Agoncillo [1960]; Constantino and Constantino [1975]). More recently, scholars have revisited Legarda's insights for their studies on individuals' agency during the early globalization period (Anderson [2006]; Mojares [2006]; Hau [2017]; Thomas [2016]; Claudio [2019]). The interest of the earlier body of literature was in either a national or class collective identity, whereas later studies focused on individual agency. The later studies broadened the perspective beyond national boundaries by putting individual Ilustrados' thoughts in the contexts of anarchism, nation-building, cosmopolitanism, orientalism, or liberalism.

Following the development of the second group of studies, I shed new light on the nature of the Ilustrados' nationalism and their international activism by revisiting the life of the country's "first diplomat", Felipe Agoncillo, who battled in vain to achieve Philippine independence through a diplomatic channel [de Ocampo 1977]. Agoncillo's attempt shows the nationalist movement in the context of a type of internationalism in which nationalist activists (e.g., leading Italian nationalist, Giuseppe Mazzini) recognized the nationalism of other nations within the Habsburg Empire and fought together to defeat Habsburg imperialism (Mazower [2013]; Fujisawa [2011]). In the context of the Spanish Empire, the leading Ilustrado newspaper, *La Solidaridad* (1889–1895), had an international scope thanks to its correspondents in Havana, New York, and Saigon (Mojares [2006:456]; Claudio [2019:12]). Marcelo H. del Pilar and Jose Rizal, the leading figures in *La Solidaridad*, and several others organized the Propaganda Movement in Spain [Schumacher 1997]. While the propagandists appealed to the public by publishing strongly written arguments, Agoncillo negotiated directly with American government officials in Washington for recognition of Philippine independence. Agoncillo was a nationalist at the same time an internationalist in the sense that he believed in the meaning of negotiations among the nations.

Agoncillo's missions in the United States and Europe seem like reasonable options from the perspective shaped by the norms of modern diplomacy, but were risky ventures considering the overwhelming influence of imperialism and a possible military clash between the nascent Philippine Republic and the United States. This paper examines the reason for deciding to send a mission and the kinds of negotiation strategies they used.

Agoncillo first proposed sending a diplomatic mission in the midst of the Philippine Revolution (Agoncillo [1960]; Taylor [1971b:499-518]; Epistola [1996]; de Ocampo [1977]). Those who have promoted nationalist historiography take for granted that the revolutionaries understood diplomacy and modern statecraft and instead highlight tensions within the Hong Kong Junta and the internal struggle over the money the junta received from the Spanish authority.

In this paper, I am to reveal the nationalist movement's transformation during the second phase of the Philippine Revolution as well as the words and deeds of the revolutionaries who were on the frontline of the transformation. Due to United States (US) intervention, the Philippine Revolution suddenly became internationalized [Ueno 2015]. In the first phase of the revolution, the agendas were anti-colonialism, nationalism, and nation-building, whereas, in the second phase, they were broadened to cover state-building and diplomacy.

Cesar Majul wrote a masterpiece on the life and thoughts of Apolinario Mabini, known as the brain behind the revolution, which reveals the challenge encountered during the second phase [Majul 1996b]. In terms of state-building, Mabini strove to create revolutionary institutions that would support Philippine state-building efforts thereafter (Majul [1996a; 1996b]). For instance, Majul [1996b] highlights the government's role in Rizal's thoughts, which influenced Mabini's ideas. Both recognized the role of government in a society in which every person has a chance to be free [Majul 1996a:22-32]. In other words, Majul noticed that Rizal and Mabini had recognized not only liberation from colonial rule but also the Filipinos' liberty to govern their nation-state [Berlin 1969].

While Mabini attempted to give shape to a modern state in the nascent Philippine Republic, Agoncillo was in charge of the effort to achieve international recognition of the young republic. In addition, Agoncillo introduced Mabini to Emilio Aguinaldo, president of the Philippine Republic (Agoncillo [1960:223]; de Ocampo [1977:3]). Agoncillo served as the official representative to the United States, whereas Mabini served as the prime minister and foreign minister of the Philippine Republic, organized in Malolos. Mabini and Agoncillo strove for state-building in the country and recognition abroad for the nascent republic.

Revisiting Agoncillo's views—rather than those of Mabini, whose ideas distinguished scholars such as Majul [1996a; 1996b] have studied well—is important because Mabini did not necessarily share all of Agoncillo's views. Agoncillo and other revolutionaries in Hong Kong played a major role in the republic's foreign relations because Mabini was preoccupied with his job as prime minister and only had limited access to the external affairs of the Philippine Islands. The core question I address in this paper is how Agoncillo developed the idea of diplomacy at the birth of the first republic in Asia. Agoncillo was a lawyer, but not all lawyers were familiar with international law, let alone diplomacy. By looking at Agoncillo's actual words and deeds, I trace the origin of Philippine diplomacy at the end of the 19th-century. Combining Legarda's global insights on the Philippine colonial economy with Agoncillo's ideational and actual travel, this paper reveals the origin of the nexus of Philippine nationalism and internationalism, whose legacy can be found in modern Philippine diplomacy, with one of its achievements being the "victory" in the arbitration case over the South China Sea in 2016.

2. The Filipino diplomat in Hong Kong

Born in 1858, Agoncillo belonged to the generation of "national heroes" in Philippine history [de Ocampo 1977:35]. Among these revolutionary heroes were Marcelo H. del Pilar (born 1850), the founder of the Propaganda Movement in Spain; Jose Rizal (born 1861), the revolutionary nationalist writer executed by the Spanish authority; and Apolinario Mabini (born 1864), the brain of the revolution. They emerged during the socio-economic transformation in the late 19th century, which Legarda [1999] richly described.

The Philippine economy increasingly began to integrate into the early globalization during the 19th century. After the end of the galleon trade, the Spanish authority gradually opened various ports to other countries, which resulted in the "explosive" growth of export products [ibid.:334]. Resonating with the growing export economy, modern infrastructure projects emerged, one after another. For example, steam navigation arrived in 1848, a banking service by the Banco Español–Filipino (today's Bank of the Philippine Islands) began in 1851, and monthly mail delivery between Manila and Hong Kong started in 1854. Moreover, a regular, direct steamship from Manila to Spain via the Suez Canal was launched in 1873 and a cable service between Manila and Hong Kong began operations in 1880 [ibid.:337]. Manila was one of the most modern cities in Southeast Asia and was deeply connected with Hong Kong, an energetic colonial port city open to the world.

Almost all of the nationalist leaders enjoyed the best educational opportunities available in Southeast Asia [Legarda 1999:338]. Established in 1619, the University of Santo Tomas was reorganized in 1865 to accept native students to courses such as law and medicine. Thanks to commercial growth, the demand for office workers, including lawyers, increased. During the 1883–1884 school year, 232 law students enrolled, as compared to 68 students in theology and medicine [Furnival 1943:43]. J. S. Furnival, a British scholar–bureaucrat working for British Burma, concluded in his comparative study that Philippine education was "far ahead of any country in the Tropical Far East" in the 19th century [ibid.:44].

Legarda introduced a contemporary observation by a Filipino writer on the commercial port city of Taal (where Agoncillo was born) in Batangas Province that described the nouveau riche's "rococo splendor" thanks to the global coffee business [Legarda 1999:214]. Another record by a contemporary observer described the educational opportunities in Batangas: "Batangas during the time of Agoncillo was 'about the most intelligent and civilized area in the Philippines outside of Manila'" (Wenceslao R. Retana, as cited in de Ocampo [1977:44]). Legarda specifically mentioned the names of two Batangueños, Felipe Agoncillo and Sotero Laurel, as the representative beneficiaries of these educational opportunities, through which they found jobs in the colonial judiciary [Legarda 1999:338].

The Agoncillos were among the wealthiest families in Taal [de Ocampo 1977:37]. Felipe's parents and grandparents were *principalla*, and their house had a large library [ibid.]. The family sent Felipe to Ateneo Municipal de Manila and then to the Colegio de San Juan de Letran, where Felipe graduated with a Bachelor of Arts degree. He then enrolled in the University of Santo Tomas and graduated with the title of Licentiate in Jurisprudence in 1880 [ibid.: 52].

After working as an assistant at the Godines law office in Manila, Agoncillo returned to Taal to practice law. After having served as auxiliary fiscal (or prosecutor) of Batangas seven times, he was elected advisor to the Administrative Council in Manila in 1894 [ibid.:56]. De Ocampo asserted that the colonial authority expected the council to manage the tensions between the civil governor and the judge of the court of the first instance in Batangas after the local government's executive and judicial powers were separated (de Ocampo [1977:57]; Abinales & Amoroso [2017:xxxiii]).

Although the secular authority embraced this talented lawyer in Taal, the religious order, as represented by Fr. Julian Diez, the parish priest of Taal, cast serious doubt upon Agoncillo's loyalty [de Ocampo 1977:59]. In 1895, Diez organized 12 witnesses to show Agoncillo's "anti-Catholic and anti-patriotic activities" [ibid.]. This was the era of the Propaganda Movement, spearheaded by Jose Rizal's *Noli Me Tangere* and *El Filibusterismo*, published in 1887 and 1891, respectively, as well as *La Solidaridad* from 1889. The friars were afraid of the movement spreading throughout the Philippine Islands and tried to suppress supporters or possible sympathizers, with or without evidence. Diez was very afraid of the subversive atmosphere in Taal (and Batangas in general), which he believed was "a great liability to our Mother Country" [ibid.:64]. According to Diez, none other than Felipe Agoncillo led "the 'subversive group' of Taal" [ibid.].

After fighting this claim in vain, Agoncillo left the Philippine Islands for Hong Kong via Japan on April 28, 1896 [ibid.:68]. Hong Kong was "a heaven for Filipino deportees" who belonged to Filipino "subversive groups" after 1872 [ibid.:70] because it was the closest port city from Manila where entrepreneurial Filipinos could find business opportunities and had a cable and mail service with Manila, which allowed them to contact other cadres there. For instance, Jose Ma. Basa—who smuggled *Noli Me Tangere* to the Philippine Islands—lived in Hong Kong [ibid.].

When Emilio Aguinaldo occupied the commanding heights of the rebellion against Spain and formed a revolutionary government in Biak-na-Bato on November 1, 1897, Agoncillo became the most vocal voice for the independence movement among the Filipinos in Hong Kong. While Aguinaldo was in the negotiation process with the Spanish authority, Agoncillo contacted Rounseville Wildman, an American consul in Hong Kong, on November 3, 1897, to propose a military alliance against Spain (Kramer [2006:82]; de Ocampo [1977:72]). Agoncillo proposed that they form an alliance against Spain and requested a

shipment of arms and ammunition from the United States to the Philippine Islands, although Wildman declined his proposal (Agoncillo [1960:73-74]; Kramer [2006:82]).

Interestingly, Wildman recognized Agoncillo as a "diplomat" in an official report to the United States. In correspondence to the State Department dated November 3, Wildman reported, "Since my arrival in Hongkong [sic], I have been called upon by Mr. F. Agoncilla [sic], foreign agent and high commissioner, etc., of the new republic of the Philippines." Wildman continued, "Mr. Agoncilla [sic] holds a commission, signed by the president, members of the cabinet, and general in chief of the Republic of the Philippines, empowering him absolutely with power to conclude treaties with foreign governments" [Taylor 1971a:472]. Wildman left a positive impression of Agoncillo, writing that Agoncillo "was a very earnest and attentive diplomat", though he failed to spell Agoncillo's name properly [ibid.].

After Aguinaldo arrived in Hong Kong on December 29, the Hong Kong Junta supported by the Filipino Central Committee replaced the Revolutionary Committee organized by Agoncillo [de Ocampo 1977:73]. Aguinaldo and his fellow 26 revolutionaries established the junta using money they received from the Spanish colonial authority as a part of the Pact of Biak-na-Bato [Epistola 1996:3-6]. Tension seemed to exist between Aguinaldo and the old-timers in Hong Kong, who had already established their businesses there [Agoncillo 1960:140-141]. Basa and the Cortes family sought protection from the United States, while Aguinaldo and his followers were determined to pursue independence. Agoncillo worked in collaboration with Aguinaldo.

Aguinaldo and his followers continuously worked for Philippine independence during their stay in Hong Kong [Majul 1996:54-55]. Therefore, it is worth mentioning that Agoncillo recommended that Aguinaldo visit Mabini before the latter returned to the Islands (Agoncillo [1960:223]; de Ocampo [1977:3]). Agoncillo recognized Mabini's unique talent and played an important role in shaping the revolution's institutional dimension by introducing "the brains of the revolution" (i.e., Mabini), who bridged the revolutionary movement and modern state-building once he met Aguinaldo [Majul 1996].

3. The strategy for independence through diplomacy

3.1. The proposal for the diplomatic negotiations

Agoncillo proposed that Aguinaldo carry out diplomatic negotiations with the United States. He continued his role as an advisor to Aguinaldo after Aguinaldo returned to the Islands on May 19, 1898. For instance, Agoncillo recommended on May 28, 1898, that Aguinaldo change the form of the government to improve its international reputation. Agoncillo gently pointed out that the dictatorial form of the government Aguinaldo had established on May 24, 1898, did not "conform

to modern ideas of civilization" (Epistola [1996:50]; Taylor [1971c:240]). Instead, he suggested the creation of a provisionary government with the same functions as the current government.

In a letter dated May 27, 1898, he gave another substantial piece of advice to Aguinaldo in terms of American policy toward the Philippines and the necessary preparation by the Philippine side (Epistola [1996:50]; Taylor [1971c:238-241]). He informed Aguinaldo of the arrival of two American cruisers and 15,000 American soldiers, led by General Wesley Merritt, who would be the governor-general in the Philippines, and alerted Aguinaldo regarding American intentions. Moreover, he suggested that Aguinaldo not disclose his intention to seek independence from the beginning but rather maintain good relations with the Americans, to enable the revolutionaries to gain material support from them (Epistola [1996:50-51]; Taylor [1971c:238]). Agoncillo prescribed that Aguinaldo should avoid irritating the Americans until they attempted to enslave the Filipinos or sell the Philippine Islands [Taylor1971 c:239].

In the letter, Agoncillo proposed that Aguinaldo begin "diplomatic negotiations" with the Americans, although he did not elaborate upon the substance of the negotiations (Epistola [1996:51]; Taylor [1971c:238]). Instead of a detailed proposal for diplomatic negotiations, Agoncillo proposed a strategy of projecting their cause to the world. Agoncillo asserted that only after the Americans became hostile could the Filipinos claim "the right in the eyes of the world to fight against them for the welfare of our country" (Epistola [1996:51]; Taylor [1971c:239]). Tellingly, Agoncillo paid much attention to "the eyes of the world" or the moral high ground in the international community to obtain recognition of the Filipinos' legitimate claim for independence.

His skepticism of the American consul in Hong Kong might have prompted Agoncillo to propose a diplomatic mission in the United States. After Aguinaldo's departure, the remaining members of the Hong Kong Junta accelerated their efforts to procure weapons (Ueno [2015:266-293]; Taylor [1971b:492]). Because the British government maintained a neutral position in the Spanish–American War, the British authority in Hong Kong did not allow the Filipinos to buy and sell weapons in public. Therefore, the revolutionaries in Hong Kong had to work secretly and involved themselves in various troubles in their secret deals with arms traders. Agoncillo had already lost his confidence in Consul Wildman, who may have been playing "a double game with our money here" to profit personally through weapons-procurement deals [Taylor 1971c:239]. Suspecting Wildman's insincerity, Agoncillo wrote in his letter to Aguinaldo dated May 27, 1898, "I will go to the United States for diplomatic negotiations" [ibid.]. He asked Aguinaldo and other leaders to give him "full power to negotiate in the name of our country" [ibid.].

In the Philippines, Aguinaldo was busy remobilizing the revolutionary forces against Spain but still recognized the significance of international recognition. At first, to encourage the revolutionaries, Aguinaldo prepared a declaration

of independence on June 12 and subsequently organized the revolutionary government by replacing it with a dictatorial government through a June 23 decree [Agoncillo 1960:222-223]. In a message written by Mabini, Aguinaldo claimed the people of the Philippine Islands were deprived of their rights at the Cortes, or the Spanish Parliament, established through the Cadiz Constitution of 1812, and that the Spanish authority suppressed the Filipinos when they had sought reform. Finally, Aguinaldo stated the Philippine Islands sought "a definite separation" from Spain and that his government constituted "a Revolutionary Government" [ibid.:233-234]. Aguinaldo further explained that the revolutionary government was provisionary and that it should be reorganized after the recognition of its independence by all nations, including Spain. Aguinaldo claimed that the Philippines had "resources and energy sufficient to … claim a modest, though worthy, place in the concert of free nations" [ibid.:235].

The decree had an "additional clause" in which Aguinaldo designed the revolutionary committee outside of the Philippine Islands to pursue the recognition of the belligerency and independence through diplomacy [Epistola 1996:47]. Aguinaldo also expected the committee to inform the Philippine government of "grave matters occurring abroad" and to recommend necessary reforms "to raise the political and civil institutions of the Philippines to the level of modern progress" (Epistola [1996:48]; Taylor [1971c:198]).

Through Aguinaldo's message, Mabini sought information and insights from abroad to modernize Philippine institutional arrangements, aside from the committee's diplomatic works, partly because Manila had lost contact with the outside world when Commodore Dewey cut the marine cable during his squadron's May 1 attack on Manila. He restored it only on August 20, 1898 [Agoncillo 1960:211, 214].

When it lost the direct link abroad for almost four months, the revolutionary government depended on the committee in Hong Kong for communication abroad [Ueno 2015:36]. Suffering from an irresponsible consul in Hong Kong (i.e., Wildman), the visible buildup of American military forces on the islands, and the Manila revolutionary government's limited understanding of public opinion outside of the islands, Agoncillo proposed a diplomatic mission to the United States.

3.2. The proposal for the diplomatic mission

Agoncillo accelerated his efforts to convince the government to send an official mission to the United States amid disturbing events developing around his government's plea for independence. The Spanish government sought peace with the United States on July 22 and received a message from the US government with several conditions for terminating the hostilities, without communicating with Aguinaldo's government [Epistola 1996:53-54]. However, facing this alarming turn of events, Filipinos abroad failed to consolidate their positions [Agoncillo 1960:115]. Afraid of possible abandonment by the United States, some even

suggested that the government surrender to the Americans and allow the United States to annex the Philippine Islands. For instance, Basa and others attempted to send a letter to President McKinley asking the United States to annex the Philippine Islands, whereas Agoncillo and others strongly opposed their move. Agoncillo wrote to Aguinaldo to explain the situation in Hong Kong and sought the latter's instructions on the means to achieve interdependence [Taylor 1971c:259-260].

Before the guidance concerning the United States, Agoncillo received a letter explaining the situation regarding the declaration of independence. This is because, in the postscript of the letter dated August 2, Agoncillo asked Mabini if the Aguinaldo government had sent "a diplomatic note" to "the foreign consuls informing them of said proclamation [of independence]", as well as their replies to the note, and asked him if he had "a copy of said note" [ibid.:264].

The revolutionaries in the Islands seem to have failed to send such a note to the consuls in Manila and the committee in Hong Kong, although Aguinaldo wrote a letter to Dewey on July 15 asking him to forward Aguinaldo's decrees of June 18 and 23 to the United States and his friendly message to the American nation [Agoncillo 1960:239]. In response to Agoncillo's request, Aguinaldo wrote him a letter and attached the Act of Proclamation of Independence and "a manifesto to the foreign governments" [Taylor 1971c:189]. Aguinaldo instructed Agoncillo to publish the documents in the Hong Kong newspapers and bring the originals to the United States [ibid.]. In the manifesto, Aguinaldo asserted the following:

> The undersigned, availing himself of the powers vested in him as [the] President of the revolutionary Government of the Philippines, in the name and on behalf of the Philippine nation implores the aid of all the powers of the civilized world begging them fervently to formally recognize the belligerency of the revolution and the independence of the Philippines. [ibid.:188].

In his letter dated August 7, Aguinaldo told Agoncillo to go to the United States "as soon as possible" but also instructed Agoncillo not to "establish himself as an ambassador until the indicated arrangement is carried out" [ibid.:189].

Instead of appointing Agoncillo as ambassador to the United States, Aguinaldo set up the Revolutionary Committee in Hong Kong and appointed Agoncillo to the position of "correspondent" to the United States on August 10, 1898, together with other correspondents in Paris, London, and Australia (Epistola [1996:47]; Taylor [1971c:197]). On the same day, Aguinaldo instructed Theodorico Sandico, a member of the Hong Kong committee's managing board, to find a way for Filipinos in Hong Kong to "act in unity" and stated that the revolutionary government's policy was the struggle for independence, not protection or annexation [Taylor 1971c:196].

Instead of leaving Hong Kong soon after receiving Aguinaldo's letter, Agoncillo stayed in Hong Kong and wrote a telegram to President McKinley via Consul Wildman as well as two letters to Aguinaldo and Mabini. In his August 15 telegram to President McKinley as "High Commissioner and Ambassador Extraordinary representing the Provisional Government Philippine Islands [sic]", Agoncillo wrote, "I assure the United States of the allegiance and unquestioning support of our people, and petition that we are granted one or more [Filipino] representatives on the commission that is to decide the future of our islands" [ibid.:669-670]. By "the commission", Agoncillo meant the commission to be held in Paris to discuss the peace treaty ending the Spanish–American War. At the time of the commission's organization, the US and Spanish governments excluded representatives from the Philippines, although the Americans did not yet have a fixed policy toward the Philippine Islands.

Agoncillo explained the situation and his observations on it in a separate letter dated on the same day but addressed it to Aguinaldo. In this letter, Agoncillo stated, "Our country is at present in a lamentable condition" because Spain and the United States had agreed the Spanish–American commission should decide the future of the Philippine Islands without including representatives from the Philippines [ibid.:670].

Interestingly, Agoncillo also explained his action by saying, "I am confident that you will approve my action. I wish you could immediately send me my appointment in accordance with the above-mentioned telegram and let me know the date of the establishment of our provisional government" [ibid.:672]. He also confessed, "I have not received a letter from you for a long time, and I am in complete ignorance about events there and about all of you" [ibid.:670]. Based on what he wrote in this letter, Agoncillo had proclaimed himself ambassador without official appointment from President Aguinaldo when he wrote a telegram to President McKinley on August 15.

As if reflecting his anxiety about his action, Agoncillo also wrote to Mabini to ask for approval of his action to send a telegram to McKinley through Consul Wildman and asked about the revolutionary government's preparations for the peace talks between the two countries. Agoncillo again expressed his disappointment but proposed that the revolutionary government send a mission to Paris to represent the Philippine government at the commission to discuss the peace treaty (Epistola [1996:55-57]; Taylor [1971c:668]).

Agoncillo received a reply from Aguinaldo directing the former to go to the United States. Before carrying out the mission to the United States, Agoncillo reiterated his request for his appointment as an ambassador (as he had described himself in his previous telegram to President McKinley) in his letter of August 26 [Taylor 1971d:2]. In his biography of Galicano Apacible, who succeeded Agoncillo when the latter left for Washington, DC, Alzona [1971:65] wrote that Apacible returned from the Philippines and brought the news of Agoncillo's appointment as "Minister Plenipotentiary to the Paris Peace Conference", though he did not provide the source of this description.

Agoncillo seemed to have gone to the United States as an "official representative" of the Philippine government, instead of as ambassador [Taylor 1971d:25]. The documents Taylor edited do not contain the document confirming Agoncillo's appointment. That the letter Agoncillo addressed to President McKinley dated October 3 does not include a title before his name is also important. This was not the case in the cablegram from Hong Kong dated August 15. In the letter he filed to the Paris Commission, he introduced himself as having "the post of Official Representative to the very Honorable President and Government of the United States of America" [ibid.:11, 25]. Agoncillo went to the United States with an appointment as a correspondent, as the August 10 decree prescribed. In the letter dated August 30, Aguinaldo instructed Agoncillo to suggest the name of someone who might act as their representative at the conference in Paris and told Agoncillo that he would send the credentials to that person [Agoncillo 1960:316].

Interestingly, Aguinaldo suggested that Agoncillo ask the Americans for their help in the same way that the Americans received French government support during their battle for independence from the British [ibid.]. Agoncillo thereafter used the example of American independence when he argued his case for Philippine independence.

4. Claim for independence in Washington, DC, and Paris

Agoncillo left Hong Kong with Salvador Lopez as his aide on September 2 and arrived in Washington, DC, on September 27. They met President McKinley on October 1, though not as representatives of the Philippine government but as private citizens (Agoncillo [1960:316-323]; Taylor [1971b:500]). Agoncillo reported that they "were well received" but were told they should talk with the commissioners in Paris. However, in the same report, Agoncillo revealed his pessimistic view of the situation by writing, "I think they will not grant us independence.… Prepare all that is necessary" [Taylor 1971d:14]. Agoncillo must have been disappointed that he could not see President McKinley as an official representative, which might have contributed to his pessimism about the Philippine independence, though he did not explain what he encountered in detail.

Despite his pessimistic evaluation of the progress of US recognition of Philippine independence, Agoncillo submitted a memorandum addressing President McKinley through the State Department, in which he explained the Philippine government's position. In the ten-paragraph memorandum, Agoncillo explained the Philippine-US relations (paras. 1 to 3), the Philippines' situation in the peace talks between Spain and the United States (paras. 4 and 5), and the Philippine claims that the Philippine government should participate in the peace talks (para. 6). In the latter part of the memorandum, he asserted that the Filipino people hoped the United States would recognize the Philippines' independence and belligerent rights against Spain (paras. 7 to 10) [ibid.:12-13].

Notably, Agoncillo explained that the Filipinos assisted the American forces against Spain "*as allies*, with the conviction that their personality would be recognized as well as their political, autonomous, and sovereign rights". To support his argument, he had used the argument in his previous communication with American officials in Hong Kong, Singapore, and Manila [ibid.:12].

In the memorandum, Agoncillo highlighted how the Filipinos had organized a legitimate government independent of Spain and the United States. He further asserted that the Philippine government had already been formed with de facto American recognition in the Philippines, although he could not provide substantial documents supporting his assertion of American recognition [ibid.]. Without further opportunities to negotiate with American government officials, he left Washington, DC, for Paris and continued his efforts in the city where the peace treaty was under discussion.

On October 22, Agoncillo reported from Paris to Hong Kong, informing the committee that the American commissioners in Paris "are aware of our aspiration" and that "Europe and America recognize now our civilization" [ibid.:15]. He sounded positive but also revealed the limits of what he could achieve in Paris by not mentioning an agreement but only awareness. Instead of recognizing the Philippines' right to belligerency and independence, they only recognized its civilization. In a separate letter that arrived in Hong Kong on November 19, Agoncillo claimed, "If our country should be retained by (the) Americans, I think independence will not be granted [to] us. Their ambition is great…. They have sent many soldiers to our country. Necessary for you to arrange immediately an expedition of arms" [ibid.:24].

After the commission finalized the peace treaty stating the transfer of the Philippine Islands from Spain to the United States, Agoncillo filed the Official Protests against the Paris Treaty [ibid.:25]. In the protest, Agoncillo claimed the Philippine government could not accept the treaty because it was never heard by the commission, which was an "unquestionable right" of the Philippine government [ibid.].

Agoncillo argued that the Spanish commissioners had no capacity to transfer their right to the Americans because "the Spanish Government has ceased to hold any dominion by deed and by right" after the proclamation of sovereignty on August 1, 1898, and the organization of the Philippine government, with its established effective control of the Islands [ibid.:27].[1] To support his assertion, aside from his claim regarding effective control of the Islands, he argued, "the Union of Spain and the Philippines was founded solely on two historical facts, in which the exclusive rights of the Filipinos to decide their own destiny was implicitly recognized" [ibid.:26].

[1] August 1 was the promulgation date of the Act of Independence after Aguinaldo's dictatorial government organized the towns [Agoncillo 1960:227].

First, he highlighted the Blood Treaty between Sikatuna and Miguel Lopez de Legazpi signed on March 12, 1565, as the initial document that bound Spain and the Philippines. In his study on Mabini, Majul introduced the Filipino revolutionaries' attempts to frame the revolution in legal discussions by highlighting the Blood Treaty, although Majul pointed out the problem of a lack of historical evidence backing the revolutionaries' contention [Majul 1996a:84-85]. The revolutionaries, including Agoncillo, claimed the treaty between the Philippines and Spain regulated their relations and that the revolutionaries took arms because the latter broke the treaty.

Second, Agoncillo focused on the Cadiz Constitution of Spain in 1812. Agoncillo claimed the Spanish authority had carried out "the violent deprivation of their [Filipino] rights" at the Cortes when the Spaniards drafted the Constitution of 1837. Legarda introduced the view of Spanish scholar–politician Franco Pi Y Margall, also a friend of Jose Rizal, to describe the Constitution of 1837 as retrogression of the Philippines from overseas territory to a colony [Legarda 2011:5]. Agoncillo asserted that the "Peninsular Public Powers (or the Spanish authority) attempted to impose their absolute sovereignty on the islands, the Filipinos protested energetically by force of arms, and from the first attempt in 1814, the struggle in defense of their political personality was implanted" [Taylor 1971d:26].

He asserted that the Filipino struggle for "political personality" had "lasted almost a hundred years" [ibid.]. Although Agoncillo did not elaborate on the struggle in his protest against the peace treaty, he must have meant the bloody uprising in Ilocos against the abolition of the Cadiz Constitution [Mojares 2006:412]. He might have been referring to the mutiny led by Mexican Captain Andres Novales, who claimed he was emperor of the Philippines, although it was suppressed within one day (Legarda [2011:4]; Claudio [2019:6]). By claiming a 100-year struggle, Agoncillo traced the origin of the struggle for Philippine independence to one of the earliest advocacies for native rights by the Filipino Spaniards, or the Spaniards born in the Philippine Islands in the early 19th century and the creoles moving from Mexico to the Philippine Islands [Mojares 2006:409-417].

After combing the history of the revolts against the Spanish authority in the early 19th century along with the independence movements from Spain in the late 19th century, which finally achieved effective control of the islands through the Philippine government, Agoncillo concluded that Spain had no authority to surrender or transfer rights over the islands, based on "the principles of the law of nations" [Taylor 1971d:27]. This notion of the principles of the law of nations shows Agoncillo's recognition of international law.

Believing the Filipinos to be the main actors in the struggle against Spain, Agoncillo gave the Americans not the role of their Spanish counterparts but merely that of arbitrators between the two nations of the Filipinos and Spaniards. Furthermore, Agoncillo claimed that the United States could not play the role

of "arbitrators as to the future of the Philippines" because it was once an ally in Spain's attack on the Philippines [ibid.]. He pointed out that the American troops in the Philippines recognized the Philippine flag and did not oppose "the formal proclamation of the Philippine nation" [ibid.:28]. He accused the Americans of questioning Philippine independence only "*after the danger*" had passed and pointed out that Admiral Dewey of the United States did not possess "disembarking forces" and depended on Aguinaldo's forces to prepare for disembarking by General Thomas Anderson's forces (italics in original in Taylor [ibid.:28-29]). Agoncillo also reminded the parties that the Americans did not oppose the Filipinos' proclamation of independence [ibid.:28].

His historical claims might not have been completely accurate, but this point was not debated at the time because the McKinley administration did not address Agoncillo's claims directly but rather simply neglected them. Avoiding diplomatic negotiations, McKinley instead relied on his Christian views and geopolitical calculations when he declared the benevolent assimilation on December 21, 1898 [Anastacio 2016:17]. Studying the legal design of the American colonial rule in the Philippine Islands, Anastacio [ibid.] argued it was a "benevolent imperialism" in which American colonial rulers organized a sovereign but not popular colonial state in the Philippines over the coming decades.

5. The American Revolution as a precedent of the Philippine Revolution

Agoncillo never gave up the fight, and he returned to the United States on December 25, or a few days after McKinley's declaration of benevolent assimilation, to prevent the US Senate from ratifying the treaty. He thereafter developed his argument mainly by using the case of the American War of Independence in the 18th century. In Washington, DC, Agoncillo, and Lopez sent six letters of request for an appointment with the Office of the Secretary of State but were ignored [de Ocampo 1977:87-118].

In a memorandum addressed to the secretary of state, Agoncillo briefly explained the situation in the Philippines and reiterated his position on Philippine independence. In the memorandum dated January 5, 1899, Agoncillo wrote, "the Philippine Republic was promulgated on June 18, 1898.… Its existence was formally announced to foreign powers on August 1, 1898." He explained that the Philippine Republic had established "a detailed system of government" over the entire archipelago except for Manila and Cavite, which American forces had occupied. Based on the government's organization and the effective control of the entire islands, he asserted that the Philippine Republic "should be welcomed to the family of the independent nation" [Taylor 1971d:33].

Faced with a series of rejections by the Department of State, Agoncillo wrote a long memorandum to the secretary of state, in which he maximized his knowledge of the law and described the history of the American War of Independence as an important precedent for the Philippine Revolution [de Ocampo 1977:118-121].

At first, he reiterated his argument of the 100-year struggle against Spanish rule, accusing Spain of depriving the Philippines of the right to self-government promised by the Blood Treaty of 1565 and the Cadiz Constitution of 1812.

Following this assertion, Agoncillo emphasized the relationship between the Philippine Revolution and the American Revolution. He argued that the Filipino revolutionaries were inspired by "the Declaration of Independence of the American people" and pointed out that the Philippine government had declared independence and organized a government controlling over almost the entire islands, whereas the Americans had declared independence while the British still occupied major ports [ibid.:118-119].

Agoncillo contended that the American occupation of Manila should not be the source of the American right over the territory because Manila's residents did not express their consent to be governed by the Americans. Rather, he argued, the government should derive its power "from the consent of the governed", according to the American precedents [Congress of the United States 1899:1321-1322]. He also cited the claim of former US Secretary of State Lewis Cass, who said that the capital city's occupation was not an issue as long as the United States could continuously occupy the majority of the country, although it may not sound so convincing to use the American annexation of New Mexico as an example for the cause of Philippine independence [ibid.:1322]. Agoncillo tried his best to remind the secretary of state about his predecessors' claim.

Agoncillo cited the words of several former U.S. secretaries of state to convince the current secretary to recognize Philippine independence (Congress of the United States [1899]; de Ocampo [1977:119-120]). He cited the words of Secretaries Edward Livingston of the Andrew Jackson administration and James Buchanan of the James K. Polk administration and reminded the current secretary that the United States has "always recognized de facto governments" [Congress of the United States 1899].

Aside from the American Revolution, Agoncillo used academic works on international law to support his contention. In terms of the definition of a "nation", Agoncillo referred to the books written by Robert Phillimore and James Kent and claimed that the Filipino nation met their definition; that is, a nation "is a people permanently occupying the definite territory, having a common government peculiar to themselves for the administration of justice and the preservation of internal order, and capable of maintaining relations with all other governments" [ibid.:1321-1322]. Based on this, Agoncillo claimed, "the Philippine Republic has been entitled to recognition as a separate national entity" since June 1898, when Aguinaldo declared independence and organized the revolutionary government.

Despite the neglect by the Department of State, Agoncillo tirelessly worked for his cause and became a lobbyist in Congress [Epistola 1996:44]. In his memorial to the Senate dated January 30, 1899, Agoncillo reiterated his contention that the Philippine government was entitled to national recognition after its establishment

of the government, considering "the rule of international law" (de Ocampo [1977:121-125]; Agoncillo [1960:363]). In the memorial, he explained the situation in the Philippine Islands. First, he argued, "the Philippine nation had achieved its independence free from any danger of losing it at the hands of the Spaniards, prior to the signing of the protocol" between the United States and Spain [Agoncillo 1960:364]. He reiterated his contention in his Official Protest against the Paris Treaty, in which he claimed that Spain had no power to transfer rights over the Philippine Islands because it had lost control over the islands before the protocol was ratified and the United States did not show any intention of gaining control over the islands.

Second, he supported his contention by referring to "several notable and exact American precedents" [ibid.:366]. He pointed out the precedent of the American Revolution, in which America warred with Great Britain and Spain joined the American side but occupied a certain British territory and demanded rights over it. On the Spanish claim, Agoncillo reminded his readers that Thomas Jefferson and Thomas Pinckney had argued, "It is contrary to the law of the nations for one nation engaged in a common cause with another to despoil its associate" [ibid.:367-368]. Agoncillo used the examples of the tripartite relationship among the United States, Great Britain, and Spain in the American Revolutionary War to explain the tripartite relationship among the Philippines, Spain, and the United States, and he claimed that the Philippines should retain the territory occupied by the United States during the Philippine Revolution.

Ignored by Congress, which ratified the treaty on February 6, 1899, Agoncillo and Lopez left Washington for Paris and continued their advocacy there, as well as in Washington and Hong Kong, until the last moment, when the Hong Kong Junta was dissolved and Agoncillo returned to the Philippine Islands in 1905.

6. Natural law or positive law

Why did Agoncillo become the first "diplomat" of the Philippines, instead of other intellectuals? Agoncillo was determined to seek independence, whereas some Filipinos in Hong Kong attempted to achieve protection from or annexation by the United States. Aguinaldo and Mabini understandably thought that Agoncillo was the most trustworthy representative to the United States.

One of the remaining questions was the missing appointment of Agoncillo as ambassador to the United States. Those who were familiar with the internal power struggle within the revolutionary government may speculate that Aguinaldo felt insecure about Agoncillo becoming too famous outside of the country. Instead of personal feelings, however, we may consider Mabini's and Agoncillo's different strategies for seeking independence. Majul noticed that Mabini had disagreed with Agoncillo when the latter argued that the Philippine government had established its sovereignty because Spain did not comply with the Blood Treaty [Majul 1996a:85-86]. Mabini argued that the Philippine Revolution was an expression

of natural law, following the examples of the American and French Revolutions [Majul 1996a]. In other words, Mabini developed his argument based on natural law and might have underestimated the mission's format, whereas Agoncillo attempted to build his position upon positive law and sought official recognition for his mission.

Agoncillo was familiar with the evolving international order, partly because he was in Hong Kong, unlike the leading figures in the Propaganda Movement in Spain or the revolutionaries in the Philippines. Hong Kong was a British colony, where various international agents from numerous countries and colonies lived and worked for commercial or diplomatic purposes. For instance, before Agoncillo arrived in Hong Kong, Jose Rizal had spent time with the exiles and also communicated with the British about his idea of creating a colony for British refugees in North Borneo [Claudio 2019:17]. Indeed, Agoncillo approached the American consul and left an impression, which prompted the consul to introduce Agoncillo as a "diplomat" in his official cable to the State Department. This intriguing cable sent from Hong Kong was the only official American document to record Agoncillo's name as a diplomat in the voluminous records edited by Taylor [1971a; 1971b; 1971c; 1971d].

Agoncillo tirelessly wrote formal letters to government officials, while the propagandists engaged public opinion through newspapers. Although Agoncillo failed in submitting a letter of credentials in the United States, he prepared a formal protest against the Paris Peace Treaty. He also submitted documents explaining the cause of Philippine independence, addressing the U.S. president, secretary of state, and Congress. In these documents, he strove to base his argument on his legal knowledge, as well as history, especially the American Revolution. Although his documents may not necessarily be accurate by today's academic standards and were not supported by written documents to prove his points, they clearly showed his efforts to support the Philippine Revolution using the framework of positive law. His efforts and the complete neglect by the McKinley administration ironically revealed the nature of the Filipino struggle against the Americans to be as a struggle between nationalists in a colony seeking legitimacy in the international community and imperialists in an independent state imposing their will with physical force.

Interestingly, Agoncillo used the American Revolution as the precedent to support his argument for the Philippine Revolution in these documents. His contemporaries in the Philippine Revolution recognized that history was an important subject for nation-building. For instance, Jose Rizal studied the pre-colonial Philippines and published Antonio Morga's historical study on the Philippine Islands, whereas Felipe Calderon—the principal author of the constitution of the Philippine Republic—organized an association of historians under American colonial rule [Mojares 2006:453, 475-477]. Historical knowledge provides substantial components of Agoncillo's diplomatic plea in his writing. In

this way, Agoncillo maximized his knowledge of history and law in his diplomatic mission, whereas his counterparts avoided negotiation and chose the imperialist path to suppress the Filipino people.

7. Conclusion

Sensing possible double-talk by the American consul, Agoncillo realized that the Philippine Republic should send a mission to the United States to break the deadlock that the revolutionaries faced in the Philippine Islands. He repeatedly asked the revolutionary government to appoint him as ambassador to project himself as a formal envoy because he believed that the appointment would empower him in Washington, DC, and Paris. Despite not receiving the appointment, he penned impressive protest letters, memoranda, and memorials addressed to the American authorities. He contextualized the Philippine Revolution in not only Philippine history but also American history, especially employing the American Revolution to convince the Americans to recognize Philippine independence. In Agoncillo's mission, we can find the nexus of nationalism and internationalism which would be the basis of diplomacy of modern states.

Legarda's study vividly reveals a contrasting view of the booming colonial economy and declining Spanish authority in the Philippine Islands. Somewhat similarly, Agoncillo's endeavors have shown the contrasting positions of colonial nationalists seeking independence via diplomatic means and imperialists in an independent state depending on crude physical force. Agoncillo's quixotic adventure failed in front of the imperialists but left a legacy of Philippine foreign policy for the independent Philippine Republic.

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The Bullinger Pool in Burma, 1921 to the mid-1930s

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One of the most important developments in the history of the rice trade of colonial Burma was the creation of the Bullinger Pool in 1921, a combination of four large British milling and export firms based on a common price policy for the purchase and sale of paddy and rice. These firms dominated the rice trade at a time when paddy was the "true currency" of the country [Binns 1948:50]: as the source of livelihood for the majority and the form of payment for rent, loans, and wages. The collective position of the four companies—Steel Bros. and Co., Ltd., Bulloch Bros. and Co., Ltd., Ellerman's Arracan Rice and Trading Co., Ltd., and Anglo-Burma Rice Co., Ltd.—reached such magnitude in the rice trade that by the 1930s, the conglomerate had become the subject of a legislative inquiry and the object of organized Burmese protest. The accusation against the Pool was that it manipulated prices in order to rake in huge profits, especially at the time of economic depression in the early 1930s. Even if the allegations of what one today might consider unfair trade practice were officially dismissed, as they were, the paper demonstrates that the Pool's primary advantage, especially its access to paddy supplies, was the cornerstone of its position in the rice trade, making any measure of control plausible at the least. Since the relationship between paddy and rice prices was crucial to the industry's pricing mechanism, the existence of a combination to set prices for both paddy and rice in the local market made the industry vulnerable to manipulation.

JEL classification: N75
Key words: rice trade, Bullinger Pool, economic history

1. Introduction

In *After the galleons* [1999], Benito Legarda demonstrates how foreign merchant houses connected the Philippines to nineteenth-century world trade. Focusing on Anglo-American firms such as Peele, Hubbell & Co. and Russell & Sturgis, both formed in the 1820s, Legarda examines their advantages over local

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companies and networks outside the colony as they faced three major variables in their business operations: commodity prices, freight rates, and exchange rates. This paper also looks at European firms in Burma, some of which were established in the 1870s, which linked the colonial economy to the outside world while Burma was still a province of India. The focus is on four British firms that dominated the rice trade, paddy being, in the government's words, the "true currency" of the country [Binns 1948:50]. Not only did the vast majority of the Burmese population rely on the sale of paddy for their source of livelihood; for many, rents, loans, and wages were paid in baskets of paddy.

In 1921 these four companies—Steel Bros. and Co., Ltd., Bulloch Bros. and Co., Ltd., Ellerman's Arracan Rice and Trading Co., Ltd., and Anglo-Burma Rice Co., Ltd.—agreed to follow a common policy for the purchase and sale of paddy and rice (except parboiled rice). They called themselves the Bullinger Pool, and their collective position in the rice trade reached such magnitude that by the 1930s, the conglomerate had become the subject of a legislative inquiry and the object of organized Burmese protest. The accusation against the Pool was that it manipulated prices in order to rake in huge profits, especially at the time of economic depression in the early 1930s. Even if the allegations of what one today might consider unfair trade practice were officially dismissed, as they were, the paper demonstrates that the Pool's primary advantage, especially its access to paddy supplies, was the cornerstone of its position in the rice trade, making any measure of control plausible at the least. Since the relationship between paddy and rice prices was crucial to the industry's pricing mechanism, the existence of a combination to set prices for both paddy and rice in the local market made the industry vulnerable to manipulation.

2. Character of western firms

Western investments in Burma had several features. Most were British and began modestly as individual proprietorships or as associations of two or three partners. Steel Bros. and Co., Ltd., for instance, began with William Strang Steel; Bombay Burma Trading Corp., Ltd., with William Wallace; Foucar Bros., with Ferdinand Foucar; and Burmah Oil Co., with David Some Cargill (Braund [1975:17-8]; Morehead [1944:46]; Lakshminarasiah (ed.) [1929:76]). In general, the firms operated on entrepreneur capital, in which investors directly controlled the business they had financed, as distinct from creditor capital, in which investors simply supplied the capital but had no part in directing their investment [Harvey 1946:67]. The firms were joint stock companies registered abroad or in India (of which Burma was a part).

Too, the major British firms engaged primarily in the extraction and processing of raw materials such as rice, teak, oil and other minerals—Burma's major exports. Although they possessed considerable amounts of capital, their methods of operation were not always capital-intensive [Aye Hlaing 1964:100]. The Bombay Burma Trading Corp., for example, which was the largest timber firm,

had considerable capital outlay but used little mechanical power. The big rice companies, which required less working capital, used some degree of mechanical power but essentially were not capital-intensive. The petroleum industry, in contrast, was capital-intensive and also highly mechanized compared to the rest of the industries.

While primary resource production was their main concern, the large British firms branched out into other industries. In the mid- to the late nineteenth century, for instance, European investors provided capital for many improvements in transportation and rice-processing, which were essential to agrarian development, and installed the commercial and banking infrastructure necessary for global commercial exchange. European merchants in the port towns, such as T.D. Findlay and Son, Steel Brothers (whose founder was initially lured to Burma by prospects in the import trade), and Bulloch Bros., not only handled imports and exports but also shipping, insurance, and various agencies [U Khin Maung Kyi 1970:34]. The fusion of various interests was sometimes achieved through the managing agent system, whereby the managing agent—instead of merely directing a business he owned—promoted, partly financed, and completely managed other industrial interests in which the agent was probably, though not necessarily, a substantial shareholder [Griffiths 1952:453-457]. Furthermore, the nature of certain industries was such that two or three processes could be carried out during different seasons of the year using the same facilities. Some rice mills, for example, doubled as saw milling or oil pressing factories during the off-season, although the largest mills were generally confined to rice [ORGI 1923:265].

The chief European firms belonged to influential merchant associations, such as the (European) Burma Chamber of Commerce, which represented and protected European trading and mercantile interests. As such, and within the framework of the colonial system, they wielded not only economic but also political influence. The Burma Chamber, for example, had a seat in various government bodies, such as the Burma Legislative Council, Port Trust Board, Municipal Council, and government sub-committees on rice, timber, imports, shipping, and others. As a lobby group, they successfully blocked the passage of the Burma Alienation Land Bill of 1908 [Burma Chamber of Commerce 1914:30-32]. Sir Arthur Bruce, commercial adviser to the government of Burma, noted: "The [European] Group, though small, was compact and, on occasion, in the struggle for power between the Burmese political parties, might find itself holding the balance of power" [Bruce 1944:21].

Lastly, almost all the European firms depended on immigrant Indian and, to a smaller extent, Chinese labor, while for their administrative staff, they hired Europeans and Anglo-Asians. Although Indian immigrants could enter the province of Burma freely in search of labor, in certain sectors of the economy such as rice and saw milling and in the dockyards, labor was recruited mostly from Telegus, Uriyas, Tamils, Hindustanis, Bengalis, and Punjabis through a labor contracting system. The contractor (*maistry*) would pay for the fare of the laborer

to Rangoon and advance him some money until he settled down and could begin to remit savings back home. In 1931 representatives of Indian labor in Rangoon claimed that there was "clear discrimination in favor of Europeans and Anglo-Indians or Anglo-Burmans as against Burmans or Indians" [Royal Commission on Labour 1931:75].

3. The Bullinger Pool

The oldest member of the Bullinger Pool, Bulloch Bros., began with James and George Bulloch, senior partners in the British firm of Halliday Bros. and Co., which owned one of the earliest rice mills in the colony. In 1870, James and George built a mill in Rangoon and another in Akyab, followed by one in Moulmein two or three years later, all of these being strategic port towns. Eventually the brothers formed their own firm, Bulloch Bros. and Co., and expanded their milling operations in these towns, while adding another in Bassein in Lower Burma. Halliday Bros. also gave rise to another offspring and Bullinger Pool member, the Arracan Co., after Halliday went into liquidation in the 1880s. The Arracan Co. then was owned and managed by Diekmann Bros. and Co., a German rice milling firm in Burma [Pearn 1939:210]. As a consequence of the First World War and the seizure of German property, Sir John Ellerman acquired a controlling interest in the firm and renamed it the Ellerman's Arracan Rice and Trading Co. in 1919. The new enterprise took over all the mills formerly owned by Diekmann Bros. in Rangoon, Akyab, Bassein, and Moulmein.

Like Bulloch Bros., Steel Bros. made an early entry into Burma's rice trade. Its founder, William Strang Steel, built his first cargo rice[1] mill in Rangoon in 1871, followed by two others in 1885. All three were soon equipped with white rice[2] milling machinery. Steel also built its first rice and saw mill in Moulmein about 1872 and entered the rice trade in Akyab some ten years later [Clark 1941a; 1941b]. Of the four members of the Bullinger Pool, Steel Bros. and Co. became the largest.

The last Pool member to enter the rice trade was the Anglo-Burma Rice Co. Registered as a joint stock company in Burma in 1918 [Government of India Central Publication Branch 1922:45], the company purchased the government mill in Rangoon that was formerly owned by another German rice milling firm, Mohr Bros.

The Pool's mills clustered around the port towns of Lower Burma, from where the bulk of Burma's rice exports was shipped. In 1929-30, for example, Rangoon alone exported 77 percent of Burma's total rice exports; Akyab and Bassein, about nine percent each; and Moulmein, five percent of the total [RGWB 5 October 1931:13]. Throughout the first three decades of the twentieth century, these port towns remained the stronghold of the Bullinger Pool. From 1917 to 1931, in the districts of Akyab, Bassein, and Rangoon, well over half of the total number of rice mill employees worked in mills owned by the Pool. Even after 1931, when as

[1] Cargo rice is the mixture of husked rice and partially milled rice with up to twenty percent paddy.
[2] White rice is rice milled to a high degree.

we shall see shortly, the Pool's share of the total number of mills and employees in all of Burma declined, the Pool nevertheless continued to enjoy a substantial share of rice milling in these districts [LIE 1917-35].

The position of the Bullinger Pool in the rice milling sector must be situated in the context of the ownership of rice mills in Burma, which the British government characterized by race. This was rather different from the case of the Philippines where, as Legarda points out, domestic and foreign ownership of business and industry was not built along racial or ethnic lines but on whether the owner had long established roots in the colony. Thus, domestic owners consisted of those born in the Philippines (indigenous Filipinos, Philippine-born Spaniards or *insulares*, and locals of mixed Spanish and Filipino parentage) as well as foreigners who "had clearly thrown in their lot with the country" [Legarda 1999:229]. In Burma the situation was complicated by the fact that Burma was administratively part of India, but Burmese were clearly not Indians and vice-versa.

Majority of the rice mills were, in fact, Burmese-owned, with Indian owners as the second largest group and European-owned mills, the fewest, and even declining both in number and as a share of the total number of rice mills by the mid-1930s.

TABLE 1. Ownership of rice mills by race, 1916-18 and 1935

Owner	1916-8		1935	
	Number	% of Total	Number	% of Total
European	49	15.4	31	4.8
Burmese	159	50.0	311	48.1
Indian	66	20.8	186	28.7
Chinese	44	13.8	119	18.4
Total	318	100.0	647	100.0

Sources: W.H.C. Prideaux, Inspector of Factories, Burma, Testimony before the Indian Industrial Commission, 1916-18 in *British Parliamentary Papers 1919*, Command Paper 238, vol. 20, p. 569; *Annual Report on the Working of the Indian Factories Act 1935* (Rangoon: Supdt., Government Printing, 1938), p. 30.

The small number of European-owned mills, however, belies their size. In 1935, when the number of European-owned mills had experienced a decline in numbers, the average size of the European-owned mill was 500 employees, while that of the Burmese was 38. Chinese- and Indian-owned rice mills were also considerably smaller than European mills (average of 65 and 53 employees, respectively), though larger still than Burmese-owned mills [Report of the Indian Factories Act 1935]. Among the large rice mills were those owned by the Bullinger Pool. Data about their size comes from the lists of *Large Industrial Establishments in India* (LIE), which were produced every other year and provided the names of owners, number of employees, and location of mills. Though not as

comprehensive as the annual reports of the Indian Factories Act (IFA), the LIE series offered "a safe index of the extent and importance of the different classes of industries" [LIE 1917; 1920:i].

TABLE 2. Number and size of mills owned by the Bullinger Pool, 1917-35

Year	No. of mills	No. of employees	Average size
1917	34	17,753	522
1919	36	17,736	493
1921	35	18,873	539
1923	32	15,685	490
1925	35	18,569	531
1927	31	15,127	488
1929	28	14,838	530
1931	29	17,011	587
1933	21	13,058	622
1935	20	12,492	625

Sources: *Large Industrial Establishments in India*, 1917-35.Small Rice Mills

4. Small rice mills

In contrast, most of the up-country mills in Upper Burma and the mid-zone[3] were small units of production, situated close to the paddy farms, and were generally owned or managed by Burmese and possibly immigrant Asians [Solomon 1931:60]. The geographic factor is important here, for as the *Burma Trade Directory* of 1930 suggests (cited in U Khin Maung Kyi [1970:38-9]), the farther away the mills were from Rangoon, the more numerous the Burmese-owned enterprises, while the closer the mills were to Rangoon, the fewer the Burmese mills. Small mills, of course, possessed their own advantages. The IFA Report of 1927 noted, for example, that these mills had "the unfair advantage that their working hours are unrestricted" (p. 1) and so could compete with the larger mills. The small mills also did not require much organization. Their overhead expenses were minimal since millers lived on or close to the premises and probably obtained their paddy at a lower cost than if they were situated in Rangoon or some other port town. The government initially welcomed the upsurge in the number of small mills as a sign of prosperity in a burgeoning economy. The Indian Industrial Commission [1918:31] observed that:

[3] Upper Burma refers to the wet zone of Myitkyina, Katha, Bhamo, and Upper Chindwin, and the dry zone of Lower Chindwin, Shwebo, Yamethin, Minbu, Sagaing, Mandalay, Myingyan, Magwe, Kyaukse, Meiktila, Pakokku, and Thayetmyo; while the mid-zone covers Toungoo and Prome.

> Although the Burman does not compete with, or to any large extent invest in, the considerable organised industries of Rangoon, he is far from backward in establishing small rice, timber and oil mills further up country, a branch of development which may be expected to expand as more fertile waste areas come gradually under occupation.

As they increased in number, these mills tended to be smaller than formerly, employing as few as ten to twenty persons [IFA 1927:1-2], and thus falling outside the coverage of the Indian Factories Act. An agricultural survey in 1932 reported that the milling capacity of the large firms ranged from 200-500 tons of paddy a day, while small mills handled from 10-75 tons [Grant 1933:30]. The Officiating Commissioner of Pegu remarked: "The outturn of these small mills is insignificant in comparison with the outturn of large mills, and even if they were continuously working, they could not possibly enter into competition with the large mills" [Proceedings of the Department of Commerce and Industry 1919:9]. It comes as no surprise that Steel Bros. described the small mills as "the little smacks and trawlers of the rice milling industry with their output of ten, twenty, fifty, one hundred tons a day" [Clark 1941b:38], in contrast to Steels' mills in Kanaungtoe alone (close to Rangoon), which had a capacity for 1,500 tons of paddy and produced 1,000 tons of finished rice a day [ibid.]. The company's total daily milling capacity was no fewer than 5,500 tons as it proudly reported in its house magazine [*Steels House Magazine* 1973:19].

The small miller had several business options: to sell rice to export merchants in the seaport towns; to sell rice to local traders for domestic consumption; or to mill for hire only. A government study in the early 1930s showed the last to be the most common option: "as a large number of the small mills are engaged in milling grain on hire for local consumption entirely, they do not exercise so great an influence on the milling of rice for export as [their] numbers would indicate" [Grant 1933:30]. Small millers able to engage in the export trade did so indirectly, through large European firms that bought rice from them and exported it along with what the firms had milled themselves. The Rice and Paddy Trade Enquiry Committee [1931:36] estimated such purchases from small millers to be approximately ten percent of total rice exports.

Furthermore, in times of poor trade, small mills were often the first to fail. In 1923 the IFA reported that "bad trade and excessive competition hit many of the up-country mills very heavily and several have failed and been taken over by the mortgagees" [1924:1]. This was particularly true in Shwebo in north-central Burma, where the number of mills rose from nine in 1919 to twenty-three in 1921, only to drop to ten mills in 1925; and in Mandalay, from nine mills in 1919 to nineteen in 1921, and falling to fourteen in 1925 [LIE 1919-25]. In 1928, the IFA [1929:1] repeated a warning it had made six years earlier, that the rice milling capacity had vastly exceeded need, based on the level of crop production. As a result, many of the small mills worked irregularly and not at a profit. Such was the situation even before the onset of the depression.

The vulnerability of the small miller to the vicissitudes of trade arose from his lack of capital, much of which had been placed in land. A report published in the 1921 *Census* of India found that:

> The older mills which are not heavily in debt may continue to make a sufficient profit to maintain the miller and his family in comfort, but little more. Many of the new mills as well as such of the old mills as are heavily in debt, are likely to be worked at a loss. [ORGI 1923:266] This finding was confirmed by the IFA a year later [1923:1]).

It was generally accepted in official circles that the major source of capital for the small miller was the (Indian) Chettyar moneylender, who charged interest rates of 18 to 24 percent or higher, with land or the mill itself as security for the loan. Other sources of capital were private moneylenders, Chinese banks in Rangoon (English [1919:664]; *Report of the Burma Provincial Banking Enquiry Committee, 1929-30*, Vol. 1 [1930:105-106, 133]) and, as discussed below, some of the large milling firms themselves.

European millers, in contrast, had financial arrangements with the Imperial Bank of India and the exchange banks in Rangoon, and sometimes with the London money market. The Imperial Bank of India acted as the central government's banker while the exchange banks, such as the Chartered Bank of India, Australia, and China, the Hong Kong and Shanghai Banking Corp., and Lloyds, financed chiefly sea-borne trade, both import and export [Banking Enquiry Committee Report 1930:39-43]. The Rangoon banks (as well as the Indian and Chinese banks) "did for the rice trade (on the security of the milled rice) what the Chetties [Chettyars] did for the growing of paddy" [Bruce 1994:17]. Equally important, some of these firms financed small millers. In 1931 the Secretary of the Rice and Paddy Trade Enquiry Committee, E.H. Solomon, described what he called an "ingenious" system of advances made to small millers during the twenties by some export firms:

> These firms, early in the rice exporting season, entered into contracts for the purchase of rice with small millers. Possessing credit with banks in the port towns and with their foreign buyers, they used to advance money to millers on the strength of these contracts for future delivery even before seeing possession of the rice. With the help of these advances, the small millers were able to augment their scanty resources and buy paddy freely during the early months of the year, while later on when the extent of their advances diminished they were able to utilize the profits made in the earlier part of the season to continue their purchases. [Solomon 1931:61] Solomon hastened to add that for this system to benefit both the small miller and the exporter, certain conditions had to be present: first, that the forward prices of milled rice in the early part of the season were considerably higher than those for ready produce; and second, that small millers complied with their contracts and made regular deliveries of agreed sales [ibid.]. During the depression this

system fell into shambles as prices dropped and contracts were consequently unfulfilled. The question of capital became acute in the early thirties, when Burmese leaders complained that the Bullinger Pool, with vast resources at its command, manipulated the local market for its own ends.

5. Export of rice

The export trade had two branches: the Asian branch, which included India and Ceylon (Sri Lanka), China, Japan, and parts of Southeast Asia; and the Western branch, which covered Europe and the Americas. Participation in the export trade tended to be roughly divided along racial lines, with European merchants as the chief operators in the Western branch, along with some Indian participation. Chinese traders were most active in the East and Southeast Asian markets, along with Indians and Europeans to a smaller degree, while Indian merchants figured prominently in the rice trade with India and Ceylon [Report of the Rice Export-Trade Enquiry Committee 1937:1]. The sources do not cite any Burmese interest group in the export trade, suggesting that the export trade was nearly completely in the hands of foreigners.

Until 1890 Europe was the principal importer of Burma rice; thereafter, the Asian branch absorbed the bulk of Burma's rice exports. The European market, which European firms controlled, accounted for only a little more than a fifth to less than one-third of the total tonnage from 1928 to 1934 [ibid.], and it was this market that the Bullinger Pool dominated [Interim Report of the Rice and Paddy Trade Enquiry Committee 1931:21]. If trade with Europe was not all that large, why did the operation of the Bullinger Pool upset local Burmese interests?

The main objection to the Pool was its capacity to influence local prices of paddy and rice owing to a combination of factors: the size of its mills, its access to capital, its control over shipping, and its dominant position in the Western branch of the export trade. Prior to the first World War, the European market was served by German and British millers in competition with one another. But after the loss of their mills in Burma during the First World War, German firms began to import rice from non-European millers, chiefly, Beng Hwat and Co. and Hoosain Hamadanee and Co. The presence of these two firms balanced the dominance of the Pool, and some believed that the competition maintained the prices of rice and paddy at an "easy level" [RGWB 29 December 1930:10]. Data from the London Rice Brokers' Association (LRBA), which handled Europe's purchases of Burma rice, show how competitive both firms were in the European branch of the rice export trade. At one point (in 1922), as Table 3 shows, the two firms accounted for slightly more than half of the total exports to Europe while the rest of the years, they represented about a third or more of the total trade.

TABLE 3. Share of total* rice shipments to Europe by Beng Hwat and Co. and Hamadanee and Co. and by the Bullinger Pool, 1921-28

Year	Total Shipments to Europe (Tons)	Beng Hwat and Co. and Hamadanee and Co.		Bullinger Pool	
		Tons	% of Total	Tons	% of Total
1921	315,415	89,142	28.3	162,549	51.5
1922	394,427	202,858	51.4	118,762	30.1
1923	400,576	155,830	38.9	143,733	35.9
1924	595,937	211,688	35.5	241,957	40.6
1925	701,865	217,141	30.9	339,055	48.3
1926	509,827	172,639	33.9	250,746	49.2
1927	539,690	174,363	32.3	271,433	50.3
1928	511,098	160,199	31.3	274,573	53.7

* Total shipments here and in Tables 4 and 5 include only those with complete data (inc. tonnage and destination).
Source: London Rice Brokers' Association (LRBA), Weekly Rice Circulars, 1921-28.

In the summer of 1928, Beng Hwat and Co. and Hamadanee and Co. collapsed and transferred their agencies to Steels, thus enabling the Bullinger Pool (consequently referred to as the "Anglo-German monopolists") to expand their share of the market. Because of this connection in 1928, certain trade sectors in Rangoon came to believe that the Pool was created years earlier precisely to recover from the non-European millers (mainly Beng Hwat and Co. and Hoosain Hamadanee and Co.) the German agencies that had threatened the British position in the trade. Mr. M. Eusoof, the representative of Moulmein to the Burma Legislative Council, alleged, for example, that the Pool "succeeded in doing so, with the result that the non-European firms ceased to exist, and thus the competitive element in the purchase of rice and paddy disappeared" [*Report of the Burma Legislative Council Proceedings* (BLCP) 17, no. 7 20 February 1930:246]. For its part, Steel Bros. explained that the two firms failed because they issued delivery orders when they had no stocks of rice, apparently on the belief "that the support of the small millers would be a cheaper mode of obtaining their requirements than buying from the older established big mills" [Clark 1941b:39-40]. Mr. T. Couper, the government's representative to the Legislative Council, asserted that Beng Hwat and Co. had "for a long time sold rice to Hamburg at a price below cost price and at a loss" [BLCP 13, no. 4 1929:164]. In his Note of Dissent, Solomon believed that the two firms had misread the market, for that summer of 1928, "contrary to their usual seasonal tendency, [prices] declined below the levels reached in the first quarter of the year" [Solomon 1931:77].

After the closure of the two 'proxy' German firms, the hold of the Bullinger Pool over the European trade grew steadily, from an average share of 39.1 percent in 1921-24 to 69.5 percent in 1934-37 (Table 4). Among the four members of

the Pool, Steels dominated the export trade, accounting for an average of from 19 percent of the total European trade in 1921-24 or nearly half of the Bullinger Pool's average shipment during those years, to 50 percent in 1934-37 or 72 percent of the Pool's average exports to Europe. Steels' acquisition of Beng Hwat and Co. and Hoosain Hamadanee and Co. no doubt benefited the firm.

TABLE 4. Bullinger Pool's average share of Burma rice shipments to Europe, 1921-37*

Year	Average total shipment by all shippers	By Bullinger Pool		By Steel Bros.	
		Tons	% of Total	Tons	% of Total
1921-24	426,589	166,750	39.1	81,182	19.0
1925-28	565,620	283,952	50.2	121,596	21.5
1929-32	482,195	244,684	50.7	157,924	32.8
1934-37	360,170	250,261	69.5	180,390	50.1

* 1933 issues are missing.
Sources: LRBA, *Weekly Rice Circulars*, 1921-37.

After the Pool broke up in 1932 (because of the voluntary liquidation of Bulloch Bros. and Co.), Steels and the Anglo-Burma Rice Co. continued to dominate the rice export trade with Europe, accounting for more than half of Burma's exports of rice and rice products to Europe.

TABLE 5. Share of Steels and Anglo-Burma Rice Co. in total exports of rice and rice products to Europe, 1934-37

Year	Total exports in tons	Shipments by Steel Bros. and Anglo-Burma Rice Co.	
		Tons	Percent of total
1934	642,685	408,044	63.5
1935	540,182	304,940	56.5
1936	535,085	295,075	55.1
1937	682,096	407,349	59.7

Sources: LRBA, *Weekly Rice Circulars*, 1934-37.

One factor that enabled the Pool to assume a large hold over the European market was its connection to shipping companies. Steel Bros. was the joint managing agent of the two major shipping lines to Europe: Patrick Henderson and Co. (initially shared with Bulloch Bros. until the latter closed in 1932, with Steels taking over as sole agent) and the Bibby Line. In addition, Steels was the agent of the Indo-Natal Line and the Indo-China Steam Navigation Co., Ltd., which dealt in the Asian branch of the rice trade (Blake [1956:51]; *Burma Trade Journal* [1938]). Bulloch Bros. was the managing agent for the British India

Steam Navigation Co., Ltd., the most important line in the India trade and which also sailed to Singapore, Penang, China, and Japan [Andrus 1948:218]. For its part, Ellerman's Arracan Rice and Trading Co. managed the Ellerman City and Hall Line and the Nippon Yusen Kaisha Line (Japan Mail Steamship Co., Ltd.) [*Trade Directory of Burma and Ceylon* [1940-41:113]; *Commerce and Industry Proceedings (Commerce)* [1920:25]).

The Pool denied that it received preferential treatment from these shipping firms or that others were barred from obtaining space as a result of the Pool's managing agency of these lines. The system of "conferences" on freight rates, however, cast doubt on the Pool's claim. Under this system, freight rates on rice and rice products were determined not by open competition but by arrangements or "conferences" between the main shipping lines in the Rangoon export trade. The conference lines met regularly and fixed the rates on different types of cargo within their respective areas of business. The conference system applied to the Indian as well as the European trade.

Shipping lines also practiced a system of deferred rebates, usually ten percent of the nominal freight, which were returned to the shippers six months from the time of actual shipment. The rebates were granted not as a matter of right but of good will and on condition that shippers remained loyal to the conference line for the duration of the six months. As a result, regular exporters, fearful of losing their accumulated rebates, abided by this condition. As described by Solomon:

> So strong is the grip maintained by the "conference lines" on the carrying trade to and from Rangoon, and so large their resources, that it is difficult for any "outside" line, unassisted by specially favourable circumstances to cut in and secure a portion of the trade in the teeth of the competition to which it would be subjected by the "conference lines." Past experience has shown that attempts at "free competition" in the shipping trade have resulted either in the economic extinction of the intruder or, if it should have been possessed of exceptionally powerful resources, in its inclusion among the other conference lines. [Solomon 1931:72]Solomon added that Burma's case was different from the situation in other parts of Asia, such as Bangkok, Singapore, Hong Kong, Saigon, and the Dutch East Indies, where healthy competition existed among shipping firms engaged in the Asian trade. It was no surprise that the conference lines were called the "shipping pool" [Andrus 1948:218].

6. Burmese reactions

In 1923, just two years after the Bullinger Pool was formed and well before the onset of the Great Depression, Taw Sein Ko, a nominated representative to the Legislative Council, asked the government if it was true that European millers had "formed a combination to depress the price of paddy" purchased and milled by them for export. The Minister of Agriculture replied that the government had no definite information [BLCP 26 November 1923:29]. Six years later, the

question was once again raised in the Council, this time at a precarious period for the rice industry. Rice prices were falling, resulting in mill closures and increased agrarian indebtedness. Tharrawaddy U Pu, representative of Toungoo South, then proposed that a committee of seven be chosen by the Council from among its elected members to investigate the rice and paddy trade in general, and particularly, "the freights, the actions of the Bullinger's Pool", and to suggest ways to improve the industry. The European representative, Mr. O. De Glanville, along with Mr. H.B. Prior of the Burma Chamber of Commerce and Mr. T. Couper, the official representative, objected to the exclusion of the nominated members of the Council from the proposed committee and to the specific reference to the Bullinger Pool. The Council resolution was thus amended accordingly; while the reference to the Pool was dropped, the investigation would nonetheless look into "freights and combinations to control prices" [BLCP 18 February 1929:154-69].

> The Committee's terms of reference were wide, but the fall in the price of paddy, rice, and rice products had just begun and the main reason why the Committee was appointed was in order that it might investigate the cause of this fall, especially in view of the belief widely current in Burma that it was due to the manipulations of the market by a group of millers in Rangoon [RGWB 30 November 1931:2].

The investigation became the occasion for Burmese to demonstrate their opposition to the Bullinger Pool. The Burmese Chamber of Commerce declared, for instance, that: "As far as this Chamber is aware, it is true that the British firms, in conjunction with German buyers, have been forcing down the price of rice and paddy in Burma" [RGWB 5 January 1931:9]. The Council of National Associations blamed the Pool for the price depression in 1930:

> There will or can be no objection to the Bullinger Pool as an ordinary business combine but when it goes to the extent of transgressing the natural law of supply and demand by taking undue advantage of its position as the sole buyer as it has done this year, its very existence has become a serious menace to the general well-being of Burma. [RGWB 1 December 1930:7]

The Council went on to warn the (European) Burma Chamber of Commerce that unless the latter exercised its influence over the Pool to ease the situation, the Council would be compelled to launch an economic campaign to counteract the decline in prices [ibid.]. On 23 November 1930, about 3,000 landowners, rice millers, and cultivators met in Insein and agreed to sell paddy at no less than Rs. 180, when the going price in the area was between Rs. 110 to Rs. 118. The group added that if lower prices were offered, the crop would be stored rather than sold [RGWB 24 November 1930:8]. A similar resolution was passed a month later by another group of millers, traders, and growers in Myoma, also under the auspices of the Council of National Associations [RGWB 29 December 1930:10]. In early January of the following year, the Burmese Chamber passed a resolution

attributing the decline in paddy prices partly to the Bullinger Pool and called upon all paddy producers and sellers to create boards for the purpose of withholding the crop unless prices way above current ones were obtained for them [RGWB 12 January 1931:9]. Thus had the movement to hold out for higher paddy prices begun, prompting a correspondent of a Rangoon paper to warn the public that such action could only aggravate the already precarious decline in prices [RGWB 26 January 1931:12]). The Burma Chamber acknowledged the growth of this movement but maintained it would fail to arrest the fall in prices (RGWB [9 March 1931:9]; [7 March 1932:5]). The Assistant Director of Agriculture for the Irrawaddy Circle commented on the futility and adverse impact of the move by Burmese growers and millers:

> This advice has been to a great extent adopted by agriculturists, but the effect is just the reverse of what was foretold. The paddy market opened at about Rs. 84 per cent in the beginning of January and has now dropped to Rs. 70 per cent. This indicates that Burma is losing its hold in the market and unless she is prepared to dispose of her paddy at the available market price she will be saddled with a large stock of exportable surplus, which … will be difficult to get rid of. The result will be disaster to the economic life of the country. [RGWB 9 March 1931:21] Those opposed to the Bullinger Pool testified before the Rice and Paddy Trade Enquiry Committee that as a result of the Pool's manipulation of the paddy and rice market, small millers and merchants were gradually driven out of business. They further alleged that the Pool reaped enormous profits which it kept to itself [Interim Report of the Committee 1931:17-9].

It is difficult to evaluate the claim about profits in the absence of evidence that only the Pool could have provided, which the Committee itself acknowledged [ibid.:19]. The Committee was further handicapped by inadequate information on rice prices in Europe, which varied depending on the terms of sale: f.o.b. (free-on-board), c.i.f. (cost, insurance, and freight), or ex-warehouse (spot). Rice exported to Europe and other Western markets was commonly shipped at c.i.f. terms, under which the seller paid for the insurance and freight, the cost of loading the goods onto the ship, and delivering them alongside the jetty at the port of destination as well as port dues and brokerage fees in Rangoon and London. But some in Burma, such as Mr. Solomon, the secretary of the Enquiry Committee, claimed that the large millers sold rice in Europe at spot prices. Also, different qualities of rice were exported to Europe (Europe qualities super, 0, 1, 2, and 3), each at its own price. Of these, the accepted pricing standard was Europe No. 2 rice (also called Burma No. 2 or Rangoon No. 2) because the prices of other Europe qualities tended to follow its movement even if this particular quality did not form the bulk of rice exports to Europe [Solomon 1931:78].

In estimating profits earned from the rice trade, the government and the Burma Chamber could not agree on any item that went into the pricing of milled rice, from the purchase price of paddy, to the costs involved in rice production, the milling output (which varied according to the quality of paddy and the desired grade of rice; see Cheng Siok-hwa, [1968:105]), and the cost of c.i.f. shipment. These points of difference are summarized in the comparison below.

TABLE 6. Rice trade profits earned by large millers as estimated by the Government and the Burma Chamber of Commerce, 1931

Government	Burma Chamber of Commerce
1. The prevailing price of paddy in Rangoon was Rs. 75 per 100 baskets (of 46 lbs. each).	1. Accepted this figure but called it deceptive because only the best grain could be milled into Europe No. 2 rice quality, and it cost more than Rs. 75 per 100 baskets.
2. The costs of processing the paddy were: • Rs. 4 for the brokerage fee, and • Rs. 9 for actual milling.	2. Cost did not take into account the expense of maintaining a large fleet of gigs hired out to brokers, and the official figure on milling costs was too low. Brokerage fee was accepted in addition to revised figures: • Maintenance of transport at Rs. 1; • Milling at Rs. 10 for 100 baskets.
3. 100 baskets of paddy would yield: • 28 baskets of No. 2 quality, • 12 baskets of broken rice, and • 10 baskets of bran (all at 75 lbs. each).	3. Yield of 28 baskets was the maximum possible and only from the highest quality grain. Average yield was: • 26 1/2 baskets of No. 2 rice, • 13 1/2 baskets of broken rice, and • 10 baskets of bran.
4. Prevailing prices of the yield were: • Europe No. 2 rice in Europe: Rs. 5-2 per cwt. (112 lbs.) or Rs. 96 for 28 baskets; • Broken rice in Rangoon, Rs. 21-8 for 12 baskets; and • Bran in Rangoon, Rs. 3-8 for 10 baskets.	4. Prices were accepted and adjusted based on the yield above: • Rs. 89-7* for 26 1/2 baskets of No. 2 rice c.i.f. London; • Rs. 24-3 for 13 1/2 baskets broken rice Rangoon; and • Bran, the same.
5. Cost of shipping 28 baskets of No. 2 rice to London at c.i.f. terms was Rs. 28.	5. Cost of shipping 26 1/2 baskets of No. 2 rice to London at c.i.f. terms was Rs. 26-8.
Total expenditure = Rs. 116	Total expenditure = Rs. 116-8
Total revenue = Rs. 121	Total revenue = Rs. 117-2
Surplus = Rs. 5 per 100 baskets of paddy, from which office expenses still had to be deducted.	Surplus = 10 annas** per 100 baskets of paddy, from which the following still had to be deducted: • Office expenses, • Cost of depreciation of mill properties, and • Interest on capital invested.

* There seems to be an error in the Chamber's calculation of the amount received for 26 1/2 baskets of No. 2 rice at the c.i.f. London price of Rs. 5-2 per cwt. The correct figure should be Rs. 90-4. The total revenue earned becomes Rs. 118-9, less expenses of Rs. 116-8, leaving a surplus of Rs. 2-1 for 100 baskets of paddy and not 10 annas as claimed by the Chamber.
** 1 rupee =16 annas
Sources: Government Communique on Paddy Price Control, RGWB 30 March 1931:4; RGWB 13 July 1931:23.

7. Impact of the depression

The question of profits was exacerbated by the drastic fall in paddy and rice prices in 1930-31, heightening the perception that the Pool was raking in enormous profits. In response to this view, Mr. Henry, Chairman of the Burma Chamber of Commerce, told the body in February 1930 that European millers were "not in a position to dictate to the world's markets what price they should pay for their rice", and that the country which produces rice most cheaply is the one that secures a position in the world market, referring to Saigon and Siam as competitors in the Asian region and to Spain, Italy, and Egypt as global competitors [RGWB 3 March 1930:3]. The exoneration of the Bullinger Pool was echoed by Governor Sir Charles Innes, who argued at the opening of the Legislative Council's session on the budget in 1931, that the decline in Burma prices of Big and Small Mills Specials (the quality of rice sold to India and other Asian markets) was not as bad as that of the major agricultural products of India.

> Surely, he insisted, this fact should make any one pause before he gives currency to the statement that the collapse of our rice market is not due to the causes that are depressing prices all over the world but to special local causes connected with the operation of what is known as the Bullinger Pool, and the need for caution is also shown by the fact that prices of rice and paddy have fallen as much in Saigon as in Rangoon and nearly as much in Siam. [RGWB 16 February 1931:3].

With regard to the Burma Chamber's claim, the Rice and Paddy Trade Enquiry Committee found that in Asia as a whole—which was the largest buyer of Burma rice—increased exports from Siam and Indochina were not effected at the expense of Burma, and that in India and Ceylon, the major markets, Burma still enjoyed a strong footing in the rice trade. However, lower freight rates to Singapore and Hong Kong from Saigon and Bangkok gave the latter two rice-producing centers an edge over Rangoon. As for the western section of the rice export trade, the Committee observed that Italy, Spain, the United States, and British Guiana were indeed growing competitors, and that Germany, Holland, the United Kingdom, and Italy re-milled and re-exported rice imported from Burma to other parts of Europe, the West Indies, and South America, thereby posing additional competition to Burma [Interim Report 1931:6-15]. The Burma Chamber of Commerce seized upon these findings to reiterate its position that cheap rice production was the key to Burma's competitiveness.

Mr. M. Eusoof, the Moulmein representative to the Legislative Council, disagreed. He presented a comparison of c.i.f. prices in Europe for Europe rice No. 2 and similar qualities from Saigon, Siam, North America, Spain, and Italy, and showed that Burma sold her rice at the lowest price along with Saigon [BLCP 20 February 1930:247]. The f.o.b. (free-on-board) price of No. 2 rice in London was also lower than that of Siam and the same as Saigon's in January 1930 [RGWB 26 January 1931:12]. Eusoof concluded:

> It is clear that though Burma sends the largest exportable amount of rice to other countries, it really sells at the cheapest rate, and in spite of it the cultivators are suffering from the continuous fall in the paddy trade. [BLCP 20 February 1930:247] Solomon also pointed out that from 1929 to 1930, rice prices in Rangoon fell by 16 percent compared to the seven percent decline in London. The Burmese Chamber of Commerce believed that the decline in Rangoon paddy and rice prices in 1930, particularly from August to the end of that year, was caused by European rice firms that dumped milling notices without having enough paddy to mill—thus bloating, at least on paper, the available supply of both paddy and the expected outturn of rice—"and in many cases with no intention of milling and giving delivery according to these notices" [RGWB 5 January 1931:10]. With the expected oversupply suggested by the milling notices, prices dropped. The Chamber did not supply proof of dumping milling notices, although one such case landed in court in 1930-31 that demonstrates the practice of issuing milling notices even without paddy on hand. That case, between Steel Bros. (seller) and Tokarsee Mooljee and Co. (buyer), however, did not show an intent not to deliver the rice for it was, in fact, delivered but late (RGWB [30 November 1931:2]; [23 May 1932:7-8]).

Solomon advanced another explanation for the fall in paddy prices. He maintained that in the early part of 1930, the Pool pursued a policy of selling rice freely, thereby depressing the price of rice and, in effect, of paddy. In the meantime, district millers found few buyers for their rice. Unable to sell as freely as they wanted, local millers were not able to buy paddy at the scale they had previously done. Solomon claimed that the large mills took advantage of this situation to purchase large quantities of paddy during the first quarter of 1930, at prices they believed would produce profits later. In the end, the big millers were able to operate at full capacity and hence reduce their overhead expenses, while many small millers in the districts and in Rangoon, having obtained little paddy, thought it wise to shut down after the milling season started rather than operate with uncertain supplies of paddy [Solomon 1931:78].

In the final analysis the Enquiry Committee asserted that prices in Rangoon (which determined prices in the districts) were governed by the world market price. The latter, in turn, was determined by the demand from Asia, the largest consumer of rice. Since European and Western markets, in which the Pool had a dominant position, absorbed less than a third of Burma's total exports, the Committee believed it was unlikely that the Pool could influence the movement of prices [Interim Report: 1931:21-2].

Those opposed to the Pool remained unconvinced, however. They argued that even in the face of such situation, the Pool had room for maneuver. If the price of rice in Europe and India moved alongside each other, the market situation would remain quiet. But they alleged that if the demand from India became stronger than usual, thus raising the price of rice, the Pool would lose, for the increased demand

for rice would push up the price of paddy. The Pool would then have to purchase paddy at higher prices even through there was no corresponding price increase in Europe (presumably because different qualities were sold on the European and Indian markets). To prevent an upsurge in paddy prices, it was believed that the Pool would sell rice locally at a lower price than that obtainable by Indian traders selling from Burma. These merchants would consequently suffer a loss. So would the cultivators because the price of paddy would fall. The Pool would also lose but could make up for its losses in the European trade, which it commanded [ibid.: 19]. The Pool denied this allegation.

8. Price manipulation and access to paddy

The relationship between rice and paddy set the framework for the industry's price mechanism. As discussed earlier, profits from the local rice trade came from the difference between the price at which paddy was bought and rice was sold, after deducting milling and other expenses. There had to be some parity between paddy and rice prices in order for the miller to produce rice and make a profit. The existence of a combination to set prices for both paddy and rice in the local market subjected the parity in both prices to manipulation. There were two methods by which the Bullinger Pool was believed to have manipulated prices. One method, given in evidence before the Enquiry Committee, was for the Pool to raise the price of paddy in the early part of the season slightly higher than the price it ought to be in comparison with the corresponding price of rice. Those wary of the Pool claimed that this was done so that the Pool could amass sufficient supplies of the crop and restrict its competitors by making the latter pay more for paddy than the local going price for rice would allow. The second was that the Pool would set rice at prices too low to allow small millers a profit, thereby discouraging other mills from entering the paddy market. Consider the hypothetical scenarios below, reckoned from Solomon's formula.

TABLE 7. Parity between rice and paddy prices per 100 baskets

	Market price of small mills specials rice	Parity price of paddy
Case 1:	Rs. 400	Rs. 159
Case 2:	Rs. 410	Rs. 163
Case 3:	Rs. 405	Rs. 161

Source: Calculated using Solomon's formula, on an average cash outturn of 41.5 percent for Small Mills Specials and a milling cost of Rs. 7.

Let us suppose that the market price of rice was Rs. 400 per 100 baskets (case 1), for which the parity price of paddy would be Rs. 159. It was alleged that if the Pool wished to sell rice abroad at Rs. 410 (case 2), it would not want the price of

paddy to rise to Rs. 163 so that it could obtain a larger margin of profit. The Pool would then agree to buy paddy at Rs. 161 per 100 baskets but, not wanting the price of rice to go up to Rs. 405 (case 3) in order to maintain as large a spread as possible, the Pool would sell rice locally at Rs. 400. Thus by setting the buying price of paddy at Rs. 161, or two rupees above the parity price (case 1) and selling rice at Rs. 400 (instead of Rs. 405 as shown in case 3), other millers affected by these policies would end up milling at a loss. So would the Pool but since it planned to sell rice outside Burma at Rs. 410, it could easily recoup its losses. The cultivator or paddy seller would also be affected, for with the Pool's export price of rice at Rs. 410, he should receive Rs. 163 instead of Rs. 161.

But what volume of rice did the Pool handle locally and was it enough to affect the parity between paddy and rice? The Burma Chamber asserted that it was impossible for the Pool to control the trade:

> The British firms do not handle more than about one third of the exportable surplus of the Burma Rice crop, or little more than one sixth of the total crop…. It would be more logical to conclude that those other rice millers and exporters, who are handling the great bulk of the crop, have been responsible for forcing down prices. This Chamber, however, does not subscribe to such a view, being well aware that the fall in paddy prices is due to causes entirely beyond the control of those engaged in the trade. [RGWB 5 January 1931:9] The Enquiry Committee agreed, pointing out that the Bullinger Pool milled from 22 to 37 percent of the rice exported by Burma from 1925 to 1930.

TABLE 8. Percentage of total rice exports milled by the Pool, 1925-30

Year	Percentage of total
1925	36.9
1926	33.0
1927	31.0
1928	22.4
1929	28.7
1930	30.4

Sources: *Interim Report of the Committee Appointed to Enquire into the Rice and Paddy Trade* (Rangoon: Supdt., Government Printing, 1931), 17; *Report of the Burma Legislative Council Proceedings* 19, 6 (19 February 1931): 259.

Two members of the Committee, Mr. W. Richards of the Burma Chamber of Commerce, and Mr. A. Chandor of the Burma Indian Chamber, added in a separate note that since millers outside the Pool handled about 70 percent of total exports, their financial weakness did not hamper them from "competing effectively" with the Pool for supplies of paddy (Note attached to the Interim Report[1931:37]).

The Burmese Chamber of Commerce replied that first, based on its study of the daily export lists from 1 January to the end of September 1930, the British firms exported about 37 percent of the total exports from Rangoon alone. Most of the remaining 63 percent had "no mills and … [had] consequently to depend upon millers, including the British firms to get the rice required for export" [RGWB 5 January 1931:10]. Second, based on the daily market reports of boat and rail paddy arrivals, the Chamber estimated that British firms purchased about 65 percent of total paddy arrivals into Rangoon. This share, plus the fact that these firms bought additional rice from small millers which they resold locally to other exporters, formed the basis of the Burmese Chamber's estimate the the British firms actually handled no fewer than 50 percent of Burma's exportable surplus [ibid.].

Part of the Burmese Chamber's estimate can be verified. In the latter half of 1932, the "Money and markets" series of the *Rangoon Gazette Weekly Budget* (RGWB) included a section on rail and boat arrivals of paddy in Rangoon. The data shows that on a weekly basis during this period, large millers took in from 32 to 63 percent of the total number of baskets of paddy brought to Rangoon, by no means a small or insignificant share.

TABLE 9. Share of paddy arrivals in Rangoon held by big millers from the end of September to mid-December, 1932

Week ending	Total no. of basket arrivals	Share held by big millers	
		No. of baskets	Percent of total
24 September	34,800	12,900	37.1
1 October	20,600	6,600	32.0
8 October	43,600	25,600	58.7
22 October	30,300	18,200	60.1
5 November	17,000	9,000	52.9
19 November	42,500	18,500	43.5
26 November	27,800	16,700	60.1
3 December	14,500	5,100	35.2
10 December	16,900	5,400	32.0
17 December	13,600	8,600	63.2

Source: RGWB 26 September to 19 December, 1932.

The amount handled by the Pool was sufficient to enable its members to influence the market price of paddy (and rice) if they so chose, for they combined precisely to operate on a common price policy. Although the Enquiry Committee exonerated the Pool, the Committee report is peppered with implicit admissions of the Pool's influence. For instance, the Committee observed: "That the way in which the Pool handles this quantity has a temporary influence on local prices must be admitted, but that it is able to manipulate prices in face of world

conditions is highly improbable" [Interim Report 1931:26]. In other words, the volume of rice in the hands of the Pool was sufficient to permit it to exercise influence over the market, albeit temporarily.

The Committee, moreover, found it justifiable that the Pool would compensate for any losses in the local trade with profits from its trade in Europe, adding that this was "not clearly unfair to the small miller".

The Pool cannot reasonably be expected to stand by and see its mills closed down and the capital sunk in them become a total loss. *It may be that is methods are not all that could be desired*. But it seems to us a sufficient answer that the competition, which it had to face, was intensive and forced on it. [ibid.: 22] (italics supplied)

In the end the Committee asserted that the Pool had no legal monopoly. Such dominating position as it has arises from the power to organise, hard work, fair dealing with its customers and loyalty of its members one to another. The small miller can attack the monopoly in so far as he shares these qualities and has adequate finance [Interim Report 1931:22]. In the eyes of the Enquiry Committee, matters would have been worse without the Pool. Paddy prices would have soared uncontrollably, given the competition in the rice milling sector. Cultivators would have benefitted, but only temporarily because mills would end up working at a loss, thus leaving room for others to organize a monopoly. In the end the paddy grower, the Committee stated, would end up worse off [Interim report 1931:26]. In effect the Committee was saying it was better to have 'controlled' competition that one that operated freely; that it was better to have a combination than none at all, and that the Pool's monopoly was the lesser evil given the circumstances in Burma. Uncannily the Committee acknowledged the very defects of the system and the real power of the Bullinger Pool.

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The BSP's journey towards a progressive monetary policy framework

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This paper examines the evolution of monetary policy framework in the country. It starts the journey with the establishment of the central bank after the Second World War, when there was still no active monetary policy as the country operated on a fixed exchange rate system and supply-led credit programs. The paper describes the challenges with the implementation of monetary policy reforms in the 1980s, particularly the shift to a "managed float" exchange rate system and the adoption of monetary aggregate targeting framework in the context of deregulation and liberalization.

It further discusses the development of monetary policy framework and operations, following the creation of an independent Bangko Sentral ng Pilipinas (BSP) in 1993, with the primary mandate of maintaining price stability. It provides a narrative on how the monetary aggregate targeting framework was modified to its eventual shift to an inflation targeting (IT) framework. It highlights the relative success of IT and discusses the innovative approaches undertaken by the BSP to further enhance liquidity management. Moving forward, the BSP's monetary policy framework and operations will likely continue evolving and serving as steady anchors of macroeconomic stabilization. This will be guided by foresight, commitment to action and helpful lessons from the past, in the context of increased uncertainty.

JEL classification: E3, E4, E5
Keywords: monetary policy, inflation targeting, monetary targeting, inflation, interest rates, exchange rate, central banking, Philippines

1. Introduction

A modern central bank is now challenged by more deregulated and liberalized markets, heightened volatilities in asset markets, and rapid technological progress. While these milestones contribute to efficiency, they could also amplify

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uncertainties and risks for financial markets. Moreover, even as an economy goes through the business cycle, the depth and breadth of each cycle differ. The elements that define each cycle likewise vary and may call for different policy measures. Thus, adopting an agile, systems-oriented approach has become more critical. These developments require introspection and a constant re-examination of deep-rooted practices. The swiftness by which technological progress proceeds in the context of a more deregulated environment, therefore, requires monetary action that is forward-looking, focused, flexible, and deft (Sheng [2013]; Bagsic and Glindro [2006]).

At the core of modern central banking is monetary policy, which essentially seeks to safeguard the real value of money and its efficacy as a medium of exchange and store of value. In doing so, monetary policy helps achieve macroeconomic stability as embodied in proximate indicators of welfare notably, national income and inflation. The influence of monetary policy works through intermediate targets, which central banks do not have absolute control of [Koning 1986]. The distinction between an intermediate target and the day-to-day operational target is oftentimes ambiguous. As such, the intermediate target must be closely linked to the final objective, controllable by the central bank and measurable.

Central banking in the Philippines was breathed into life in 1948 when President Elpidio Quirino signed Republic Act (RA) 265. Reeling from the ashes of World War II, supply-driven credit programs and fixed exchange rate policy characterized the nascent financial landscape. Central banking then was rudimentary. There was no active monetary policy like we know in modern central banking because the central bank operated on a fixed exchange rate system and supply-led credit programs. The Philippines then espoused the creation of cooperative banks to spur growth and development. The creation of the rural banking system in 1952 signaled the country's early openness to supply-leading interventions and can be considered the earliest embodiment of the financial inclusion objective. From simple supply-led credit support systems in the aftermath of the second world war, the role and functions of the central bank evolved and matured with the changes in the economic and regulatory terrain [Tolentino et al. 2020].

In keeping with the times, monetary policymaking in the Philippines has strived to proactively respond to the demands of modern central banking. Just like any reform process, the monetary policy reform path was fraught with challenges. Many of the reform turning points were precipitated by a crisis. With learning, the reforms increasingly took on a more proactive and progressive stance. The tempo was slow at the beginning but started to quicken in the 1990s.

Interest rate ceilings were eliminated in the early 1980s, followed by the deregulation in the foreign exchange market in the 1990s. In between these two decades and notwithstanding the interest rate liberalization, the supply-driven credit programs that underlined the development financing function of the Central Bank of the Philippines (CBP) persisted.

The creation of an independent central monetary authority, that is, the Bangko Sentral ng Pilipinas, in 1993 put an end to development financing that hobbled its predecessor. In 1994, RA 7721, liberalizing the entry of foreign banks, was passed into law. Post 1998, reforms in financial disclosure rules, accounting standards, corporate governance standards, capital adequacy requirements, and the banking/securities industry structure have been institutionalized. A major reform of the General Banking Law was enacted in 2000, two years before the formal implementation of inflation targeting as the monetary policy framework of the BSP (Guinigundo and Cacnio [2019]; Bagsic and Glindro [2006]).

2. First wave of monetary policy reform

After the collapse of the Bretton Woods arrangement and stagflation in the early 1970s, the global monetary order was in search of a workable monetary policy framework for credible control of inflation. Many central banks in advanced economies embarked on monetary aggregate targeting (MT). Emerging market central banks, however, opted to implement numerous direct controls on the exchange rate, lending and interest rates as well as augmented exchange rate fix [David 2018]. The disinclination may have stemmed from greater exposure to supply shocks and trade volatility, procyclicality of both domestic fiscal policy and international finance, lower credibility with respect to both price stability and default risk, and less developed or imperfect institutions [Frankel 2011].

During the 70s, the Philippines adopted a fixed exchange rate regime and a credit targeting framework that used interest rate controls and credit ceilings. There was no coherent policy focus on implementing monetary policy as it was saddled with multiple mandates and limited autonomy. While the central bank was accommodating the credit expansion of domestic banks and performing the lender of last resort function, it was also encumbered with fiscal concerns, including the channeling of resources to priority sectors. The lack of clarity and focus made for a fragile policymaking in times of political and economic instability.

The central bank was also involved in supply-driven credit programs, including large-scale lending with preferential interest rates. These resulted in financial pressures and imbalances that eventually became unsustainable. A massive capital flight accompanied by default on external debt service and wide-spread insolvency of domestic banks and enterprises led to financial crisis in 1983. This led to a two-year recession starting in 1984, the year when the highest inflation rate was recorded in history at 49.2 percent.

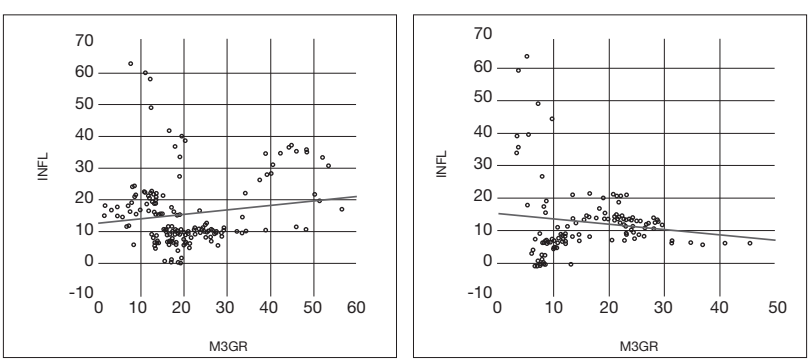
In response to the crisis, the country changed its monetary policy regime in October 1984, with a shift to the "managed float" exchange rate system and the adoption of MT framework. Under MT, the central bank placed greater emphasis on reducing inflation. It was accountable for achieving an announced monetary aggregate growth target that was needed to achieve a desired level of inflation.

The MT framework operates on the assumption of a stable and predictable relationship between and among money, output, and inflation. With an assumed stable velocity of money,[1] a change in money supply prompts a change in price or inflation. The effectiveness of monetary targeting is therefore contingent also on the stability of money demand. When money demand is stable, variations in its determinants are systematically associated with the fluctuations in money velocity, rendering the monetary aggregate as the natural operational target [Atkinson et al. 1984].

The Philippine central bank adopted the base money[2] as the operating target, the broad money or M3[3] as the chief intermediate money target,[4] and the open-market instruments and reserve requirements as main tools for monetary policy. The explicit announcement of a monetary target also helped in anchoring inflation expectations as this provided signals to the market on the monetary policy stance of the central bank [Guinigundo and Cacnio 2019]. A year after the adoption of the MT framework, the country's inflation rate dropped to a single digit in November 1985 and this continued until end of 1987.

The focus on base money facilitated the restoration of monetary control over M3, which was closely related to inflation [Arora 2000]. The statistically significant positive correlation between the growth of M3 and inflation can be seen in the scatterplots and estimation results for pre-MT period whereas the insignificant negative correlation between the growth of M3 and inflation was obtained beginning the MT period.

FIGURE 1. Scatter plots of inflation rate (2012=100) and m3 year-on-year growth,1971 to 2001

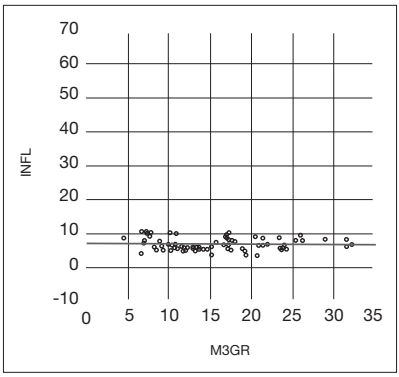


[1] Velocity of money is the rate or the average number of times per year that the money is spent in buying the total amount of goods and services produced in the economy [Mishkin 2004].

[2] Base money is the sum of reserve money, reserve-eligible government securities (including liquidity reserve) and reserve deficiency of banks, if any [Arora 2000].

[3] M3 is narrow money (currency plus domestic currency demand deposits) plus quasi money (domestic currency time and saving deposits) [Arora 2000].

[4] While broader monetary aggregates could predict future economic activity more accurately compared to narrowly defined monetary aggregates, the greater control of central bank on M3 made it a reasonable intermediate target of monetary policy [Lamberte 1984].



MODIFIED MT

Source of basic data: Philippine Statistics Authority and Bangko Sentral ng Pilipinas

TABLE 1. Comparison of indicators in various periods of monetary targeting,1971 to 2001

	Pre-MT	MT	Modified MT
Period	1971-1984 Sep	1984 Oct – 1995 June	1995 July – 2001
Correlation coefficient of M3 and inflation growth rates	0.14*	-0.13	-0.03
Inflation rate average (%)	15.6	12.3	7.0
Inflation volatility	11.1	10.5	1.8
Volatility of money velocity	0.1	0.2	0.1

* Statistically significant at 10 percent level
Volatility is measured in terms of standard deviation.
Money velocity is M3 velocity based on real Gross National Income and Consumer Price Index
Source of basic data: Philippine Statistics Authority and Bangko Sentral ng Pilipinas

The implementation of reforms in bank supervision, development of monetary policy instruments, and major reforms in public enterprises and banks in the second half of 1980s led to further improvement in the country's monetary operations.[5] However, as the adverse impact of the financial crisis lingered, political instability and further external and domestic shocks led to double-digit inflation from 1988 to 1991 and an economic contraction in 1991. This resulted in the resurgence in balance sheet problems of banks that required another emergency assistance by the central bank.

The balance sheet of the old CBP was saddled by the accumulation of significant loss-making assets. The biggest losses were traced to the excess of interest expenses over interest income that arose from interest subsidies, off-budget loans, and assumption of foreign exchange liabilities of some domestic corporations

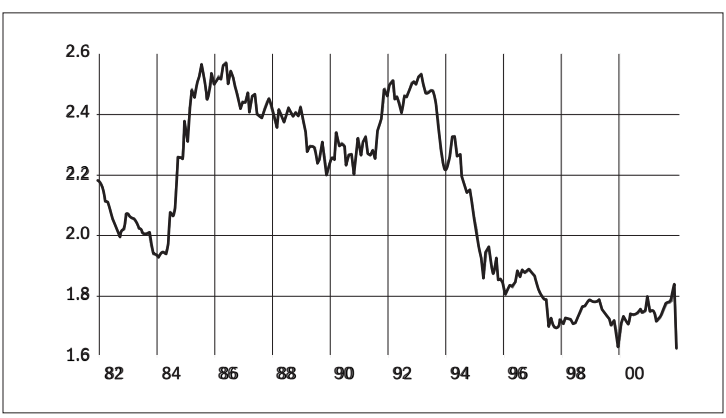
[5] Op cit.

(government-owned-and controlled corporations and private companies), which should have been under the remit of fiscal policy. These heavy losses circumscribed the conduct of monetary policy and severely undermined the financial solvency of the CBP [Lamberte 2003].

In 1993, along with the country's renewed focus on macroeconomic stability and market-oriented reforms, the Bangko Sentral ng Pilipinas (BSP) was established as the new central bank. Starting with a clean slate, the BSP strengthened its operational independence with a well-defined primary mandate of maintaining price stability. This allowed for a more effective implementation of monetary policy and facilitation of financial intermediation, supported by reforms such as fiscal consolidation, privatization of government owned and controlled corporations, and financial liberalization [ibid]. The favorable policy environment resulted in the containment of inflation to a single digit level in 1993.

However, the confluence of financial liberalization, together with rapid innovations in the financial system (e.g., ATM, credit cards), macroeconomic cycles, external and domestic shocks, and financial crises had reduced the stability of money demand in the country. Lim [2008] noted that financial liberalization led to "structural breaks" in income velocity of money and volatilities in money multiplier and these weakened the link between monetary aggregates and inflation. Figure 2 shows the downtrend and volatile velocity of money.

FIGURE 2. Income velocity of money, 1981 to 2001



Note: M3 velocity is based on real GNI (2000=100) and consumer price index.
Source of basic data: Philippine Statistics Authority and Bangko Sentral ng Pilipinas

Monetary policy was made more complicated with increased capital inflows in 1994, which put pressure on the base money. As pointed out by Guinigundo [2005], the double-digit expansion of M3 in 1994 and 1995 was accompanied by a drop in the inflation rate from 12.5 percent in 1994 to 6.9 percent in 1995, an indication of a structural break. The reduced information content from M3 implied weakening of this monetary aggregate as a lever of monetary policy and as an indicator of the monetary policy stance [Guinigundo 1999].

As capital inflows exerted exchange rate appreciation pressures on exports, there was also increasing recognition within BSP that intervention was not the sole solution. Thus, BSP began raising the existing ceiling on outward investments without requiring prior BSP approval, limiting foreign loan approvals including foreign currency deposit unit loans to those earmarked for foreign exchange cost, adjusting the rediscount rate formula, and monitoring of foreign exchange inflows from initial public offerings. The BSP also took an active role in advocating for further liberalization measures such as the accelerated phase down of forward cover to oil companies.

To improve the effectiveness of monetary policy and provide the BSP with greater flexibility during periods of massive capital inflow, the MT framework was reworked to incorporate some elements of inflation targeting. In the second half of 1995, while base money targeting continued, monetary policy formulation included the assessment of the impact of capital inflows on prices by monitoring actual inflation outturns relative to programmed levels. Exceeding monetary target was tolerated as long as actual inflation was within the projected monthly path. This was implemented by shifting the operating target to net domestic asset and allowing the base money target to increase for any excess of foreign reserves. When inflation exceeded the projected monthly path, the operating target reverted to base money and the exchange rate was allowed to appreciate or the BSP implemented sterilization.

While the MT framework of the BSP served its purpose well and remained useful since its adoption in the mid-1980s, the BSP found it necessary to modify the manner in which it conducts policy primarily due to marginal improvement in inflation during the pre-modified MT period (i.e., both inflation average and volatility remained double-digit in Table 1). This is partly attributed to the weakening of the monetary policy framework resulting from major structural shifts toward greater liberalization of the financial system in the 1990s. At the core of the monetary targeting modification was the greater emphasis on price stability and less on the intermediate target, M3. The information set used in the conduct of monetary policy was broadened. The framework, therefore, began to assume a semblance of inflation targeting.

The modified MT had established price stability as the clear objective of monetary policy, with less emphasis on monetary targets. Table 1 shows the decline in inflation rate to a single digit and the reduction in inflation volatility under this framework. Notwithstanding the improvement in inflation, price stability was not sustained under the modified framework as other objectives were still considered in monetary policy. For instance, during the Asian Financial Crisis (AFC), the focus of monetary policy was on restoring confidence on the Philippine peso[6] and containing inflation. When these were achieved, monetary policy priority shifted to the provision of support to economic recovery.

[5] Guinigundo [2017] pointed out, however, that the occasional intervention of the BSP in the foreign exchange market was always in consideration of the price stability objective. Due to the significant role of the Philippine peso in predicting inflation, the BSP was participating in the market to ensure the orderly determination of the exchange rate and to minimize the pass-through effects on prices.

Moreover, increased difficulty in predicting short-run monetary developments had complicated the implementation of monetary targeting [Arora 2000]. This can be observed using the money demand equation of Arora [2000] in Table 2. It shows that while cointegration tests indicate the presence of a long-run equilibrium relationship among real money balances, real income and inflation expectations,[7] the short-run error correction model has a small value for error correction parameter. This parameter represents the speed of adjustment towards long-run equilibrium. Multiple breakpoint test on the money demand equation also showed structural breaks in years of financial reforms, economic and financial crises, and surge in capital inflows.

TABLE 2. Money demand estimate,1981 to 2001

Money Demand Equation: $\frac{M}{P} = a_0 + a_1 \frac{Y}{P} + a_2 \Pi^e + \in$ where: $\frac{M}{P}$ is log (real M3); $\frac{Y}{P}$ is log(real GNI); and Π^e is expected inflation or dlog (CPI)	
Johansen Cointegration test of real M3, real GNI, and expected inflation	Trace and Max-eigenvalue tests indicate 2 cointegrating equations**
Cointegration test on Residuals	ADF test statistic: -2.4***
Multiple breakpoint tests	Break dates**: 1986,1991, 1994, 1997
Long-run coefficients:	
Real GNI	1.50 (68.0)***
Expected inflation	-0.34 (-5.7)***
Error-correction estimates	
Lagged real M3 (first difference)	-0.07 (-1.1)
Real GNI (first difference)	1.04 (5.2)***
Expected inflation (first difference)	-0.50 (-4.1)***
Error-correction term	-0.08 (-3.0)***

Statistically significant at *10 percent, **5 percent and ***1 percent levels
Unit root tests indicate variables were integrated of order 1.
Source: Arora [2000], authors' estimate using basic data from Philippine Statistics Authority and Bangko Sentral ng Pilipinas

3. The road to inflation targeting

Inflation targeting (IT) was seen as a promising approach to sustaining price stability over the medium term. Houben [1997] proposed that in the face of large monetary and real shocks, a policy that directly targets inflation in a transparent and consistent framework while giving enough room for maneuver to deal with unforeseen developments is ideal. Debelle and Lim [1998] also recommended the same to establish central bank credibility, since commitment to price stability would demand monetary policy discipline, transparency, and accountability.

[7] Cointegration tests were conducted on the variables and the residuals of the money demand equation.

On January 24, 2000, the Monetary Board approved the shift of the country's monetary policy framework to inflation targeting. Just like any reform, the adoption of inflation targeting had its fair share of naysayers, the usual refrain was "if it ain't broke, why fix it". The BSP recognized that the undercurrents of trade deregulation and financial liberalization required a stronger policy anchor for the central bank to maintain monetary stability. Since monetary stability presupposes price stability, controlling inflation is the most sensible proximate policy goal to pursue.

Promoting price stability confers a distinct advantage in terms of more well-defined focus of monetary policy and the exercise of instrument independence. However, the BSP does not pursue price stability independent of other objectives. It recognizes that price stability is intrinsically linked to other objectives of financial stability and facilitating efficient payments and settlements system, all in support of more inclusive economic development. As Sheng [2013] puts it, whereas price stability safeguards monetary stability, financial stability ensures that the value of money is not eroded through credit, operational, or other risks.

Guinigundo [2005] provided an exhaustive discourse on the contexts that led to policy shift to IT, as encapsulated in this section. Unlike monetary targeting that reacts mainly to current inflation, IT has the forward-looking feature since monetary policy operates with long and variable lags. The BSP was already announcing annual inflation targets even under the modified monetary targeting framework. The shift was considered opportune as the preconditions like central bank independence and the primordial role of price stability were already existing. Moreover, the information-intensive nature of IT was seen to sharpen the economic surveillance capacity of the BSP.

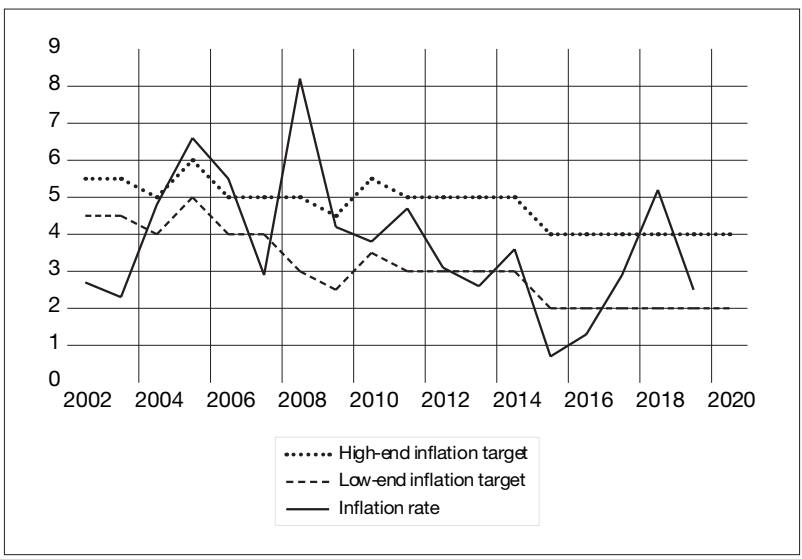
The change in monetary policy framework necessitated systems and process enhancements. The success of inflation targeting hinged on an effective communication strategy. Public information campaigns were held to raise awareness and to consult various sectors of the society in designing specific elements of the new framework. Some of the envisioned modalities that were discussed included the use of headline consumer price index (CPI) inflation as the official target; the adoption of a core inflation measure as an input to monetary policy setting; and the announcement of the government's annual inflation target, with one-percentage point band over a two-year policy horizon.

To support analytical rigor in decision-making, the Advisory Committee (AC) was created. The AC was tasked to provide the Monetary Board with insightful and well-considered analyses and recommendation on monetary policy stance. This required significant investment in sharpening analytical capacity in the development of quantitative models for inflation forecasting since these are crucial for a forward-looking monetary policy framework [Guinigundo 2005]. The Monetary Board also started considering a much broader set of information in discussing the monetary stance during periodic meetings. The BSP concomitantly pursued the liberalization of the BSP rediscount window, refocusing the use

of rediscounting facility to support the price stability mandate instead of development financing, as well as the gradual reduction and uniform application of reserve requirements.

Recognizably, steering inflation towards the target was not an easy feat even when the transition period happened earlier during the modified MT regime. The initial years of implementation of inflation targeting were characterized by frequent breaches around the narrow target band (Figure 3). Nonetheless, inflation stabilization has been observed since the BSP adopted inflation targeting as the framework of monetary policy. Average inflation and inflation volatility have declined even with disruption caused by the global commodity price shock in 2008-2009.

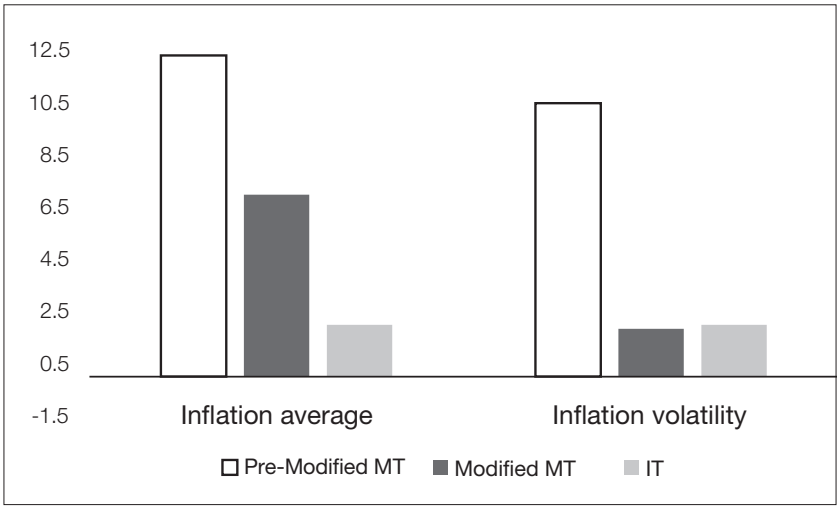
FIGURE 3. Inflation performance during the IT period



Source of basic data: Bangko Sentral ng Pilipinas

Figure 4 shows that among the three monetary policy frameworks adopted by the country, the shift to IT framework has been the most effective in promoting price stability. This is supported by a number of studies that discussed and empirically assessed the effectiveness of IT in allowing the country to achieve a lower average inflation and reduced inflation volatility (Guinigundo and Cacnio [2019]; Guinigundo [2017]; Glindro, et al. [2016]).

FIGURE 4. Inflation average and volatility in three monetary policy regimes

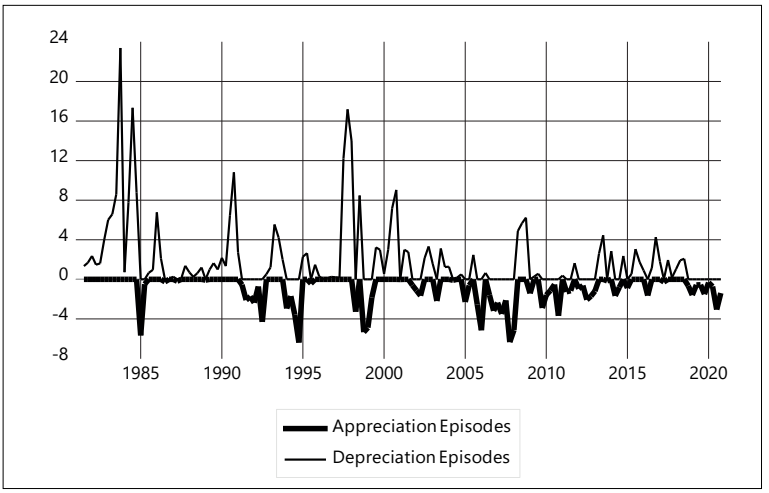


Source of basic data: Philippine Statistics Authority

Early in the IT implementation, the BSP initiated the engagement of international external experts in 2005 – 2006 to conduct a comprehensive review of the operational arrangements for inflation targeting and of the inflation forecasting models. The panel of experts consisted of Professor Kenneth F. Wallis of the University of Warwick, Prof. Bennett T. McCallum of Carnegie Mellon University, and the late Peter J. N. Sinclair of the University of Birmingham. The salient recommendations put forward by the experts centered on three principles: acceptability, achievability, and reform-orientation. Specifically, the proposals included widening of the forecast band, development of forward-looking forecasting models, generation of measures of inflation expectations from surveys and experts' forecasts, reporting of risks and reduction of frequency of policy meetings to better assess the evolution of key economic developments [BSP 2020a].

Greater exchange rate flexibility accompanied the disinflation process. This was evident after the 1997 Asian financial crisis and the subsequent implementation of financial sector reforms. Figure 5 shows that depreciation pressures which were stronger in the pre-IT period, have significantly ebbed and appeared more in balance with appreciation episodes during the IT period. Over time, the policy weight of exchange rate developments was largely on account of its impact on inflation and inflation expectations. BSP occasionally engaged in foreign exchange market intervention to stem excessive exchange rate volatility arising from speculative or "hot money" flows rather than structural flows such as remittances, exports, and foreign direct investment [Amador et al. 2009].

FIGURE 5. Exchange rate depreciation/appreciation episodes



Authors' estimates. Depreciation and appreciation episodes were estimated on a quarter-on-quarter basis.
Source of basic data: Bangko Sentral ng Pilipinas.

3.1. Communication as complementary policy instrument

Since its official implementation in January 2002, the BSP began publishing the Quarterly Inflation Report and minutes of Monetary Board meetings to increase transparency and accountability. In the event of breach of annual inflation target, open letters to the President explained the circumstances that led to the breach and the action plan to bring it back to target path was issued. The BSP increasingly held press conferences and issued press releases on its monetary policy stance, which provides the public with the BSP's views on evolving economic developments that underpin its policy decision. These, together with use of social media, are now staples of the BSP's communication system.

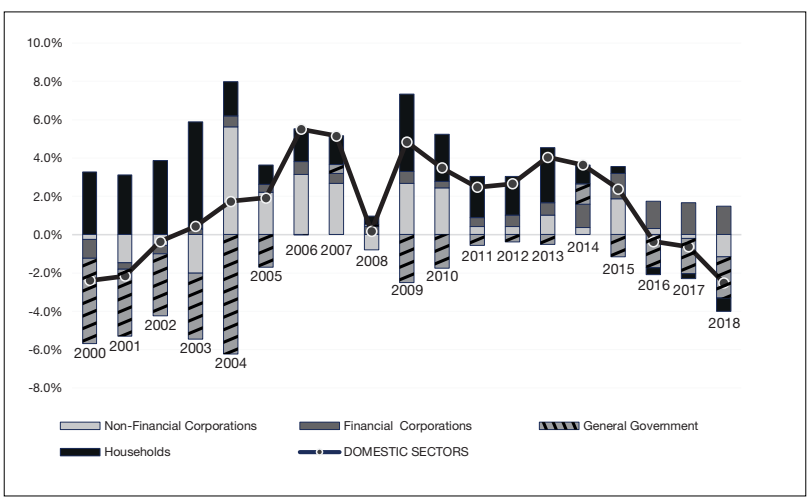
The forward-looking nature of IT has put greater importance on the expectations channel of monetary policy. Since the efficacy of monetary policy under the IT framework hinges mainly on the anchoring of inflation expectations, the BSP has considered communication with the public as an important and powerful part of its policy toolkit. Hence, aside from open market operations and other instruments, the BSP has acquired the flexibility to undertake "open mouth operations" as an important policy instrument. These operations refer to monetary policy communication and accompanying signaling that may move the markets at the same or even greater magnitude than the actual rate adjustments [Amador 2019]. The BSP has become more strategic in its communication to stabilize expectations and hence, further enhance the effectiveness of monetary policy. It is continually improving the way it communicates, particularly when introducing new policies and/or during times of heightened volatility and uncertainty.

3.2. Policy instrument constraint

The unique power of central banks to issue its own securities for regular liquidity management was clipped with the passage of RA 7653 that created the independent BSP.[8] This power has been restored only in 2019, following the passage of amendments to the BSP charter under RA 11211. Thus, for the period 1993 – 2019, the BSP had to think of innovative modalities to improve its liquidity management operations that support inflation targeting.

Since 1993, the BSP had to rely on available government securities in the secondary market for its open market operations. The expansion in savings amid limited absorptive capacity of the economy, as reflected in the flow of funds data (Figure 6), resulted in substantial excess liquidity in the system that needed to be absorbed. As government securities available in the secondary market dwindled following fiscal consolidation, the BSP had to look for alternative mechanism to siphon off excess structural liquidity.

FIGURE 6. Net lending (+)/net borrowing (-) (as percent of GDP)



Source of basic data: Bangko Sentral ng Pilipinas

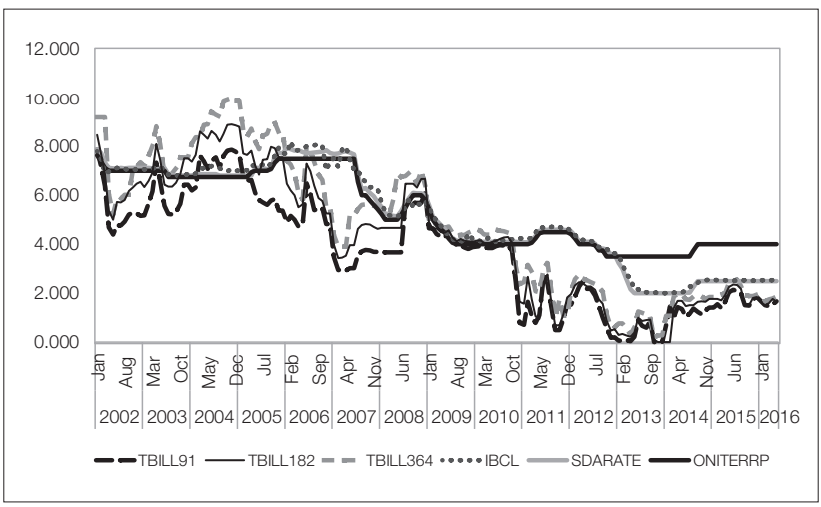
Expansion of SDA access. With capital inflows in excess of the absorptive capacity of the economy, the BSP expanded access to its the Special Deposit Account (SDA)[9] facility in April 2007 to include trust entities of banks and non-bank financial institutions. Over time, banks, largely through their trust entities, placed sizeable portion of their funds with the BSP even as loan growth continued

[8] RA 7653 allowed for issuance of BSP securities only in cases of extraordinary movements in price levels.
[9] First offered in November 1998.

to increase. This behavior can be traced to the general macroeconomic condition of inadequate investment opportunities vis-à-vis increasing savings. As such, deposit placements at the BSP provided alternative lucrative investment outlets [Amador et al. 2009].

Since SDA was a passive instrument, the BSP had little control over the volume of placements made by eligible counterparties. Not only did it impinge on BSP's balance sheet, it also inadvertently competed with private funds because it was seen as an alternative investment. The tenability of a passive SDA stood precariously against huge capital inflows. As can be gleaned from Figure 7, there was an apparent delinking of the key policy rate, that is, the RRP, from market and retail interest rates, which tracked the SDA from 2013 to 2016. It was eventually decommissioned and absorbed into the more market-based auction facility in 2016 when the BSP shifted to the interest rate corridor (IRC) system.

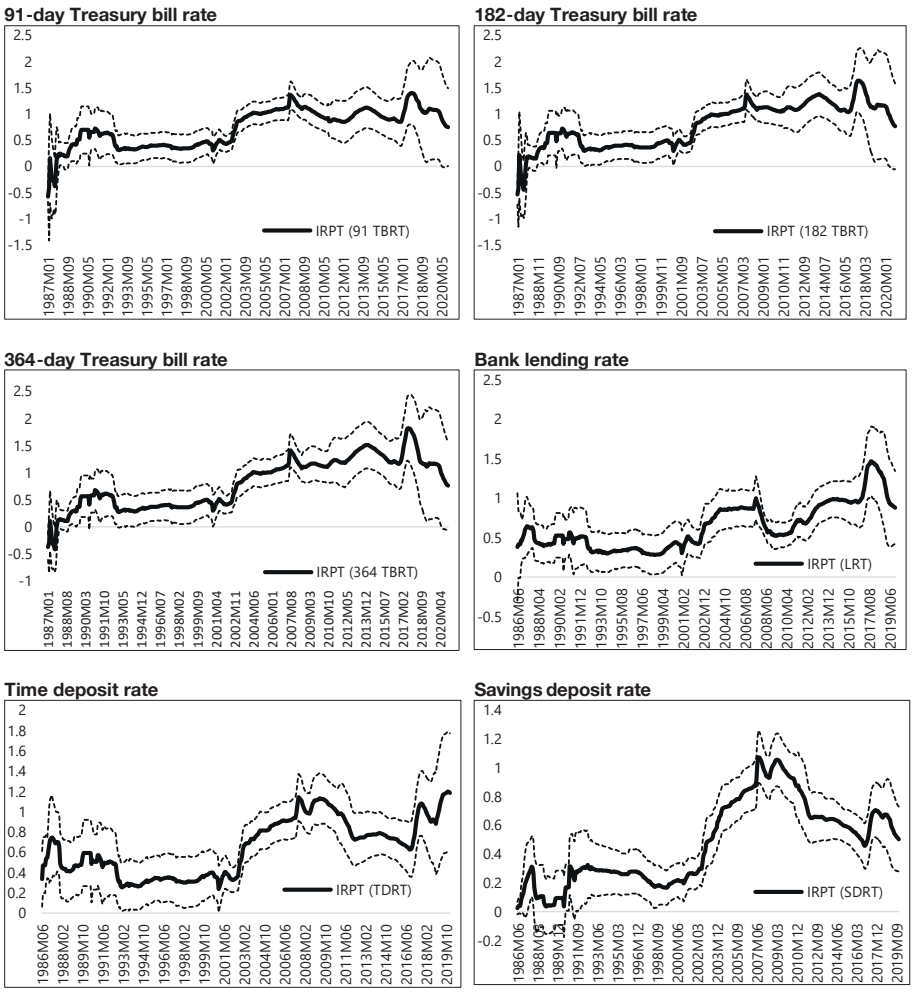
FIGURE 7. Pre-IRC market rates behavior



Source of basic data: Bangko Sentral ng Pilipinas

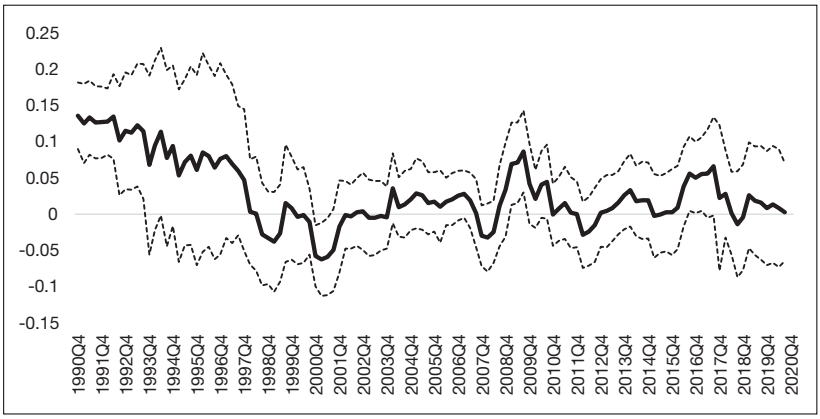
The progressive enhancements in the monetary policy framework were reflected in the strengthening of the pass-through of policy rate to market and retail rates and weakening of exchange rate pass-through to inflation (Guinigundo and Cacnio [2019]; Guinigundo [2017]; Delloro et al. [2017]; Glindro et al. [2016]). The same findings are shown in simple rolling regression estimates with fixed length window of ten years.

FIGURE 8. Long-run pass-through of BSP policy rate to market and retail interest rates



Source of basic data: Bangko Sentral ng Pilipinas
Authors used rolling regression with a fixed length window of 10 years.

FIGURE 9. Estimated long-run pass-through of exchange rate to inflation



Source of basic data: Bangko Sentral ng Pilipinas, International Monetary Fund, Philippine Statistics Authority
Authors' estimates based on rolling regression with 10-year fixed window and is applied on ARDL model with inflation expressed as a function of international oil price and rice price, output gap, and end-of-period nominal exchange rate.

3.3. Towards more market-based monetary policy operations

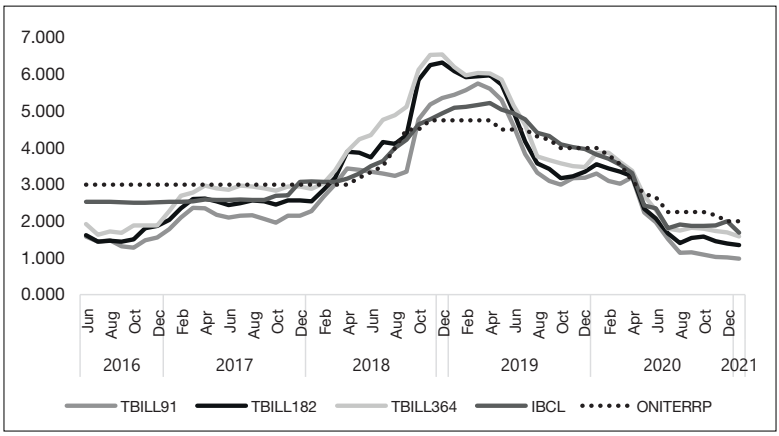
Monetary operations in support of inflation targeting have continually advanced. The various policy considerations and trade-offs imply that the textbook version of the inflation targeting framework, which prescribes pursuing inflation stability with floating exchange rates through adjustments of a short-term interest rate, may be too narrow for EME central banks [Carstens 2019]. This has pushed EME central banks to use additional policy instruments. Foreign exchange intervention has been used to deal directly with the financial channel or guard against volatile exchange rate movements while macroprudential tools have been deployed to deal with specific imbalances or vulnerabilities in a targeted way.

3.3.1. Introduction of the Interest Rate Corridor (IRC) system

In order to guide the short-term market interest rates towards a target policy rate, the Interest Rate Corridor (IRC) system was introduced. Under the new scheme, the reverse repurchase (RRP) was converted into an overnight RRP with fixed rate equivalent to the policy rate. Other fundamental changes included replacement of the Repurchase (RP) facility by a standing overnight lending facility (OLF) and replacement of the SDA term facility by a standing overnight deposit facility (ODF) and an auction-based term deposit facility (TDF). The OLF rate and ODF rates serve as the upper bound and lower bound of the corridor, respectively. Under the new system, the determination of the volume offer is based on BSP's appraisal of the appropriate amount of liquidity that needs to be infused or drawn off the system to ensure alignment of market rates with the policy rate.

As shown in Figure 10, market rates hewed more closely to the policy target rate since the implementation of IRC in 2016, signifying a more effective policy signal [BSP 2016].

FIGURE 10. Market rates behavior during the IRC period



Source of basic data: Bangko Sentral ng Pilipinas

With the adoption of the IRC system in 2016, an auction-based TDF was introduced to implement the policy on liquidity management. The counterparties—universal and commercial banks, thrift banks, and supervised non-bank and quasi-bank institutions—were required to submit their bids (volume and rate) for term placements with the BSP. The term deposit auction currently offers three tenors—seven-day, 14-day, and 28-day.[10] The TDF facility has been oversubscribed most of the time, indicative of surplus liquidity condition (Table 2).

TABLE 2. Incidence of oversubscription in the TDF

	Number of auction days	No auction (holidays	Incidence of oversubscription	
7-day	239	-	193	81%
14-day	151	9	112	79%
28-day	235	39	124	63%

Authors' computation
Incidence of oversubscription refers to bid-coverage ratio that exceeds 1.0 during auction days.
Source of basic data: Bangko Sentral ng Pilipinas (https://www.bsp.gov.ph/Pages/PriceStability/TermDepositFacilityTDF.aspx)

[10] The BSP initially offered two tenors—seven days and 28 days.

3.3.2. Issuance of debt securities

The recently enacted RA No. 11211, or the amended BSP Charter restored the BSP's ability to issue debt securities to support liquidity management even during normal times. The reinstatement of this ability for the BSP is critical. The prolonged period of low global interest rates could induce substantial capital inflows, which, in the past, have led to the significant build-up of international reserves and excess liquidity. BSP securities provide greater flexibility to absorb excess liquidity.

As was done in past monetary policy reforms such as the shift to IT and adoption of the IRC, BSP's issuance of its own debt instrument was planned to be undertaken at a measured pace to avert disruptive market volatility. It was executed with an initial offering for 28-day tenor amounting to a small ₱20 billion. Such an approach was intended to facilitate market learning and avoid competition with the National Government (NG) in the primary government securities (GS) market. Ever prudent in its approach, the slow and steady approach becomes all the more critical as the country was still reeling from the effects of the pandemic when the maiden issuance of BSP securities was made on September 18, 2020.

Normally, central bank securities cover the shorter segment of the yield curve, and the offered tenors for BSP securities shall be conditional on market preferences and liquidity conditions. The offer size for the auction of BSP securities is based on the BSP's forecasts of the total amount of system liquidity to be absorbed. If there is persistent structural excess liquidity, longer-tenor CB bonds can also be issued [BSP 2020a].

Modalities for BSP issuances. Quarterly auction schedule for the issuance of BSP securities is posted on the BSP website in advance of actual auction dates. To ensure that NG borrowing requirements and latest market and liquidity settings are sufficiently considered, the offer volumes and maturities will be made available with two-day lead time.

Multiple-price auction (English) is applied to BSP securities whereas uniform price (Dutch) is adopted for original issuance of BSP bonds. The BSP's Monetary Operations System (MOS) is the platform for the submission of bids and allocation.[11] The secondary market trading of BSP securities is carried out through the designated trading platform of the Philippine Dealing and Exchange Corp (PDEx). Registration of awarded securities, both in the primary and secondary markets, is carried out in the National Registry of Scripless Securities (NROSS) of the Bureau of the Treasury (BTr). After receipt of instruction to deliver the BSP securities to banks' NROSS accounts, the NROSS activates the settlement of the peso leg on the PhilPaSS, thereby ensuring delivery-versus-payment [BSP 2020b].

[11] By the BSP's OMO Auction Sub-Committee (ASC)

3.4. Extraordinary monetary policy measures during the pandemic

Central banks around the world expanded its role in macroeconomic stabilization following the massive economic and financial disruptions of COVID-19 pandemic. The abrupt and massive disruption of economic activities following containment measures frazzled market participants. Financial markets were pummeled and animal spirit dampened. Even central banks from emerging market economies resorted to unconventional monetary policy (UMPs), which refer to unorthodox tools deployed by central banks when conventional monetary policy tools cannot adequately deal with the challenges posed by a crisis. While many of the UMPs[12] are actually part of the central bank toolkit (as embodied in its lender of last resort function), it is when they function as the principal means for achieving the central banks' objectives that they become extraordinary (RBA [2020], as cited in Glindro et al. [2020b]).

In the Philippines, buying interest in the government debt market paper and participation in the national government's regular auctions weakened significantly in the early phase of the implementation of quarantine measures in March. The BSP suspended TDF auctions to ensure supply of peso liquidity in the financial system [Boelsch et al., as cited in Robleza et al. 2020].

The BSP also extended, for the first time since 1993, bridge financing to the NG. The first instance was the repurchase agreement worth ₱300 billion in March 2020 that was bought back by the NG in September 2020. The BSP's repo arrangement with the NG was a short-term relief measure intended primarily to provide NG with some fiscal flexibility to finance its programs to counter the impact of the COVID-19 pandemic. It was not aimed at bringing down market interest rates over the medium-term. Overall, the BSP's intervention measures were geared at preventing disruptive imbalances in the financial market by ensuring sufficient liquidity and preventing liquidity strains that could trigger bankruptcies, defaults and lay-offs. ([Robleza et al. [2020]; Capule et al. [2020]; Glindro, et al. [2020a]).

Another short-term provisional advance of ₱540 billion was extended to the NG in October, which was settled in December 2020. The latest borrowing was the ₱540 billion granted in January 2021 [Diokno 2021]. These provisional advances were in accordance with Section 89 of RA 7653 that was retained in the amended RA 11211.[13] Bayanihan 2 (RA 11494), passed on September 11, 2020, authorized the BSP to provide *additional* provisional advances to NG but the amount shall not

[12] The three broad categories of UMP measures are liquidity easing, credit easing, and quantitative easing (see Glindro et al, [2020b] for the summary of Smaghi [2009] and Ishi et al. [2009].

[13] Sec 89. Provisional Advances to the National Government. The National Government may make provisional advances with or without interest to the National Government to finance expenditures authorized in its annual appropriations. Provided that such advances shall be repaid before the end of three months as the Monetary Board may allow following the date the National Government received such provisional advances, and shall not exceed 20 percent of the average annual income of the borrower for the last three preceding fiscal years.

exceed ten percent of the average income of NG for the last three years and would need to explicitly earmarked for the government's COVID-19 response programs. The NG can avail itself of the additional provisional lending until 2022, and must be repaid within one year upon availment.

The legal and binding limits to the direct monetary support that the BSP can extend to the NG have been put in place in the BSP Charter precisely to instill discipline and prudence, thereby mitigate the risk of excessive monetary financing and fiscal dominance. The BSP extraordinary support is a crisis management tool and is not designed to be a permanent fixture of monetary policy during normal times. It cannot and must not substitute for the necessary post-pandemic fiscal adjustment (Robleza, et al. [2020]; Glindro et al [2020a]; Smaghi [2009]).

4. The future of monetary policy

Monetary policy would need to prepare for a world of larger shocks, where sustained lower global equilibrium interest rates has become the norm. As Andrew Bailey [2021] pointed out, the task of monetary policy developed from being a "choice on a single dimension (the official interest rate) to a more multi-dimensional choice". Central banks must always endeavor to make the policy signals from each policy tool coherently distinct. This has become all the more pressing in periods when there are no evident inflationary pressures such that monetary policy may be hard put to take a long-term view.

While easy financing conditions may boost economic activity in the near term, it can potentially impair long-term economic prospects through debt accumulation and its associated financial and macroeconomic consequences. Since financial stability risks also imply risks to longer-run price stability, intertemporal policy trade-offs bring to the fore the issue as to when central banks should act pre-emptively. This has compelled EME central banks to use macroprudential tools in addressing specific imbalances.

As emphasized by Claessens and Valencia [2013], the spillovers, complementarities and potential conflict of policy measures are compelling reasons for promoting better coordination and employing robust data-driven economic surveillance mechanisms. Monetary policy must be able to sort through various sources of volatilities, safeguard central bank's operational independence. Clarity strengthens the effectiveness of the monetary transmission mechanism by enhancing the public's understanding of how the policy stance is likely to evolve in response to economic conditions. It reduces uncertainty and facilitates better-informed decision making by economic agents.

Taking stock of the policy trade-offs and complementarities, central banking in the Philippines has indeed gone a long way. Guided by foresight, commitment to action, strategic communication, and helpful lessons from the past, the BSP's monetary policy framework and operations will likely to continue to evolving and serving as steady anchors in macroeconomic stabilization in the context of increased uncertainty.

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Policy responses to shocks and monetary effectiveness under inflation targeting: the Philippine case

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This article examines how monetary policy responses to economic shocks and monetary policy effectiveness have changed in the Philippines since inflation targeting was implemented in 2002. The study makes use of a structural vector autoregression to estimate financial and monetary policy shocks, among other shocks, based on an identification strategy similar to Gilchrist and Zakrajsek [2012] and Bassetto et al. [2016]. A Philippine financial conditions index (FCI) purged of monetary influences then decomposed according to instrument or market is used to aid estimation and analysis. Results of the recursive vector autoregressions (VAR) comparing pre-inflation-targeting and inflation-targeting periods reveal stronger and more systematic policy responses to non-financial demand shocks, partial and transitory accommodation of supply shocks, and greater exchange rate flexibility initially under the new monetary policy regime. There is, however, an observed weakening of monetary policy responses to financial disturbances and monetary policy transmission to growth likely related to episodes of strong capital inflows.

JEL classification: C32, E31, E42, E44, E52, E58
Keywords: central banks, inflation targeting, monetary policy, Philippines, structural VAR

1. Introduction

Seeking macroeconomic stability, a number of countries have adopted inflation targeting as their monetary framework over the past three decades. Unlike in developed countries where beneficial effects of inflation targeting were often found to be insignificant (e.g., Ball and Sheridan [2003]; Lin and Ye [2007]), the shift has typically produced significantly positive outcomes in developing economies. These include lower inflation and growth volatility [Goncalves and Salles 2008]; lower inflation and inflation variability [Lin and Ye 2009]; higher and more stable output growth [Abo-Zaid and Tuzeman 2012]; more stable

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income velocity and money growth [Soe and Kakinaka 2018]; and lower output-inflation tradeoffs [Huang, Yeh, and Wang 2019].[1]

While there are many cross-country studies on inflation targeting in developing countries, including those in developing Asia, there are only a few that look at individual countries. This research adds to the literature by presenting an econometric analysis of how the implementation of inflation targeting has affected economic behavior in the Philippines, which numbers among the Asian adopters.

The Philippines is a good case to study because of its notable transformation over the years. Prior to the adoption of inflation targeting in 2002, it had among the highest inflation and inflation volatility measures among adopting countries in the region.[2] The country then experienced higher and more variable inflation mainly due to sharp policy swings, exchange rate fluctuations, and supply shocks [Debelle and Lim 1998]. Filardo and Genberg [2010] noted the challenging inflation conditions in the country during the initial years of implementation of the new monetary framework when it experienced pronounced and persistent inflation swings, undershooting or overshooting inflation target bands rather than staying inside them.

Gerlach and Tillman [2012] saw a decline in inflation persistence in the Philippines only around 2009. The Bangko Sentral ng Pilipinas (BSP) cited strong communication with the public as its strong suit, a strategy consistently applied since inflation targeting was implemented to deal with missed inflation targets or for potential target breaches [Guinigundo 2005]. The country had high monetary policy transparency scores from 2002 and onwards, registering the highest score in Southeast Asia from 2002 to 2006 (see Table 1 in Dincer and Eichengreen [2009]).

Taking stock of the inflation targeting experience in the Philippines up until 2010, the BSP cited enhanced policymaking, increased policy discipline, improved focus on the price stability objective, and stronger credibility of the central bank, aside from greater central bank transparency, as the main benefits [Tetangco 2010]. While there has been a dearth of literature on inflation targeting in the Philippines in subsequent years, it is quite easy to verify how inflation and inflation variability in the country had been relatively low while output performance had been relatively steady during that period.

In terms of method, the key objective of this study is to empirically identify structural shocks from vector autoregressions (VARs) applied to macroeconomic data before and after the adoption of inflation targeting. The paper uses an identification strategy similar to that applied by Gilchrist and Zakrajsek [2012]

[1] An exception is the study by Brito and Bystedt [2010] who find that inflation targeting has no effect on the level and variance of inflation in emerging market countries.

[2] The Asian Financial Crisis (AFC) of 1997/1998 provided the impetus for some developing Asian economies to switch to inflation targeting. With (virtually) pegged exchange-rate regimes perceived to be crisis-prone after the AFC, several countries in the region adopted inflation targeting as an alternative monetary policy regime—namely, South Korea in 1999, Indonesia and Thailand in 2000, and the Philippines in 2002 [Eichengreen 2002]. Apart from the need for an alternative nominal anchor, Asian central banks that turned to inflation targeting did so due to instabilities encountered in monetary targeting, particularly in the relationship between monetary aggregates and inflation.

and Bassetto et al. [2016] to estimate monetary and financial shocks, apart from other (i.e., supply and demand-related) shocks.

To help identify financial shocks, the structural VAR makes use of a financial conditions index (FCI) for the Philippines purged of direct monetary influences; the FCI is further decomposed according to the instrument or market/source to estimate distinct financial shocks. This is the first study to calculate a diverse set of financial shocks in this manner and to do so for an emerging market economy.

The econometric approach provides a relatively standard but effective way to investigate the impact of inflation targeting on the economy. It offers a way to measure the impact of financial conditions and monetary policy shocks on inflation and growth, providing a reasonable gauge for monetary effectiveness, and to estimate monetary policy responses to macro disturbances, particularly financial shocks. From sample period extensions, one is able to track the evolution of inflation targeting after its adoption.

Results reveal generally favorable changes in behavior in the Philippines under inflation targeting consistent with the observed positive outcomes in developing economies. These include stronger and more systematic responses of monetary policy to non-financial demand shocks; an accommodation of supply shocks, albeit partial and transitory; and greater exchange rate flexibility, in the initial decade at least. There is however an observed weakening of monetary policy responses to financial disturbances and monetary policy transmission to growth that is likely related to episodes of strong capital inflows.

This paper is organized as follows. Section 2 explains the econometric model and the strategy for identifying shocks and lays out the research design. Section 3 describes the data used and provides some preliminary observations on the impact of inflation targeting on the macroeconomy. Section 4 presents the complete set of results and discussions, while Section 5 provides further analyses and conclusions about the future challenges of inflation targeting in the country.

2. Specifying the model and identifying shocks

To identify shocks and investigate monetary policy responses to these shocks, this paper first estimates the following VAR model,

$$y_t = A_0 + A(L)y_{t-1} + C_0 d_t + u_t, \quad u_t \sim N(0, \Sigma_u)$$

where y_t represents the $n \times 1$ vector of endogenous variables; $A(L)$, the $n \times n$ matrices of reduced-form VAR coefficients; A_0, the n-vector of intercepts; C_0, the n-vector of coefficients for dummy variables used to control for crisis periods; and u_t, the n-vector of reduced-form errors with corresponding variance-covariance matrix Σ_u.[3]

[3] Dummy variables are assigned for the 1997/1998 Asian Financial Crisis [1997:3–1998:4] and the 2008/2009 Global Financial Crisis [2008:4–2009:4].

The variables in vector y_t consist of the log difference of real gross domestic product (GDP), the log difference of the real effective exchange rate (REER), the log difference of the consumer price index (CPI), the first difference of a FCI, and the change in the monetary policy instrument (log difference of M2 for the period prior to the adoption of inflation targeting and/or the first difference of the reverse repurchase rate (RRP) rate during inflation targeting).[4] A measure of financial conditions is incorporated in the standard monetary VAR to capture financial shocks, in addition to monetary policy shocks. This study also includes the REER to help capture relative demand effects, which may be important for developing economies like the Philippines.

The reduced-form errors are related to the structural errors, ε_t, as follows:

$$u_t = S\varepsilon_t, \quad \varepsilon_t \sim N(0,1).$$

To uniquely identify the structural model from the VAR estimate of $\hat{\Sigma}_u (= SS')$, a recursive identification scheme is adopted, where a Cholesky decomposition of the variance-covariance matrix is used to obtain a lower triangular matrix $\tilde{S}$.

As in a standard monetary VAR (e.g., Christiano et al. [1999]), the policy variable has no contemporaneous restrictions. The basic assumption is that a central bank, especially an inflation-targeting one, considers all available information—including from financial shocks—when forming monetary policy decisions. This identifies a reduced-form policy reaction function that corresponds to a policy rule in a structural model [Boivin and Giannoni 2006].

In the spirit of Gilchrist and Zakrajsek [2012] and Bassetto et al. [2016], both financial and monetary policy shocks are assumed to affect economic activity and price changes with a lag. This paper additionally places the log change in REER before the log change in CPI in the Cholesky ordering to identify relative demand and other aggregate demand shocks. Following the literature, only supply disturbances are assumed to affect real output contemporaneously.

2.1. Comparing pre-inflation-targeting and inflation-targeting periods

The VAR model is initially estimated for balanced periods before and after the shift to inflation targeting. However, instead of splitting the sample based on the date inflation targeting took effect officially, it is divided based on the results of tests of parameter instability applied to the policy equation of the VAR. This allows for a cleaner comparison of pre-inflation-targeting and inflation-targeting periods, considering observations of continued reorientation of monetary policy instruments and procedures to support the inflation-targeting framework in the brief period after its adoption [Guinigundo 2005].

[4] Using the first difference or log difference of the policy instrument rather than their level implies a monetary policy reaction function where policy changes are made in response to key economic variables, including financial conditions, and is similar in form to Romer and Romer [2004]. This also ensures stationarity of the variables in the structural VAR model.

The Bai-Perron and Quandt-Andrews breakpoint tests indicate a structural change in the policy equation around the middle of 2002.[5] Considering this result, the VAR model is first estimated for the following quarterly subsamples: 1993:4–2002:2 (the pre-IT period) and 2002:3–2011:1 (IT period 1, balanced to have an equal number of observations as the pre-IT period). The inflation-targeting period is subsequently extended to 2016:1, or until just before an interest rate corridor system was adopted by the BSP for better market interest rate control (IT period 2); and further to 2019:4 (IT period 3).[6]

The VAR incorporates a quarterly lag of one in all specifications, comprising the model variants and robustness checks outlined below, based on the results of lag order selection tests. These tests include the Akaike, Schwarz, and Hannan-Quinn information criteria.

2.2. Further impacts of financial and monetary policy shocks

To further explore the impact of financial and monetary policy shocks under inflation targeting, GDP is replaced by some of its major subcomponents in the VAR. The baseline specification is alternately run with real fixed capital investment and household consumption spending from the expenditure side of national income accounting, and with real manufacturing and services output from the industry side. This helps indicate which sectors of the economy are more likely to be hampered by financial constraints and frictions. This results in a model closer to those estimated by Gilchrist and Zakrajsek [2012] and Bassetto et al. [2016].

Unlike previous papers, the VAR model was run for the inflation-targeting period using different financial measures and compare the macroeconomic impact of and policy responses to the corresponding shocks. The latter are the subcomponents of the FCI decomposed according to financial instrument or source (money, bond, loan, equity, currency, or from external markets).[7] As noted by Kocherlakota [2010], even rudimentary economic models suggest that one needs more than a single indicator to measure financial conditions in a way that is useful to inform monetary policy, given the existence of distinct financial frictions.

[5] Based on trimming percentage of 15 percent, the Bai-Perron multiple breakpoint tests uncover the following break dates: 1997:3, 2002:3, 2007:3, and 2013:3. The Quandt-Andrews unknown breakpoint tests meanwhile estimate a structural break in 1997:4 (within 15 percent trimmed data) and 2002:2 (within 20 percent trimmed data). The break dates likely reflect the impact of the 1997/1998 AFC and the 2008/2009 GFC. As noted above, dummy variables for these periods are included in the VAR to help control for their effects.

[6] Although available, data for the year 2020 were purposely excluded from the sample period and reserved for future research because of the exceptionally large volatilities observed during the COVID-19 pandemic crisis.

[7] The FCI can also be disaggregated according to type (i.e., price, interest rate, credit spread, quantity/liquidity, risk/stress, or source). However, results based on this decomposition were not as distinct, informative, or illuminating as those based on instruments or markets/sources.

2.3. Note on robustness

Various robustness checks were applied prior to the writing of this paper, though they are no longer shown to conserve space.[8] The important findings tend to hold across a number of model specifications. There is minimal impact on the key results if one uses alternative variables (e.g., an FCI that is not purged of direct monetary policy influences, M3 rather than M2), or adds additional dummy variables (specifically, to indicate the adoption of an interest rate corridor system and to capture external episodes such as the oil price drop that occurred around 2015).

The VAR was additionally estimated in the same manner as Christiano et al. [1999] using levels of variables rather than log differences or first differences. This differs from the main specification in that it includes possibly non-stationary variables.[9] Some of the main results remain intact, such as the impact of monetary policy shocks on economic activity and prices and monetary responses to financial and non-financial demand shocks, though only for the balanced inflation-targeting period (IT period 1).

3. Data and some preliminary observations

Real GDP, its subcomponents, and CPI are taken from the Philippine Statistics Authority (PSA). The series are seasonally adjusted using the X-12 method. REER data is obtained from the International Financial Statistics database of the International Monetary Fund (IMF), while the overnight RRP rate and M2 are obtained from the BSP.

The FCI and its subcomponents are computed as quarterly averages of monthly series estimated using a nonstandard principal component analysis that works on unbalanced datasets.[10] Following Hatzius et al. [2010], cyclical influences are removed from the financial indicators by regressing them against output growth and inflation before estimating the index. For this paper, financial indicators are additionally purged of monetary influences by including the policy rate as an additional regressor prior to FCI estimation. This generates even purer financial shocks.

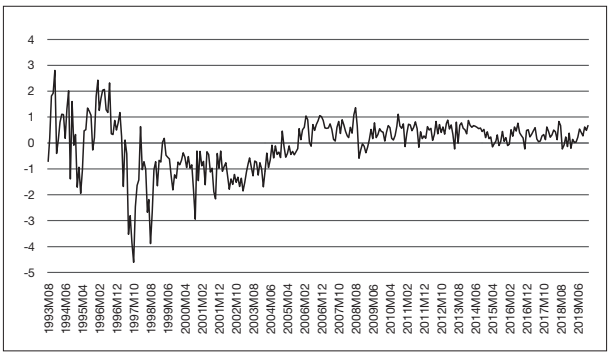
Figure 1 presents the monthly FCI for the full sample period of the VAR. Financial conditions tightened considerably during the Asian financial crisis (AFC), with the FCI at nearly five standard deviations below the historical average (in October of 1997). Conditions remained tight in the financial sector until 2005 but loosened beyond that point, especially as fiscal reforms took effect in 2006. The minor exception had been during the global financial crisis (GFC), especially around the time when Lehman Brothers collapsed (in September of 2008).

[8] They can be obtained from the author upon request.

[9] Estimating a VAR using nonstationary variables may result in spurious regressions, and so researchers recommend differencing these variables before estimating; however, there are cases when this is also inappropriate such as when the data are truly stationary and when there are cointegrated processes [Hamilton 1994].

[10] The series was estimated using data gathered for Debuque-Gonzales [2020] based on the method of Hatzius et al. [2010]. Forty-eight financial indicators were used to calculate the FCI.

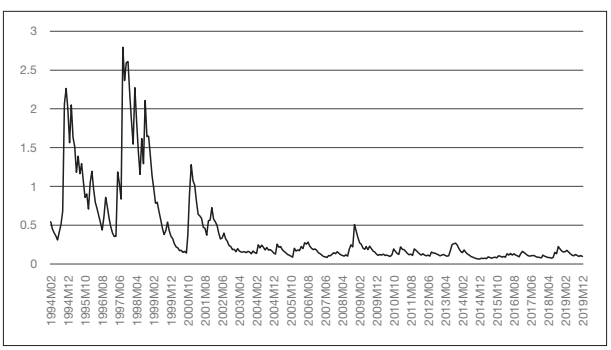
FIGURE 1. Monthly financial conditions index



Note: The FCI in this figure is additionally purged of monetary influences (see main text). A value of 0 means financial conditions are at mean levels of liquidity, stress, and risk, consistent with real activity, inflation, and monetary conditions. A value of -1 suggests worse financial conditions than the average historically by 1 standard deviation; the reverse holds for a value of 1.

The FCI indicates greater financial stability across time. Figure 2, which features variances estimated using generalized autoregressive conditional heteroskedasticity (GARCH) estimation, more visibly confirms this, revealing a sharp decline in volatility after the AFC and relative calm afterward. The financial sector and monetary reforms had been instituted after the regional crisis, and this helped keep financial conditions stable in succeeding years. These reforms aimed to maintain the health of banks through asset cleanups, improved bank risk management, bank capital base build-up, and more coordinated financial sector regulation. The BSP "sought to maintain a stable inflation and domestic interest rate environment" even prior to the formal adoption of inflation targeting [Guinigundo 2006].

FIGURE 2. Financial volatility



Note: The volatility measure is obtained from a Garch (1,1) model of monthly returns using 6 autoregressive lags on the Philippine Financial Conditions Index.

Table 1 provides summary statistics for the variables used in the VAR estimation, with the sample grouped into pre-inflation-targeting and inflation-targeting periods. While one cannot attribute the changes across time solely to inflation targeting, they are, at the very least, indicative of the impact of the new monetary policy environment. The numbers reveal greater monetary and financial stability overall under inflation targeting, with lower variances in prices and monetary and financial conditions.[11]

TABLE 1. Summary statistics

	Pre-IT period (1993:4-2002:2)			IT period 1, balanced (2002:3-2011:1)			IT period 2 (2002:3-2016:1)			IT period 3 (2002:3-2019:4)		
	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs
Log-diff. CPI	1.71	1.03	35	1.16	0.75	35	0.95	0.71	55	0.92	0.68	70
Log-diff. GDP	0.94	0.87	35	1.24	0.93	35	1.36	0.83	55	1.38	0.86	70
Log-diff. M2	4.34	3.66	35	2.42	2.66	35	2.77	2.84	55	2.72	2.57	70
Log-diff. REER	-0.21	4.47	35	0.33	2.79	35	0.37	2.44	55	0.27	2.32	70
First-diff. FCI	-0.03	1.17	35	0.05	0.41	35	0.03	0.35	55	0.03	0.32	70
First-diff. RRP rate	-0.20	2.51	35	-0.09	0.35	35	-0.05	0.30	55	-0.04	0.31	70

CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate, RRP = reverse repurchase, SD = standard deviation
Sources: Author's calculations; Bangko Sentral ng Pilipinas; International Financial Statistics, International Monetary Fund; Philippine Statistics Authority
Note: The FCI series was computed by the author based on data from Debuque-Gonzales [2020]. Data on real GDP and CPI were seasonally adjusted using the X12 method. Log-differences are in percent.

A spike in the volatility of output growth is not apparent, even if one adjusted for the relative severity of the AFC and the GFC in the sample, while average quarterly GDP growth clearly rose, contrary to earlier fears (see Mishkin [2000] for the common criticisms of inflation targeting in the early years). Output instability and slow growth might have been the case if monetary authorities had enforced overly strict inflation targeting, but a flexible system had instead been considered by the Philippine central bank as an ideal [Tetangco 2010]. Meanwhile, average inflation as measured by the quarterly log difference of CPI declined over the years.

In sum, the shift in monetary framework seems to have generated mostly positive results for the BSP, according to the descriptive statistics, with policy goals greatly met. This paper aims to uncover other, less overt, outcomes under inflation targeting. These include possible differences in macroeconomic responses to shocks, particularly financial and monetary policy shocks, and in monetary policy responses to these shocks.

[11] It is useful to note here that the pre-inflation-targeting period includes the AFC, while the inflation-targeting period includes the GFC.

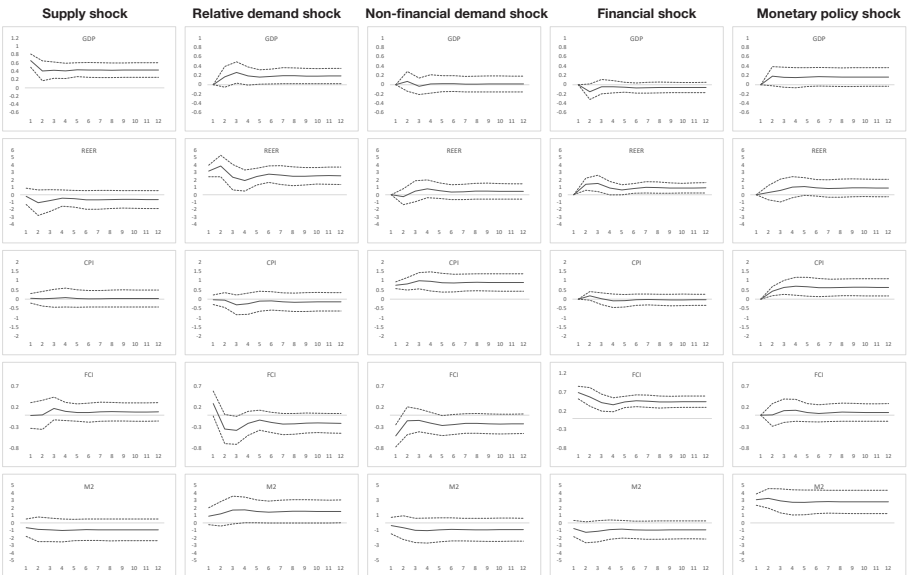
4. Results and discussion

This section first shows the macroeconomic implications of the different structural shocks obtained from the recursive model, comparing pre-inflation-targeting and inflation-targeting periods. It then tracks the evolution of impulse responses to financial and monetary policy shocks, in particular, under inflation targeting.[12] Monetary policy responses to the various structural shocks are then presented and compared across periods. This is followed by a discussion of the heterogeneous impact of financial and monetary policy shocks on the real economy, and monetary policy responses to different types of financial shocks.

4.1. Macroeconomic implications of shocks

Figure 3 depicts the impulse response functions of the endogenous variables to the orthogonalized shocks prior to the adoption of inflation targeting. Figure 4 shows the same set of impulse responses for the balanced inflation-targeting period (IT period 1). The pre-inflation-targeting structural VAR includes M2, representing the policy target during the time, while the inflation-targeting VAR includes the RRP rate, which is the announced policy rate. As described earlier, the corresponding policy instrument for each period is placed last in the recursive ordering.[13]

FIGURE 3. Impulse responses to structural shocks (pre-IT period)

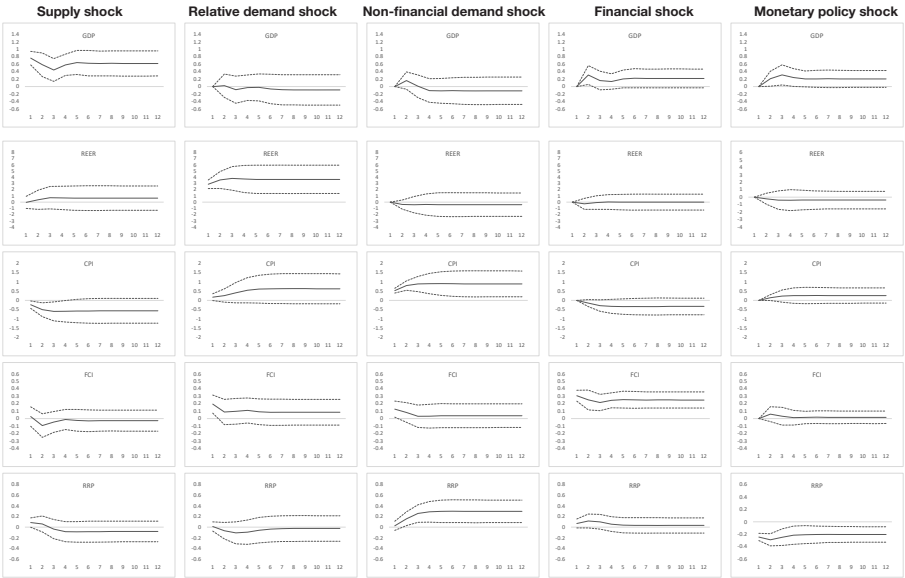


CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate Sample period: 1993:4-2002:2.
Note: These are impulse responses to structural shocks identified from the VAR model, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. CPI, GDP, M2, and REER are in logarithms.

[12] Emphasis is placed on monetary, financial, and supply shocks, which are more carefully identified in the structural VAR. The remaining shocks are loosely identified as relative demand and non-financial demand disturbances.

[13] Including both M2 and the RRP rate in the specification generates similar responses of the other endogenous variables. Findings from these regressions support the identification scheme applied, as RRP impulse responses and the impact of RRP shocks are insignificant in the pre-inflation-targeting period estimates but become significant in the inflation-targeting samples.

FIGURE 4. Impulse responses to structural shocks (IT period 1, balanced sample)



CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate Sample period: 1993:4-2002:2.
Note: These are impulse responses to structural shocks identified from the VAR model, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. CPI, GDP, M2, and REER are in logarithms.

In the pre-inflation-targeting period, a one-standard-deviation (expansionary) monetary policy shock leads to statistically significant increases in output and inflation above their trend, cumulating to 17 and 63 basis points, respectively, in a 12-quarter horizon (Figure 3). While the effect on output occurs within two quarters, the full impact on consumer prices takes about four quarters, which is on the shorter end of estimates of the Philippine central bank (Tuaño-Amador [2003]; Guinigundo [2005]).[14]

An unanticipated monetary easing is also followed by a REER appreciation in the longer horizon, likely reflecting rising domestic costs. Although the FCI inches up in response to a monetary policy shock, the effect is statistically insignificant, with the zero-line (indicating no response) remaining within the 95 percent confidence band.

The impact of a one-standard-deviation improvement in financial conditions on GDP tends to be negative prior to the adoption of inflation targeting, but the result, on the whole, is insignificant. Moreover, a financial shock has only a small and short-duration effect on inflation compared to a monetary policy shock. Like in the case of a monetary policy surprise though, it leads to REER appreciation in the longer run.

[14] According to Tuaño-Amador [2003], the estimated lag of monetary policy—the time it took for a policy change to impact inflation—was about 5 to 6 quarters. Guinigundo [2005] later placed the policy lag at 15 to 21 months (5 to 7 quarters) based on estimates from the BSP's VAR models.

Supply shocks have mostly insignificant effects on endogenous variables apart from GDP during the pre-inflation-targeting period, while the notable impact of non-financial demand shocks is on financial conditions, which tend to worsen over time. A one-standard-deviation relative demand shock leads to a rise in GDP growth above the trend of about 26 basis points in total in three quarters and 19 basis points in 12 quarters but also leads to a tightening of financial conditions.[15]

As in the pre-IT period, macro responses to an expansionary monetary policy shock under inflation targeting similarly indicate monetary efficacy. A (negative) one-standard-deviation structural innovation to the policy rate raises both output growth and inflation above trend in estimations based on IT period 1 (Figure 4).[16] It takes 3 quarters for the impact on GDP growth to peak at 31 basis points, before leveling off at 21 basis points beyond five quarters. The impact on prices appears smaller and less distinct, with the full effect, about 26 basis points, similarly reached within four quarters. Like the findings for the pre-IT period, surprise monetary easing does not significantly loosen financial conditions.

Financial shocks influence output in IT period 1 in a manner that is more in line with expectations. A one-standard-deviation improvement in financial conditions significantly raises output growth by about 31 basis points above trend in two quarters before settling at 22 basis points after five quarters. These findings are similar to those of Bassetto et al. [2016] and Gilchrist and Zakrajsek [2012]. Financial disturbances also lead to a decline in inflation during the period, as monetary policy tightens. Such findings indicate the influence of credit supply shocks, which theoretically spur growth as the financing environment softens, trigger monetary tightening, but have an indeterminate impact on inflation [Moccero, Pariès, and Maurin 2014].[17]

Supply shocks behave as expected in estimations for IT period 1, pushing up growth while lowering inflation on impact and for the longer term. The remaining demand shocks both raise inflation, but the impact on GDP growth is insignificant.

4.1.1. Evolution of macro responses to structural shocks under inflation targeting

The structural VAR is also estimated for longer sample periods, to observe the evolution of macroeconomic responses to structural shocks under inflation targeting, as well as to check for robustness of empirical results. As mentioned earlier, the first round of estimates extends the inflation-targeting data set by 5 years to 2016:1 or before the implementation of a channel system in June of 2016

[15] Hoffmaister and Roldós [2001] suggests that relative demand shocks, which they similarly measured through a structural VAR, are largely fiscal in nature as they correlate highly with public spending indicators in developing countries in Asia and Latin America.

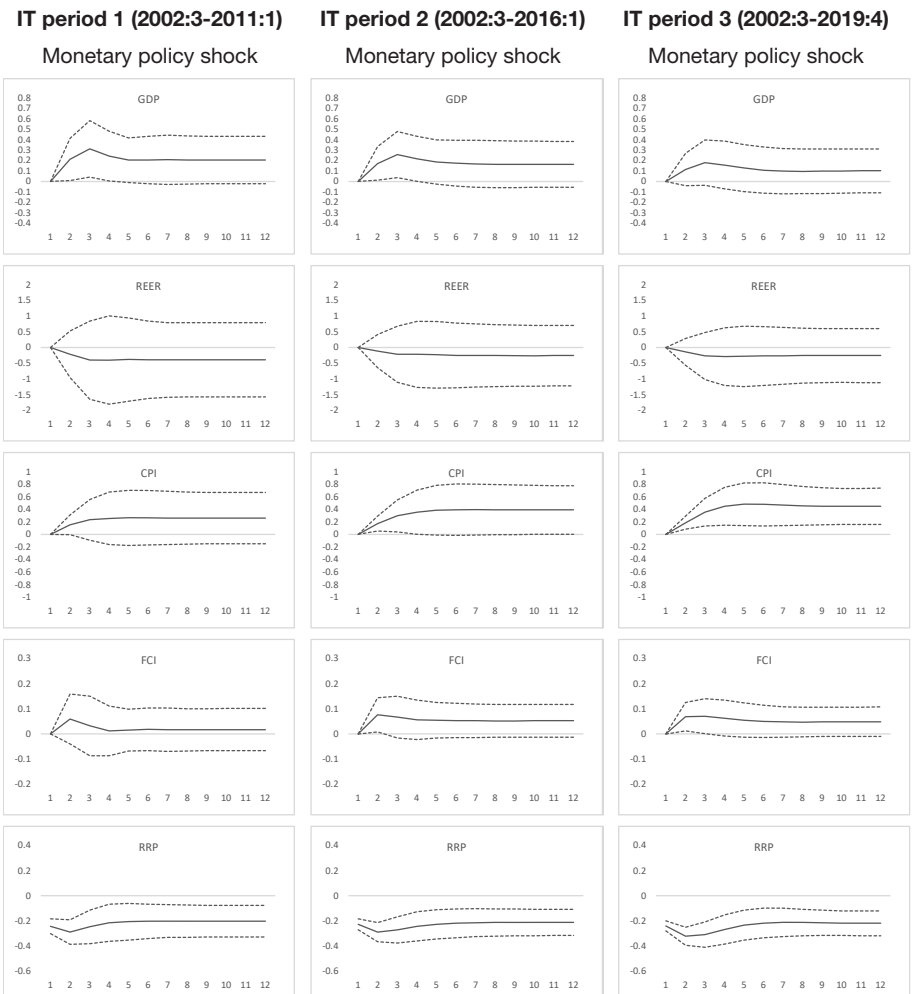
[16] For easier comparison, figures in this paper show the impulse responses of the endogenous variables to expansionary shocks in monetary policy, or an unanticipated decline in the policy rate for IT periods 1 to 3.

[17] The final impact on prices will depend on the relative shifts in aggregate supply and demand. This is the case because these curves move in the same direction in response to positive credit supply shocks. Credit demand shocks, on the other hand, increase both the quantity and price (interest rate) of financing which may have a negative effect on investment and output.

(IT period 2). The second round further extends the sample by about four years, to 2019:4, or prior to the COVID-19 pandemic-induced health and economic crisis (IT period 3).

Figures 5a and 5b summarize the impulse responses of the macroeconomic variables to monetary policy and financial shocks, respectively, based on the different sample periods for inflation targeting. Impulse responses to supply shocks and the remaining demand shocks are no longer shown, as results are consistent across samples.

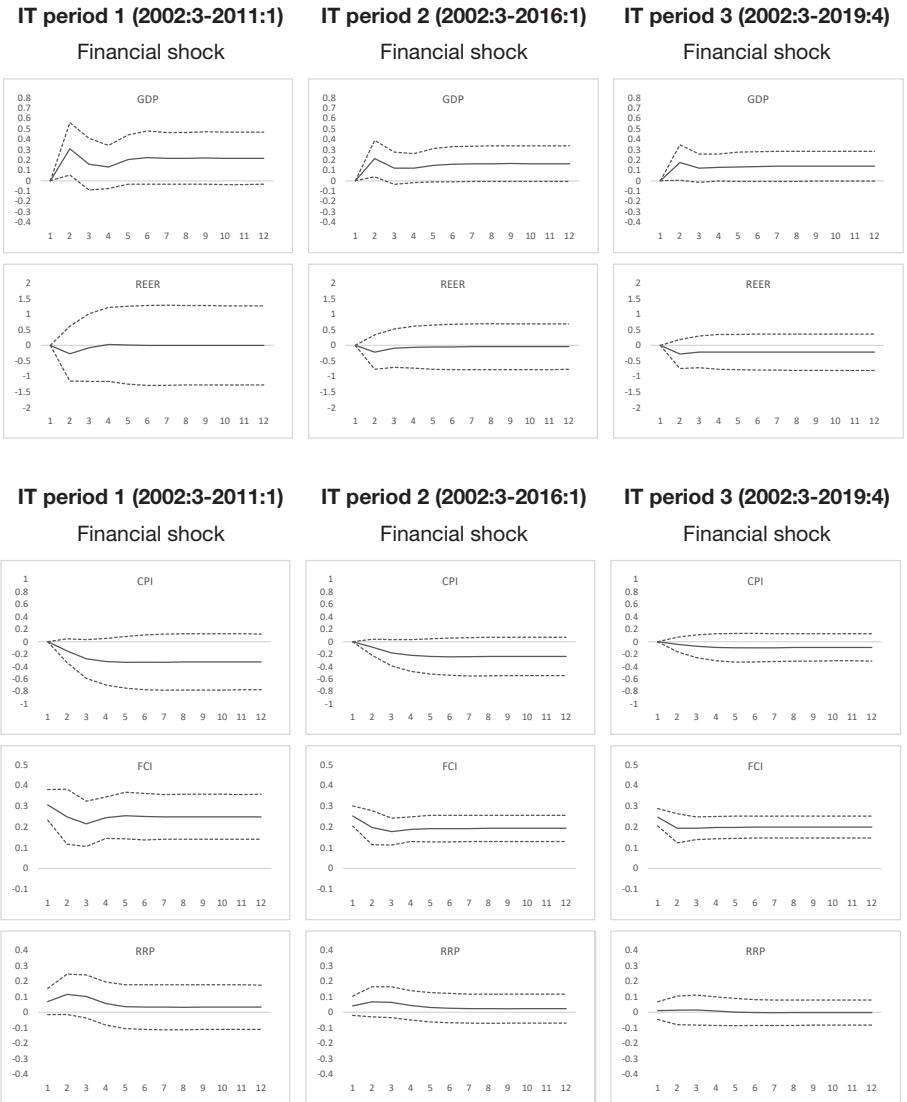
FIGURE 5A. Impulse responses to monetary policy shocks under inflation targeting



CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate, RRP = reverse repurchase rate

Note: These are impulse responses to monetary policy shocks identified from the VAR model, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. CPI, GDP, and REER are in logarithms.

FIGURE 5B. Impulse responses to financial shocks under inflation targeting



CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate, RRP = reverse repurchase rate
Note: These are impulse responses to financial shocks identified from the VAR model, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. CPI, GDP, and REER are in logarithms.

Figure 5a (third row) shows confidence bands around the impact of monetary policy shocks on inflation have progressively narrowed under the new monetary regime, indicating greater accuracy of estimates. The accumulated impulse response of inflation to a 1-standard-deviation monetary policy innovation across

a 12-quarter horizon has increased from 26 basis points in IT period 1; to 39 basis points in IT period 2; and to 45 basis points in IT period 3. This suggests greater monetary policy influence over inflation over time. The response of the FCI likewise becomes more distinct as the sample is lengthened, with financial conditions visibly improving in response to an unanticipated monetary expansion (fourth row, Figure 5a).

In contrast, the cumulative response of GDP growth to a monetary policy shock has become less precise across estimations, with the confidence band widening to include zero (first row, Figure 5a). The cumulative effect of surprise monetary easing on output growth has declined from 20 basis points in IT period 1, to 16 basis points in IT period 2, and further to 10 basis points in IT period 3. This suggests some loss of monetary policy effectiveness across time in terms of influencing the output.

One sees a similar decline in the impulse responses of GDP to financial shocks across inflation-targeting sample periods, but the impact is still significantly positive in the last regression. Financial shocks are quicker and more powerful than monetary policy innovations in influencing output, indicating the presence of financial frictions (first row, Figure 5b). The accumulated increase in output growth to a 1-standard-deviation structural innovation in the FCI peaks at 56 basis points within two quarters before plateauing at 22 basis points after 5 quarters for IT period 1; reaches 21 basis points within two quarters then tapers to 17 basis points after 5 quarters for IT period 2; and rises to 18 basis points before quickly settling at 14 basis points in IT period 3.

The tendency for financial shocks to result in lower inflation meanwhile disappears in the full sample (third row, Figure 5b). Such disturbances no longer lead to lower price pressures when the full dataset is used, a development that possibly relates to the corresponding change in monetary reaction, with policy responses to financial shocks appearing to weaken (see next subsection).

Table 2 shows the decomposition of the forecast error variance (FEV) of the macroeconomic variables in the VAR. The outcomes further reveal the relative importance of structural shocks in the evolution of these variables under inflation targeting.

For GDP, financial shocks have, across inflation targeting periods, accounted for a larger fraction of the FEV of output growth than monetary shocks, though both contributions have lessened over time. For CPI, one can see that monetary policy disturbances have increasingly contributed to the FEV of inflation, indicating stronger policy influence in this area. For the RRP rate, the distinct change has been the increase in the importance of monetary policy shocks in explaining future variation, and a corresponding decline in the significance of other structural shocks. This reflects the adoption of the RRP rate as the policy rate during the shift to inflation targeting and suggests greater control over this rate across time.

TABLE 2. Variance decomposition of macroeconomic variables

	Supply shock	Relative demand shock	Non-financial demand shock	Financial shock	Monetary policy shock
			IT period 1 (2002:3-2011:1)		
GDP	71.3	1.9	6.7	13.4	6.7
REER	3.1	93.3	1.5	1.3	0.9
CPI	20.8	12.7	55.5	6.3	4.7
FCI	9.8	25.6	10.7	51.4	2.4
RRP rate	15.1	7.6	21.7	7.2	48.5
			IT period 2 (2002:3-2016:1)		
GDP	81.8	1.8	2.6	8.1	5.8
REER	3.2	94.8	0.7	1.0	0.4
CPI	26.0	6.5	55.6	3.2	8.8
FCI	10.9	25.4	7.4	51.7	4.6
RRP rate	12.6	6.3	14.8	3.3	63.1
			IT period 3 (2002:3-2019:4)		
GDP	90.5	0.7	1.5	4.6	2.6
REER	4.1	93.6	0.3	1.4	0.6
CPI	14.5	3.7	66.3	0.6	14.8
FCI	8.2	24.2	6.2	57.1	4.3
RRP rate	6.4	3.5	21.7	0.2	68.3

CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate, RRP = reverse repurchase
Note: The table shows the forecast error variance decompositions at 20 quarters.

4.2. Monetary policy responses to structural shocks

The last rows of Figures 3 and 4 summarize the monetary policy responses to the different structural shocks prior to and during inflation targeting, respectively. In the pre-IT period (Figure 3, fifth row), the policy is tightened in response to an unanticipated improvement of financial conditions. This helps explain the contractionary (though insignificant) effect of financial easing on output noted earlier. Conversely, unanticipated relative demand expansion spurs monetary policy easing, which tends to further boost GDP.[18] An interpretation may be that policymakers tend to tighten liquidity in response to a surprise REER depreciation and loosen it in the case of a surprise REER appreciation. This observed behavior matches central bank policy to engage in foreign exchange (FX) intervention only when needed—i.e., to lower FX volatility and not to influence the exchange rate. Monetary responses to supply and non-financial demand shocks are insignificant but slightly tilt towards contraction.

In the balanced inflation-targeting period (IT period 1), monetary policy is tightened on impact in response to the unanticipated easing of financial conditions. The increase in the RRP rate in response to one-standard-deviation financial shock peaks at 12 basis points around the second quarter and returns to trend after

[18] It is useful to note at this point, that responses are symmetric in the structural VAR's IRF computations. This paper presents the expansionary case when reporting most results, but this is mainly for brevity.

about four quarters (Figure 4, fifth row). This provides evidence of what may be construed as "leaning against the wind", or a possible precursor to such a strategy, where the monetary authority considers financial stability and responds to known indicators of financial conditions, such as asset prices and credit quantities (Agur and Demertzis [2013]; Gambacorta and Signoretti [2014]; Svensson [2017]).[19] The policy rate increase eventually reverses, however, allowing output to expand above-trend together with a fall in inflation akin to what happens under an aggregate supply shock.

Supply shocks are slightly accommodated, but only on impact and fleetingly, with the RRP rate rising by about nine basis points for one quarter in response to a one-standard-deviation positive supply disturbance. Accommodative behavior, which indicates softening of the inflation-output variability tradeoff, has been observed in other inflation-targeting central banks, albeit mostly in advanced economies and for longer periods (e.g., Tachibana [2013]). In the case of an adverse supply shock, which depresses output and heightens price pressures, successful anchoring of inflation expectations allows inflation-targeting central banks not just to refrain from raising the policy rate, but to lower it to stabilize output.[20] In the context of the Philippines, the observed accommodation was likely due to policymakers' recognition of the possible impact of supply shocks on inflation expectations, especially when shocks were seen to be persistent or prolonged.[21]

Monetary policy strongly and systematically tightens in response to non-financial demand shocks. Although this occurs with a lag, with the full effect (about 30 basis points) taking about four quarters to complete, the consistency in behavior under inflation targeting contrasts with the greater ambiguity of monetary responses to demand shocks prior to inflation targeting.

As opposed to what occurs in the pre-IT period, the policy does not significantly respond to a relative demand shock under inflation targeting, though the inclination is still to stabilize relative prices. This suggests a weaker tendency to control the exchange rate, as had been typical policy advice given to developing economies after the AFC (as noted, for example, in Mishkin [1999] and Kawai et al. [2005]).

Figure 6 summarizes the monetary responses to structural shocks as the sample period for inflation targeting is lengthened. Policymakers' reactions seem consistent in that they gradually but systematically tighten monetary policy in response to a positive non-financial demand shock, which is vital to

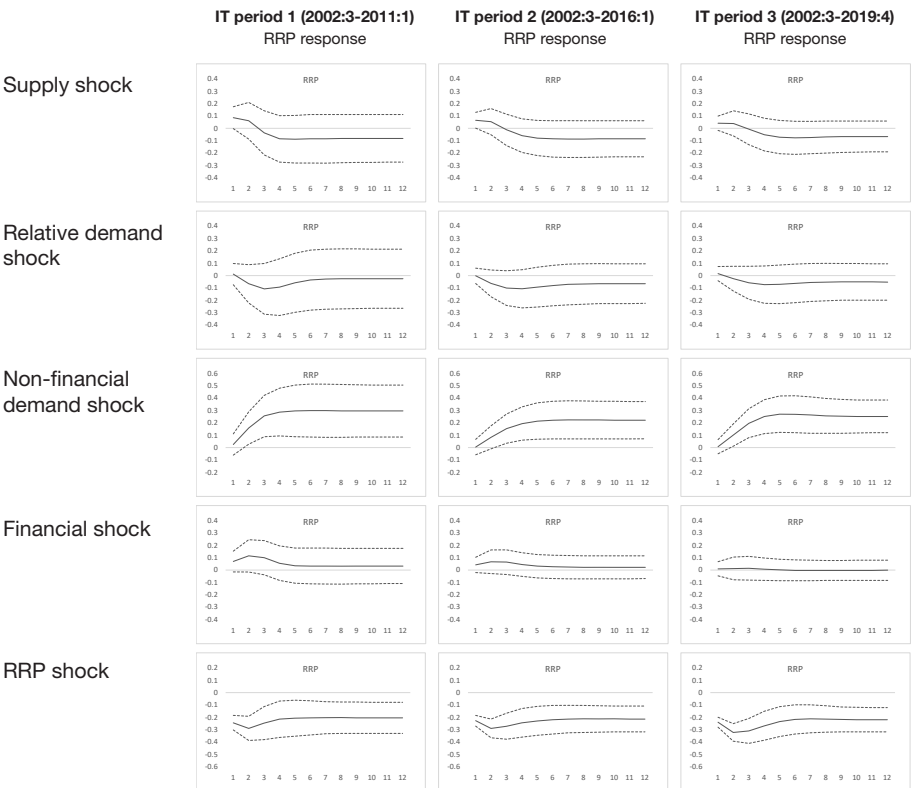
[19] Such responses are also useful for checking the identification strategy of the structural VAR. To additionally identify financial shocks and differentiate them from monetary shocks, Fornari and Stracca [2012] impose a *non-negative* reaction of the short-term interest rate after a financial shock.

[20] Central banks included in Tachibana [2013] were developed economies–specifically, Australia, Canada, New Zealand, Sweden, and the UK.

[21] This vital observation was made by central bank officials during those times.

meet the inflation target; and yet partially and transiently accommodate supply disturbances. The notable change across sample periods however is the weakening of the policy response to a financial disturbance, with the central bank appearing to no longer respond as much to financial conditions when one considers the full inflation targeting sample.

FIGURE 6. Monetary responses under inflation targeting

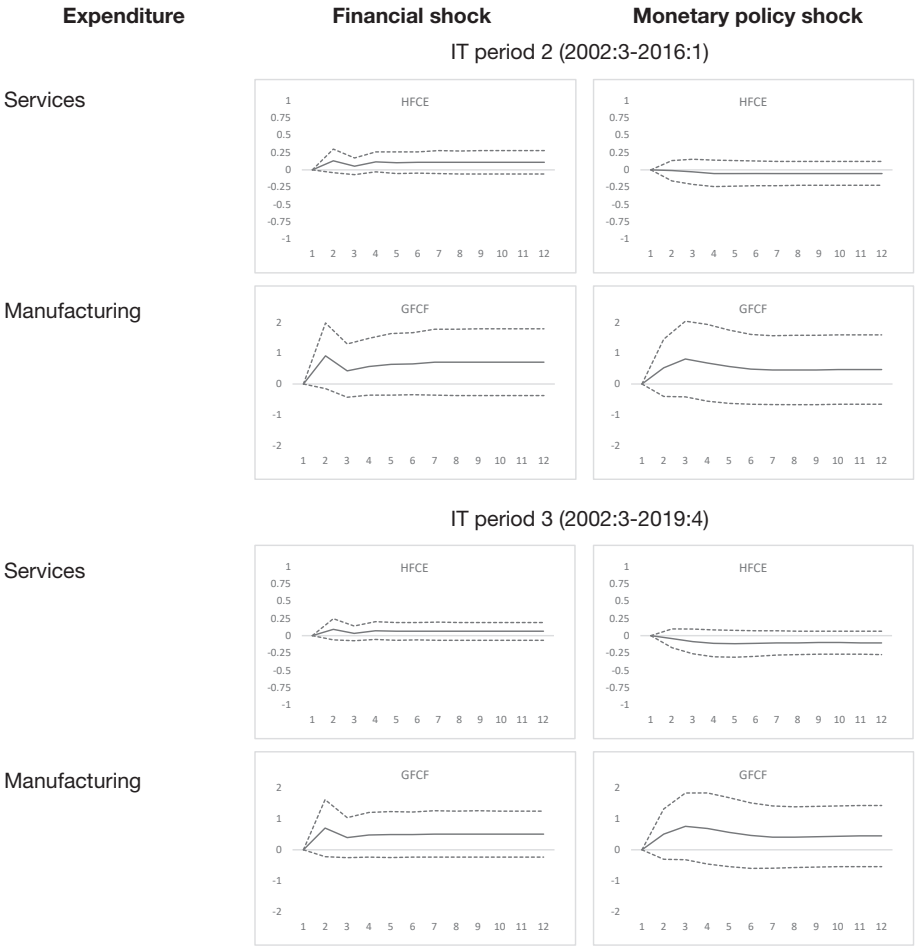


CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate, RRP = reverse repurchase rate
Note: These are monetary policy responses to structural shocks identified from the VAR model, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. CPI, GDP, and REER are in logarithms.

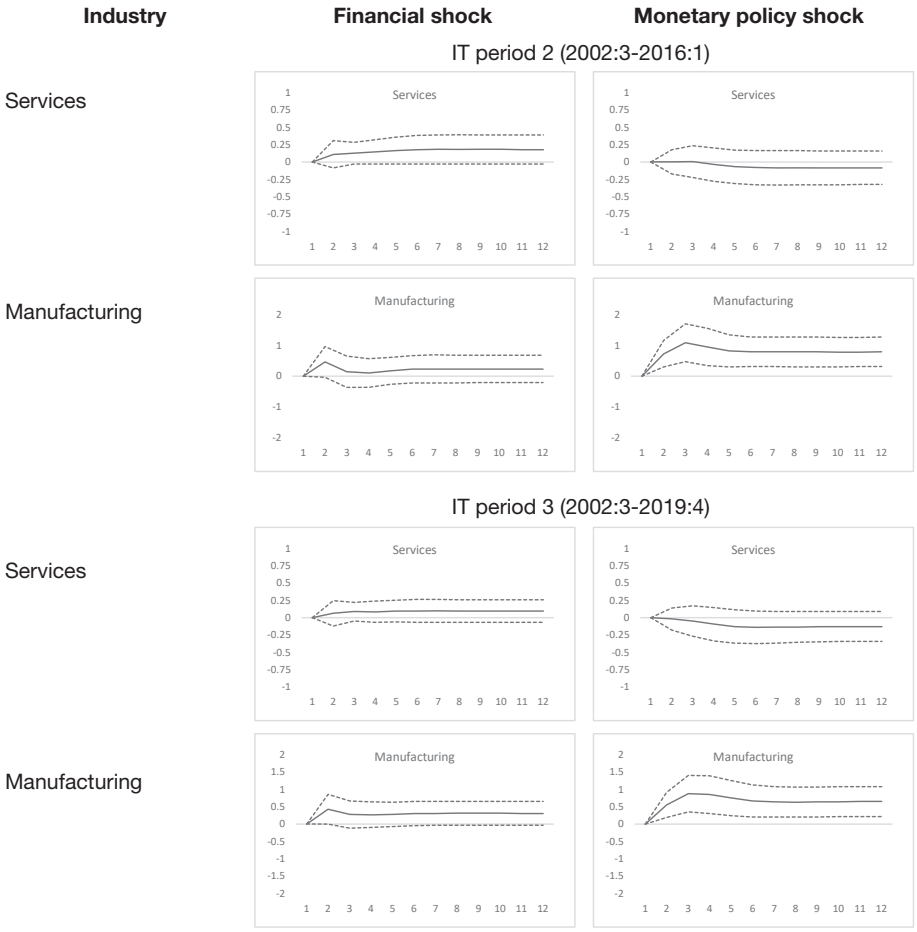
4.3. Heterogeneous impact of financial and monetary policy shocks

Figure 7 (expenditure panel) shows that both financial and monetary policy shocks have a larger impact on fixed capital investment than on household consumption, although there is still some indeterminacy in the direction of the responses of the former. Moreover, for both types of spending, the impact of financial shocks tends to be larger and more significant compared to that of monetary policy shocks.

FIGURE 7. Output responses to financial and monetary policy shocks, by expenditure and industry



Note: These are responses to financial and monetary policy shocks identified from the VAR model, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. Household fixed consumption expenditure (HFCE) and gross fixed capital formation (GFCF) are in logarithms.



Note: These are responses to financial and monetary policy shocks identified from the VAR model, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. Manufacturing and services output are in logarithms.

The results suggest that both sectors face financial frictions, but with firms likely to be much more reliant on credit and therefore more responsive to monetary and financial expansion than households. They are consistent with the expectation that a positive financial shock will bring about higher private investment, as external finance serves as a more vital element in the production of capital goods than consumption goods (Fornari and Stracca [2012]; Hall [2010]).

They are also consistent with the strong presence of credit supply shocks observed earlier, as such disturbances tend to emanate from the corporate sector, where it matters more on the production side [Fornari and Stracca 2012]. Findings are also related to those of Gilchrist and Zakrajsek [2012], who find the impact

of financial disturbances to be stronger on business investment versus GDP, and of Bassetto et al. [2016], who find that financial shocks have a disproportionate effect on investment compared to monetary policy shocks.

In comparison, there is greater nuance across inflation-targeting periods for services and manufacturing on the production side of GDP (Figure 7, industry panel). Only financial shocks have a significant effect on services in IT period 2, but this disappears in IT period 3. The impact of financial shocks on manufacturing, on the other hand, is significant in the longer run only in the full sample, while that of monetary policy shocks is significant across all sample periods, with impulse responses accumulating to and settling at about 70 basis points by the third quarter. Furthermore, monetary policy tends to have a larger effect than financial conditions on the manufacturing sector.

The results indicate financial constraints and frictions for manufacturing firms, as improving both monetary policy and financial conditions leads to higher manufacturing growth. Services growth, in contrast, appears unresponsive to monetary easing and only weakly responsive to improvements in the financing environment. This suggests lesser reliance of services firms on external finance, which does not seem incompatible with the composition and nature of the sector.[22]

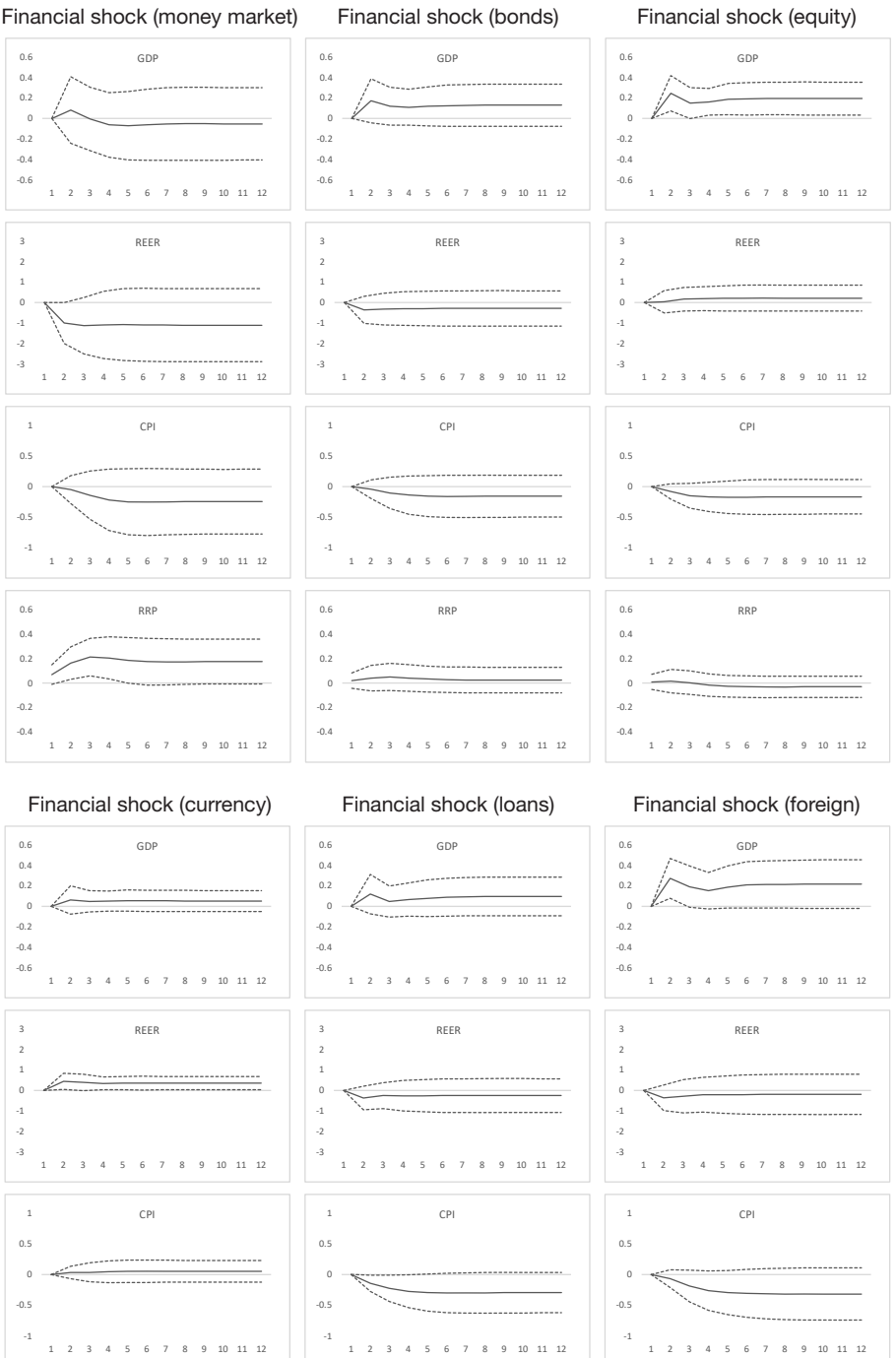
4.4. Macro effects of disaggregated financial shocks

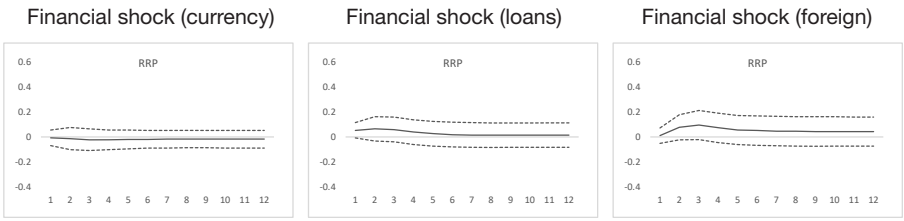
Figures 8a and 8b summarize the results of structural VARs that were alternately estimated using FCI subcomponents that focused on a particular financial instrument/asset or source—namely, domestic bonds, stocks, currencies, loans, or the global financial market.[23] The foreign finance subcomponent condenses information from the Chicago Board Options Exchange Volatility Index (VIX), the US TED spread (the 3-month London Interbank Offer Rate minus the three-month US Treasury bill rate), the US term spread (the ten-year US Treasury note yield minus the three-month US T-bill rate), and a measure of world oil prices to represent commodities.

[22] The formal services sector accounted for in the national income accounts data largely consists of domestic wholesale and retail trade (about a third of total services output), apart from finance, insurance, and real estate (about a fourth). Though both manufacturing and services sectors are weighed down by lack of financial scale in developing countries, Daway-Ducanes and Gochoco-Bautista [2019] argue that financial expansion may adversely affect services more than manufacturing due to the presence of a large informal services sector and the inclusion of potentially destabilizing services sectors, such as financial intermediation and real estate services.

[23] Indicators meant to capture risk are incorporated in the relevant category. For instance, the loans classification includes bank distance-to-default as well as the bank-sector beta, while the currency market category includes foreign-exchange-related volatilities and the exchange market pressure index.

FIGURE 8A. Impulse responses to financial shocks (IT period 2)





CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate, RRP = reverse repurchase rate
Sample period: 2002:3-2016:1
Note: These are responses to various financial shocks identified from the VAR model based on a decomposition of the FCI, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. CPI, GDP, and REER are in logarithms.

The figures display the impulse responses of the endogenous macroeconomic variables (excluding the FCI because of space considerations) to different estimates of financial shocks, including the monetary policy responses to these shocks. As evident from Figure 8a, the policy rate tightens in response to positive financial disturbances from the domestic money market in IT period 2, stabilizing output at the trend. The RRP rate hike in response to a one-standard-deviation liquidity disturbance accumulates to 21 basis points by the third quarter before gradually tapering to 17 basis points.

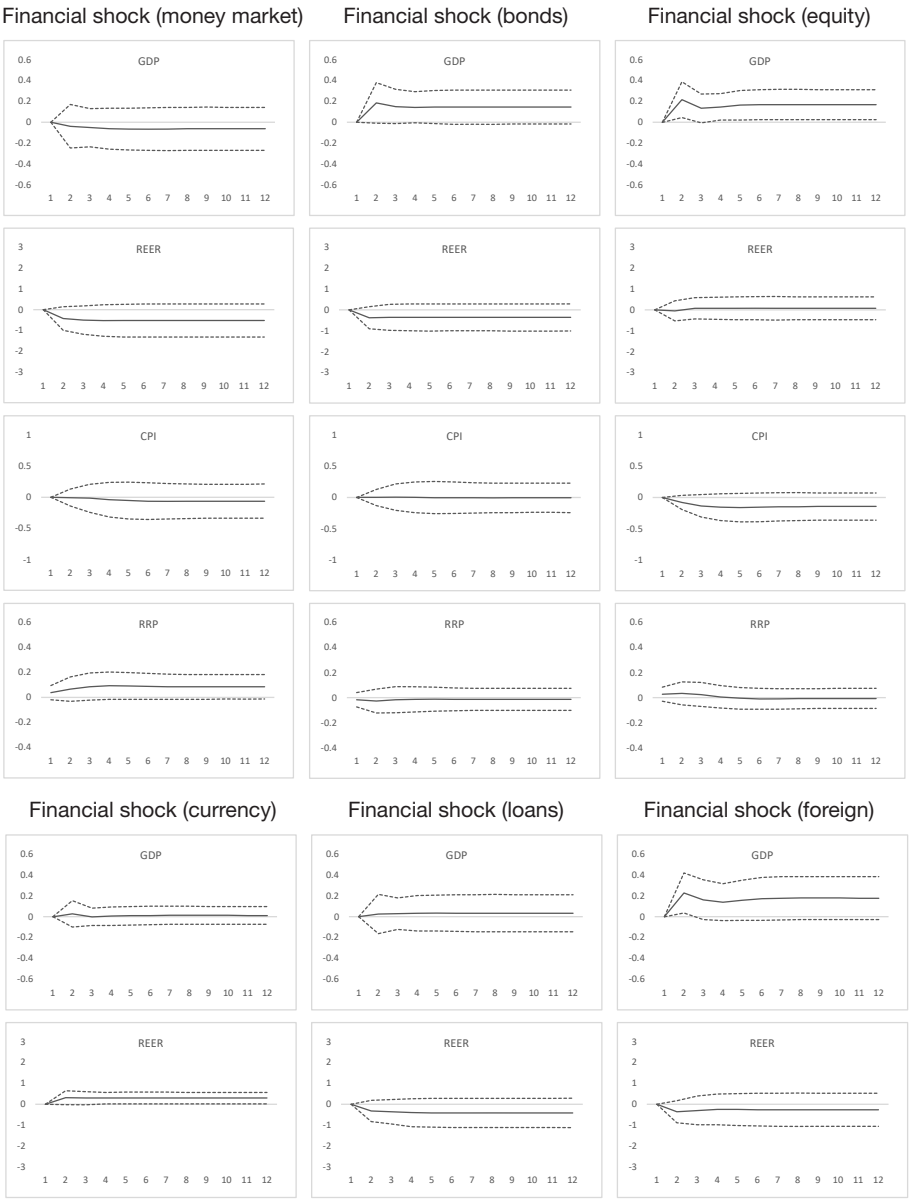
Monetary policy similarly tightens in response to a foreign financial shock, but by a lesser degree (by ten basis points in three quarters) and for a shorter period (reverts to near trend in five quarters), allowing a significant GDP increase. The responses can be further traced to the VIX and the US TED spread, which both reflect the global liquidity conditions and risk sentiment of international investors. The foreign financial shock estimated in this paper is primarily driven by the VIX, which indicates the risk appetite of global investors and corresponding scarcity (high VIX) or abundance (low VIX) of foreign capital. Positive financial shocks from bank loans also trigger a small policy reaction on impact, which goes back to trend after a year.

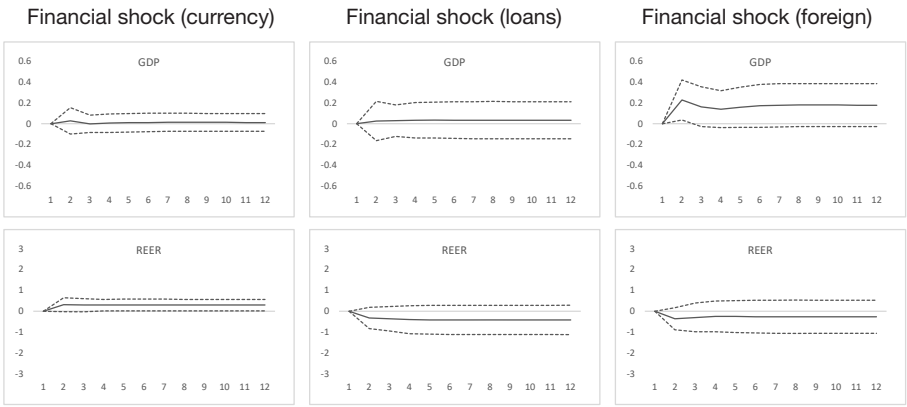
Considering these policy responses, most financial shocks seem to behave like aggregate supply shocks in IT period 2, as they raise output and lower prices simultaneously.[24] The pattern is purest for financial shocks coming from the domestic equity market, where there is no corresponding monetary response, and sharpest for disturbances from foreign financial markets, which are closely associated with domestic markets on account of risk-on/risk-off behavior of global investors.[25] Financial shocks from the bond market (which tend to dominate domestic financial conditions) and bank loans also follow the same pattern, but with less distinct responses.

[24] Financial shocks from the FX market are an exception. The only significant response to a positive financial shock from this market is REER appreciation.
[25] A positive financial shock from the equity market is therefore akin to an unanticipated tax cut that lowers costs and boosts production.

Financial shocks from domestic equity and global financial markets continue to behave like aggregate supply shocks in IT period 3 (Figure 8b). One can also see similar policy responses to these disturbances in the full sample. While there is little change in the impulse responses to structural shocks from the money market, in terms of direction, monetary policy responses to these disturbances are much smaller in the full sample, at less than half their previous size.

FIGURE 8B. Impulse responses to financial shocks (IT period 3)





CPI = consumer price index, FCI = financial conditions index, GDP = gross domestic product, IT = inflation targeting, REER = real effective exchange rate, RRP = reverse repurchase rate
Sample period: 2002:3-2019:4
Note: These are responses to various financial shocks identified from the VAR model based on a decomposition of the FCI, as specified in the main text, over 12 quarters. Dashed lines represent 2-standard-error bands. CPI, GDP, and REER are in logarithms.

The biggest difference across sample periods seems to be in relation to structural shocks that emanate from bank loans. Surprise improvements in financing conditions related to bank credit completely fail to spur growth in the full sample, while monetary policy no longer tightens in response to such disturbances during the period and inflation no longer falls. The latter set of responses also occur to a certain extent for bonds.

All in all, the findings suggest that, in the evolving inflation-targeting environment, policymakers blunted the macroeconomic impact of financial shocks, and this behavior has been consistent for certain types of shocks, specifically those emanating from global financial and domestic money markets. This indicates policy sensitivity to a surge of liquidity, or a drying up of funding on the flipside, and is compatible with monetary policy that attempts to discipline a financial boom yet becomes accommodative in periods of a financial bust.

However, such patterns of behavior gleaned from impulse response functions have disappeared for bank loan shocks, and to some degree bond market shocks, in the latest (full-sample) regressions. This helps explain the observed weakening of the monetary policy and inflation response to financial shocks across sample periods, as noted previously (Figure 5b).

5. Further discussion and concluding remarks

Using a simple and relatively standard but potent specification for a structural VAR, this study was able to identify and estimate various macroeconomic shocks and deliver sensible impulse response functions that summarized important economic behavior prior to and during inflation targeting in the Philippines.

The structural VAR allowed investigation of the differences in (1) the impact of financial and monetary policy shocks on inflation and growth, shedding light on the issue of monetary effectiveness; and (2) systematic responses of the monetary authority to macroeconomic shocks, including financial shocks, which have rarely been estimated in the empirical literature, especially in developing and emerging market economies. It also allowed observation of the evolution of economic behaviors in inflation targeting monetary settings.

Descriptive statistics showed mostly positive outcomes in relation to the country's adoption of inflation targeting in 2002. Comparing impulse response functions for the balanced periods before and after implementation of the new monetary regime, however, one finds monetary effectiveness may have been about the same (and even a bit stronger) in the period before inflation targeting. This may have also been due to the length of the pre-IT sample (last quarter of 1993 until mid-2002), which was limited by the length of the FCI series used in the study. Guinigundo [2005] and Tuaño-Amador [2003] both state that the BSP had already shifted to "modified monetary targeting" by 1995, an approach that placed greater emphasis on price stability and which, like inflation targeting, extracted information from a much broader set of economic and financial variables, with attention no longer focused on just the monetary aggregates. Thus, the main difference between modified monetary targeting and inflation targeting had been the forward-looking feature of the latter, as policymakers were then still responding mainly to *current* inflation.

Some policymaker responses were about the same in both monetary frameworks in a balanced comparison, with the policy rate systematically rising in response to a positive financial shock and declining in response to a negative financial disturbance. These are of course actions that are also compatible with a monetary authority trying to rein in inflation or maintain an inflation target if financial shocks are interpreted as simple aggregate demand shocks, though inflation falling significantly below trend in the case of a financial expansion seems to imply otherwise.

Whether or not Philippine monetary authorities leaned against the wind to prevent a build-up of financial risk at any point in time has yet to be established. Whether that was correct policy or not, particularly for an emerging market economy, also remains a lively area of debate.[26] Yet, central bank leadership at the time had certainly been open to the idea, with the central bank governor espousing

[26] There has been lively discussion over the years on whether such a strategy is optimal. Prior to the GFC, the popular view was that a central bank should pay little attention to financial variables beyond their effects on inflation (e.g., Bernanke and Gertler [2000; 2001]; Gilchrist and Leahy [2002]). There has been a major reassessment after the crisis, with authors emphasizing the importance of accounting for "changes in financial conditions" when making interest-rate policy decisions, particularly when frictions are known to be coming from the credit supply side [Woodford 2011].

a "broader reaction function" that incorporated financial stability or other important considerations as representing "an evolution of the framework and a way forward for (inflation-targeting) central banks" [Tetangco 2010:300-301].

Monetary policy responses under inflation targeting differed from those in the pre-IT period in three important ways based on this study's empirical results. First was the strong and systematic tightening of the policy rate in response to non-financial demand shocks as can be expected from a central bank that is trying to meet an official inflation target or target range. Such behavior stands out, especially in comparison to more ambiguous responses seen under a less defined monetary framework.

The second was the apparent accommodation of supply shocks by policymakers, albeit partial and fleeting (about one to two quarters), which would not have been feasible if inflation expectations had not been well anchored. The ability to loosen monetary policy in the face of adverse supply conditions, therefore, indicates success in the implementation of an inflation-targeting framework. This also fits the BSP's portrayal of itself as a flexible inflation targeter (e.g., Guinigundo [2014]) as well as observers' initial impressions of inflation targeting as implemented in the Philippines (Mariano and Villanueva [2006]; Lim [2006]).

The third difference across monetary regimes was in the approach to exchange rate management. The impulse response functions indicated a greater tendency to control the exchange rate in the pre-IT period and greater tolerance for exchange rate flexibility in the balanced inflation-targeting phase. Pegged exchange rate regimes had fallen out of favor after the AFC in 1997/1998 and were believed to have made financial crises in emerging market countries more likely (e.g., Mishkin [1999]). Moreover, adopting an inflation target meant subordinating the exchange rate to the final goal of low inflation, which was considered sound advice at the time [Debelle and Lim 1998].

The role of the exchange rate under inflation targeting had been recognized early on as a critical issue in emerging market countries, a number of whom were reluctant to display "benign neglect" of exchange-rate movements [Mishkin 2000], and it will always be so in open economies like the Philippines [Tetangco 2009]. Relatedly, under the classic Mundell-Fleming "trilemma" and even under Rey's "dilemma" or the "irreconcilable duo" [Rey 2018], which argues that exchange rate policies may not even matter, the biggest challenge of an inflation-targeting central bank in an emerging market economy will always be in responding to massive capital inflows (and sudden outflows).[27]

[27] In the classic trilemma, a country cannot have a fixed exchange rate, an open capital account, and monetary autonomy all at the same time. Because of a global financial cycle in capital flows, asset prices, and credit growth, Rey [2018] states that a country has to further choose between the latter two (open capital account and monetary autonomy), regardless of exchange rate regime. In such a setting, policy options at the country level would be limited to such measures as targeted capital controls, national macroprudential policies, and more stringent limits on leverage of financial intermediaries.

Indeed, such issues likely colored the evolution of monetary policy responses to macroeconomic shocks under inflation targeting in the Philippines and the effectiveness of these responses. Structural VAR analysis in this paper showed that the observed tendency to lean against the wind virtually disappeared when the sample period for inflation targeting was lengthened, with the central bank appearing to no longer respond as much to a change in financial conditions. A closer look at sources of financial disturbances further revealed that this traced to a change in the monetary policy reaction (or non-reaction) to credit market shocks, mainly in bank lending.

Ongoing research [Debuque-Gonzales 2021] focusing on a period of high portfolio inflows and short-term-interest-rate divergence (i.e., between the policy rate and the 91-day Philippine Treasury bill, the known benchmark for bank loans) found that, during the said period, the policy rate systematically *fell* in response to a positive financial shock, perhaps to stabilize the exchange rate, while inflation hovered *above* rather than below trend. This may have occurred as raising policy interest rates to ward off inflation during periods of high liquidity would have been a tricky response for policymakers, as this would have invited further capital inflows and greater currency instability. This period, which included late 2010 to early 2018, roughly covered the latter half of the current paper's full sample for inflation-targeting, thus helping explain the change in the observed behavior.

In addition to a negative short-term-interest-rate spread during the high capital-flows period as high liquidity pulled down T-bill rates, the study uncovered a simultaneous weakening of interest rate transmission from short-term to long-term domestic market rates (the latter proxied by ten-year Philippine Treasury note yields) as well as to the average bank lending rate. Similar to the observations of Jain-Chandra and Unsal [2012] for Asian emerging market economies and Rey [2018] for a broader set of countries, the paper found that Philippine long-term yields tended to move more closely with long-term global yields, as represented by ten-year US Treasuries, while domestic bank lending rates generally moved more independently, especially of short-term market rates, during the period. These observations, taken together, help explain the observed weakening of monetary policy transmission to output growth across inflation-targeting sample periods in this paper.[28]

In sum, the results of this paper suggest that the adoption of inflation targeting in the Philippines has largely been successful, changing central bank behavior in a good way, but future challenges remain, and likely in the same areas—i.e., in maintaining monetary influence over the economy, dealing with capital surges, and preserving financial stability, while also keeping exchange rates at a robust and competitive level.

[28] The BSP has conducted monetary policy with an understanding of the difficulties posed by cross-border capital surges. At different points in time in recent history, it had been compelled to prohibit access of foreign capital to its various deposit facilities (e.g., to special deposit accounts and term deposits) and introduce a variety of macroprudential measures to help maintain price and financial stability.

Tetangco [2009], in his assessment of the future of inflation targeting in the country, highlighted the need for central banks to deepen their understanding of financial linkages in the transmission of shocks and monetary policy. This paper traced some of those linkages and, additionally, through an examination of the heterogeneous effects of the interplay of financial and monetary policy shocks, revealed financial frictions and constraints in important sectors of the economy—especially among firms for investment, and within manufacturing. From this perspective, one can expect that tradeoffs encountered by an inflation-targeting central bank in a country like the Philippines when dealing with future capital surges will hardly ever (or never) be easy.

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Global liquidity, global risk appetite, and the risk of credit and asset booms

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This study examines the channels through which net cross-border bank flows and VIX, working through the domestic banking system, could potentially lead to the creation or exacerbation of credit and asset booms that may threaten financial stability. It uses bank firm-level data for the Philippines over the period 1991-2018. Among the study's significant findings are the following: bank lending to the real estate and housing sector is consistently and significantly affected by net cross-border bank flows (NCBF); non-core bank liabilities is an important variable as it consistently affects the amount of total loans and loans to the commercial and industrial sector as well as bank asset growth and bank leverage; net cross-border flows lower bank asset growth; and banks' cost of loans tends to be reduced by NCBF and by a reduction in global risk appetite. The use of macroprudential measures-including monitoring bank non-core liabilities and lending to sectors such as real estate-as well as capital flow management measures is warranted in order to prevent bank credit and asset booms from being created or exacerbated, which may threaten growth and financial stability.

JEL classification: E4, E5, E6, F3, F4, F6
Keywords: asset booms, credit booms, financial stability, cross-border bank flows, VIX, bank firm-level data

1. Introduction

Changes in global liquidity and risk appetite transmitted across national borders in an era of increased integration of financial markets have become an important channel of external shocks to an economy and pose a challenge to the conduct of monetary policy and the stability of the financial system. For example, Baskaya et al. [2017] find an important international credit channel through

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which capital inflows and domestic bank borrowing from abroad, especially by larger, stronger capitalized banks, affect domestic bank credit supply in the case of Turkey.

With greater capital mobility across national borders, central bankers are constantly on guard against possible inflationary effects of such inflows, and potential implications on financial stability, given the potential of capital inflows to create or exacerbate credit and asset booms, and busts when such flows reverse. Using data over the period 1870-2008, Shularick and Taylor [2012:1032], conclude that financial crises are essentially "credit booms gone wrong", as lagged credit growth is a significant predictor of financial crises while other variables are not.

Capital inflows, especially cross-border bank inflows in bank finance-dependent economies, tend to create large imbalances in both bank and non-bank firm balance sheets, and induce behavior that tends to take advantage of the availability of cheap credit, including increased leverage and the downplaying of risk. A recent study by Brauning and Ivashina [2018], for example, finds that the volume of credit in EMEs is directly affected by foreign bank lending to firms there, with a 32 percentage-point increase in the volume of such loans when US monetary policy eases. Bank and non-bank firms may be more willing to take on debt and increase their leverage ratios in order to acquire assets when cheap and abundant funding is available. The temptation to do so may arise partly because the risks of illiquidity and credit defaults are downplayed when large capital inflows and rising asset values boost balance sheets. Greater bank balance sheet imbalances which fuel asset and credit booms may set the stage for a potential financial collapse down the road a la Minsky.

The effects of financial crises are oftentimes not confined to the financial sector alone and may adversely impact the real economy. Cecchetti [2008] and Gochoco-Bautista [2008; 2009] find that asset booms raise the tail risks of both bad output and inflation outcomes. In addition, Gochoco-Bautista [2000] also finds that excessive credit is associated with currency depreciation pressure periods in countries such as the Philippines.

Thus, in general, central bankers today regard large and volatile capital flows associated with changes in global liquidity, global risk appetite, and the intermediation of these through domestic banking systems, as matters that need to be dealt with decisively and in a timely manner. Furthermore, they realize that these cannot be simply left to private market participants alone to deal with. This is especially so in the case of emerging economies which typically do not have deep nor mature financial systems to efficiently intermediate such flows. The IMF itself has had a change of heart regarding unbounded capital mobility in the aftermath of the Asian Financial Crisis, allowing the use of so-called "capital management measures" to deal with large and volatile capital inflows, but only almost as a last resort.

This study uses bank firm-level data for the Philippines over the period 1991-2018 to understand the channels through the domestic banking system by which capital inflows and VIX[1] can potentially give rise to credit and asset booms. The Philippines is a small, open economy with a financial structure that is heavily bank dependent. Like many developing economies, a bank-dependent financial structure exists alongside a large informal financial sector. The formal financial sector is dominated by a few large universal banks through which most capital inflows are intermediated, if they enter the formal financial sector.[2]

In particular, this study examines some channels of transmission of capital flows to the banking sector at a more micro level, via changes in the cost of bank loans—or the average interest paid on bank loans, the total quantity of bank loans, and bank loans to the commercial and industrial sector and to the housing and real estate sector. It draws inspiration from a study by Baskaya, di Giovanni, Kalemli-Ozcan, and Ulu [2017a], which uses a matched firm-bank-loan level dataset for Turkey to explain the role of the global factor VIX, used as an instrument for capital flows, on real borrowing rates and domestic credit growth at the firm level.

While the current study does not have as ideal a dataset for the Philippines, one advantage that it has over the Baskaya et al. [2017a; 2017b] is that it is able to examine the relationship between net cross-border bank flows (NCBF), global risk appetite, proxied by VIX, and lending to specific sectors, such as the housing and real estate sector. Lending to the real estate sector, a non-tradeable goods sector, tends to have an adverse impact on financial stability because of the potential for asset booms being created as shown in Cecchetti [2008] and Gochoco-Bautista [2008; 2009]. It is also able to see whether VIX is a good proxy for capital flows and the global financial cycle compared with NCBF.

The study is divided into the following sections: Section 2 is a review of the literature on asset booms, the channels of effects from global liquidity and global risk appetite to an economy through the creation of asset and credit booms and busts and the implications on financial stability, and the possible implications for the conduct of monetary policy; Section 3 describes the data and discusses the empirical methodology; Section 4 presents and discusses the empirical results obtained; and Section 5 concludes.

[1] VIX is the Chicago Board Options Exchange's volatility index measuring expectations of stock market volatility based on S&P 500's stock options.

[2] There are also rural banks in the formal banking sector, but these do not intermediate capital inflows from abroad. The stock market is not a significant source of financing investment. The Philippines receives about 30 billion US dollars in remittances from overseas workers annually. Most of these are used to support consumption demand and consumption smoothing.

2. Literature review

One difficulty in ascertaining the genesis of asset booms is that the literature has not arrived at a universally-accepted definition of what an asset boom is, nor whether it is caused by changes in certain fundamental factors or is the result of irrational exuberance. There is also little consensus on whether there is any usable information to be gleaned from asset booms, however defined. In the past, the criteria for 'usable' information tended to be limited to any information inferable from asset booms that directly impacted the average rate of inflation forecasts as in Bernanke and Gertler [2000], for example.

Despite these unsettled issues, there does seem to have been a sea change in attitude about the wisdom of not ignoring large changes in asset prices and credit growth. There are studies that demonstrate the less-than-benign effects of asset booms on the economy and on financial stability. Cecchetti [2008] and Gochoco-Bautista [2008; 2009], for example, show that asset prices contain useful information to assess the tail risks of the worst output and inflation outcomes that monetary authorities ought to pay attention to, and that does not require the classification of movements in asset prices as being indicative of asset booms.

Studies have examined the channels of transmission of global liquidity and risk appetite shocks to an economy. Rey [2015], for example, finds evidence relating the co-movement of capital flows and asset prices, bank leverage, and domestic credit, to a global financial cycle proxied by VIX. Changes in VIX reflect changes in global risk appetite of global investors which drive capital inflows to EMEs in a global chase for higher yields, in large part as a reaction to zero-lower bound interest rates in countries such as the US and Japan and in Europe in the aftermath of the GFC. A Bank for International Settlements (BIS) study [2014] also finds that the co-mingling of global factors with domestic factors has become a more important determinant of financial cycles, especially in Emerging Asia.

The availability of global liquidity may create large balance sheet imbalances and induce changes in the behavior of bank and non-bank firms in a way that may raise the risk of imprudent behavior, increase leverage ratios, create credit and asset booms, and give rise to financial vulnerability and crisis.

Bruno and Shin [2015] find evidence of the transmission of global liquidity and financial conditions through the effects of cross-border bank flows on the leverage cycle of international banks which propagates global liquidity. Adrian and Shin [2010] examine the behavior of bank leverage in relation to asset price increases. They explain that if bank leverage moves pro-cyclically when asset prices are rising, then such behavior enhances business cycle effects. Output booms will be larger when assets are growing alongside bank leverage, exacerbating the boom. The converse case is true. Gochoco-Bautista [2016] finds that bank leverage does not behave pro-cyclically in response to a low VIX or equivalently, a high global risk appetite, and that specific kinds of flows are responsible for the growth in bank leverage. Merely having large capital flows or equity flows does not lead to growth in bank leverage. The worrisome aspect of portfolio flows significantly

explaining the growth in bank leverage is that since portfolio flows are short-term, they are easily reversible flows. This could leave more leveraged banks without continuing funding sources when portfolio flows stop or reverse. Furthermore, results indicate that the growth of bank leverage is also more sensitive to VIX when portfolio flows are considered.

The availability of large sources of non-core funding from global wholesale markets may provide the rope that allows banks and non-bank firms to hang themselves with. Borio and Lowe [2004], Hahm et al. [2012], Kim et al. [2013], Baskaya et al. [2017a; 2017b] point out that banks often turn to non-core liabilities driven by banks' foreign exchange borrowing but which are a less stable source of funding. It is an indicator of greater financial vulnerability when credit growth exceeds bank core deposit growth. Kim et al. [2013] find evidence of a sharp increase in non-financial corporate deposits in China, Korea, and the Philippines associated with large offshore corporate bond issuance. Similarly, Hahm et al. [2013] use a credit supply model to model a lending boom, in which the vulnerability to crisis is seen in a large stock of non-core liabilities to finance bank lending in a panel of emerging and developing economies.

Lagos and Zhang [2018] focus on another channel of influence relating monetary policy to financial markets, especially asset prices. When monetary policy is tight, payments instruments such as bank reserve and money balances used in settling financial transactions become scarce. This makes financial assets more illiquid and reduces their resale value option and their price, which they refer to as a "turnover-liquidity mechanism" of monetary policy. [Lagos and Zhang 2018:2]. In short, this is a channel in which less liquidity in financial markets reduces asset prices. This liquidity-based mechanism is offered to explain a negative correlation between real stock returns and increases in the nominal interest rate.

Cecchetti [2008] and Gochoco-Bautista [2008; 2009] find that asset booms in housing and equity markets, but especially in the former, raise the risk of extreme outcomes, with the risk of real output-and price level-gaps being in the tails of worst outcomes of their distributions. The finding that housing booms are more pernicious relative to equity market booms may be due to the role of bank finance in financing home purchases. This is not the case for equity market purchases. There are important examples of the disastrous effects of housing booms and busts in the not-too-distant past. The prolonged deflationary process in Japan following the bursting of its housing bubble in the early 1990s and the drag on economic growth, for example, continues to this day. More recently, the collapse of housing prices in the US and in the value of sub-prime mortgage securitized assets led to a global financial crisis.

The effects of asset booms on the economy and on financial stability have spawned a large debate as to whether monetary policy needs to be pro-active and act pre-emptively, use macro-prudential measures, etc. to prevent the formation of asset booms as in Cecchetti et al. [2000], or whether monetary policy should

simply be reactive, as in Bernanke and Gertler [2000]. Despite many unsettled issues, central bankers today no longer regard financial stability as the natural by-product of a successful inflation strategy alone and recognize the perils of ignoring large changes in credit and asset growth. Gochoco-Bautista and Bautista [2005], for example, find that contracting domestic credit growth and raising the interest rate differential does work to reduce exchange market pressure in the Philippines, and that in crisis periods, monetary authorities in the Philippines responded to exchange market pressure by reducing domestic credit growth and did not engage in sterilization as was usually done under non-crisis periods.

A further complication is that as Rey [2015] explains, the existence of the global financial cycle no longer affords monetary authorities absolute monetary policy independence via a floating or flexible exchange rate regime in a world with free capital mobility, as conventionally thought. Asset prices, capital flows, and credit flows evidently obey global factors via the global financial cycle, but this cycle is typically not in sync with business and financial cycles in individual countries. Thus, Rey concludes that the "trilemma" is reduced to a "dilemma" in that an independent monetary policy is only possible if and only if the capital account is managed.

Responses of monetary authorities to large capital inflows themselves have implications on the interaction of global and domestic factors in affecting financial cycles and the potential for credit and asset booms to occur. Filardo and Siklos [2013], for example, provide evidence that large interventions by monetary authorities in the foreign exchange market in response to large cross-border capital flows have implications on asset booms in Emerging Asian economies. Asset booms tend to occur alongside large and persistent accumulation of reserves by central banks.

3. Data and methodology

This study considers the possible channels of effects from capital inflows through the banking sector to the cost of bank loans as well as to the amount of loans extended by banks for the purpose of lending to commercial and industrial firms, and the real estate and housing sector, as these could create credit and asset booms in these sectors.

As Baskaya et al. [2017a] explain, whether capital inflows lead to asset booms is confounded by both effects arising from the supply side and/or the demand side. The channels by which global liquidity and risk appetite spill over to a small open economy's domestic credit conditions, for example, are unclear and changes in global liquidity tend to have varied effects.

In their study, VIX, the usual proxy for global risk appetite, is used as an instrument for push-driven capital inflows whose movements are exogenous to domestic fundamentals in a small open economy. Assuming country risk can be decomposed into global risk and country-specific risk, when VIX is low, global

risk appetite is high, and country risk will tend to decline, *cet. par.* In this way, VIX is an instrument for and will capture supply-driven capital inflows. Movements in domestic fundamentals, such as Gross Domestic Product (GDP), exchange rates, and inflation are controlled for, as they are assumed to be correlated with the demand for capital inflows.

An alternative explanation, this time from the demand side, is that a low VIX and greater global risk appetite raises expectations of future economic conditions, which have wealth effects or balance sheet effects and affect firm demand for credit. A decline in VIX may lead firms and banks to expand their balance sheets and demand more credit. If so, the amount and cost of firm-level borrowing will rise when VIX is low.

The methodology therefore needs to take into account the fact that loan demand and bank lending rates are driven by both the demand for and supply of credit. Capital flows affect both the demand and supply sides of credit and have opposing effects on the price of credit.

Following Baskaya et al. [2017a], we use a reduced form regression to examine the impact of VIX on loans and the cost of loans using panel data for Philippine banks in the period 1991 to 2016. The dependent variable is either quantity of bank loans extended or the cost of such bank loans. The explanatory variables include either VIX or cross-border bank flows, bank characteristics such as assets, capital ratio, liquidity ratio, non-core liabilities ratio, return on bank assets (ROA) and a set of macro control variables including real GDP growth, inflation, and the exchange rate.

The general form of the equation estimated by the study is

$$\log Y_{b,t} = a + \beta \log M_{t-1} + \theta_1 Bank_{b,t-1} + \theta_2 Macro_{t-1} + \varepsilon_{b,t}$$

where for bank b and time t, we have:

Y	is either (i) quantity of loans extended by banks in total, or lent to the commercial and industrial sector, or lent to the real estate and housing sector or (ii) the price at which banks' loans are extended,
M	is either *NCBF* (net change in cross-border bank flows) or *VIX*
Bank	is a set of bank characteristics including assets, capital ratio, liquidity ratio, non-core liabilities ratio, and ROA
Macro	is a set of macro control variables including real GDP growth, inflation and the exchange rate

Another set of regressions were run to explain bank asset growth and bank leverage using the rest of the same explanatory variables. A lag length of 1 is used in all regressions.[3]

[3] The Arellano-Bond GMM procedure does not require a search for the optimal lag length using conventional measures.

Bank exposure to international financial markets may affect the way changes in global financing conditions spill over into domestic credit markets. Baskaya et al. [2017a; 2017b] ask whether changes in the measure of capital inflows have a larger impact on loan level and borrowing rate when credit is supplied by banks with higher non-core funding, and hence with funding mostly raised in international capital markets.

Hence, we would expect that bank lending more dependent on non-core liabilities will be more responsive to capital inflows. When VIX is low and therefore, global risk appetite is high, banks funding costs tend to decrease, and they can pass this on to firms by lowering firms' borrowing costs. Firms will tend to borrow more at a lower cost of borrowing. There is a supply-side associated domestic credit boom as seen in domestic loan growth and pricing associated with capital inflows proxied by VIX.[4]

In this study, a dynamic generalized method of moments (GMM) procedure due to Arellano and Bond [1991] is used to obtain efficient estimates when a regression has both endogenous and exogenous explanatory variables.

First, a regression is estimated explaining the cost of loans (measured by the ratio of interest and fees on loans to total loans) as a function of the amount of net change in cross-border bank flows (NCBF), bank assets, bank leverage, liquidity ratio, non-core liabilities, ROA of banks, GDP growth, inflation, peso depreciation, and lagged values of these.

Second, a similar regression is estimated using quantities or values of various loan variables as the dependent variable, such as the value of total banks loans, the amount of bank loans to the real estate and housing sector, and the amount of bank loans to the commercial and industrial sector.

These regressions are then re-estimated using VIX in place of net cross-border bank flows as an explanatory variable.

The next sets of regressions attempt to examine the behavior of bank asset growth and bank leverage. As in the previous case, the regressions are also re-estimated using VIX in place of net cross-border bank flows as an explanatory variable.

3.1. Data

Annual data covering the period 1991-2018 are taken from Datastream/ Worldscope, International Financial Statistics (IFS), Bank for International Settlements (BIS), and the Bangko Sentral ng Pilipinas (BSP). There are 29 banks in the data set. The list below presents the descriptive statistics of the data used in the study. All the variables, except those in ratios, are in real terms, deflated by the GDP deflator.

[4] Baskaya et al. [2017a] also examine whether different types of firms, e.g., more versus less-credit constrained firms as proxied by firm size or net worth, are differentially affected by lending by banks with high non-core liabilities when VIX is low. They also test whether there is a difference in changes in the amount of foreign- and domestic-currency loans by high non-core banks when VIX is low.

The variable names are listed below. Those with an asterisk are variables constructed using existing data.

Bank firm data

Interest and fees on loans
Total loans
*Cost of loans =Interest and fees on loans/Total loans
Pre-tax income
Income taxes
Net income of banks=Pre-tax income-Income taxes
Total assets
*ROA of banks=Net income/Total assets
Cash=Cash and due from banks
*Core liabilities=Demand Deposits + Savings and Time Deposits
*Liquidity ratio=Cash /Core liabilities
Total liabilities
*Non-core liabilities=Total liabilities-Core liabilities
Demand Deposits
Savings and Time deposits
Total liabilities plus shareholder equity
*Shareholder equity=Total liabilities plus shareholder equity-Total liabilities
*Bank leverage=Total assets/Shareholder equity
Commercial and industrial loans
Real estate/mortgage loans
Total loans

Other macro data

VIX
GDP, seasonally-adjusted
Inflation
Peso depreciation

Net cross-border flows or claims (NCBF) is the difference between foreign exchange and break-adjusted change in total claims[5] and total liabilities (as calculated by the BIS) of institutions in all reporting countries to banks in the counterparty country which in this study is the Philippines. The series used in the regressions is converted to domestic currency and deflated by the GDP price index.

[5] The source of data is https://stats.bis.org/statx/srs/table/a6.1. A claim as defined in the BIS website is a financial asset that has a counterpart liability and which excludes financial derivatives (https://www.bis.org/statistics/glossary.htm?&selection=230&scope=Statistics&c=a&base=term).

With 29 banks and 28 years of observations, the total sample is 812. The available set of observations for analysis, however, is much smaller because the sample banks differ in entry and exit periods. The number of observations, *N*, is shown in the last column of the Table 1 below.

TABLE 1. Descriptive statistics full sample 1991-2018

	Mean	Std Dev	Min	Max	*N*
Bank Data					
Return on Assets (%)	2.0	37.4	–220.3	764	475
Asset Growth (real, %)	6.0	37.8	–429.3	502	450
Leverage (%)	151.5	914.0	–53.9	14,032	470
Liquidity Ratio (%)	17.2	9.6	2.9	73	407
Non-Core Liabilities (₱ mil)	34.5	54.8	0.4	379	409
Commercial/Industrial Loans (₱ mil)	113.7	220.0	0.0	1,281	228
RE & Mortgage Loans (₱ mil)	34.7	45.9	0.0	291	205
Total Loans (₱ mil)	150.5	266.1	0.0	2,020	411
Cost of Loans (real, %)	3.8	2.9	–4.6	21	388
Macroeconomic Data					
Depreciation Rate (%)	2.41	8.69	–10.6	32.8	27
Inflation Rate (%)	4.86	2.32	0.61	9.88	27
GDP Growth (%)	4.56	2.05	–0.58	7.36	27
Cross-border bank claims, (NCBF, US$ bil)	–0.25	2.96	–6.07	7.97	28
CBOE Volatility Index	19.8	8.57	11.2	43.3	28

4. Results

4.1 Highlights of results in Tables 2A-3B

Tables 2A and 2B show the regression results in which either the cost of loans—a measure of the interest rate charged on bank loans—or the quantity of loans in total as well to either the real estate sector or the commercial and industrial sector is the dependent variable, and various regressors including net cross-border bank inflows (NCBF) as the indicator of global liquidity. Tables 3A and 3B are the same regressions except that VIX is used in place of NCBF as the indicator of global liquidity. Regressions without crisis dummies for the Asian Financial Crisis and Global Financial Crisis periods are in the A tables while those with such dummies are in the B tables.

TABLE 2A. Crossborder regressions (cost and quantity of loans)

	Cost of loans	Total loans	Com/Ind loans	RE & Mort loans
Net Change in Cross Border Claims	–0.214	–0.057	0.506	0.876+
	(0.559)	(0.068)	(0.317)	(0.493)
Net Change in Cross Border Claims (–1)	–0.796+	0.043	–0.331	–0.425+
	(0.418)	(0.064)	(0.374)	(0.240)
Leverage	–0.101	–0.075*	0.077	–0.222*
	(0.161)	(0.033)	(0.074)	(0.109)
Leverage(–1)	0.396+	0.066+	–0.258	–0.07
	(0.205)	(0.034)	(0.179)	(0.133)
Liquidity Ratio	0.874**	–0.149**	–0.006	0.250*
	(0.315)	(0.031)	(0.188)	(0.114)
Liquidity Ratio(–1)	–0.585**	0.192**	0.187	0.062
	(0.141)	(0.026)	(0.134)	(0.177)
Return on Assets	0.133	0.011	0.331	0.301*
	(0.150)	(0.020)	(0.324)	(0.124)
Return on Assets(–1)	–0.164	0.042*	–0.203	–0.368**
	(0.153)	(0.016)	(0.265)	(0.061)
Non–Core Liabilities	–0.756+	0.304**	–0.025	–0.036
	(0.406)	(0.065)	(0.223)	(0.422)
Non–Core Liabilities(–1)	0.223	–0.257**	0.551+	0.311
	(0.439)	(0.062)	(0.301)	(0.476)
GDP Growth	0.425**	0.009	0.025	0.114
	(0.047)	(0.007)	(0.055)	(0.090)
GDP Growth(–1)	0.047	0.009	0.032	0.175+
	(0.075)	(0.006)	(0.054)	(0.105)
Depreciation Rate	0.143**	–0.003*	0.013	0.006
	(0.010)	(0.002)	(0.015)	(0.011)
Depreciation Rate(–1)	–0.006	–0.002	–0.001	0.016
	(0.016)	(0.001)	(0.012)	(0.018)
Inflation Rate	–0.469**	–0.009*	0.021	0.042
	(0.041)	(0.004)	(0.035)	(0.062)
Inflation Rate(–1)	0.705**	0.016*	0.056	0.137
	(0.059)	(0.007)	(0.037)	(0.143)
Cost of Loans(–1)	0.438**			
	(0.066)			
Total Loans(–1)		0.938**		
		(0.035)		
Commercial/Industrial Loans(–1)			0.442**	
			(0.140)	
RE & Mortgage Loans(–1)				0.625**
				(0.040)
AC(1) test: z–stat(p–value)	–3.29(0.001)	–2.92(0.004)	–1.62(0.104)	–1.50(0.134)
AC(2) test: z–stat(p–value)	–0.81(0.416)	–0.63(0.529)	–0.08(0.938)	–1.09(0.275)
#Observations	311	321	170	148

TABLE 2B. Cross border regressions with dummies (cost and quantity of loans)

	Cost of loans	Total loans	Com/Ind loans	RE & Mort loans
Net Change in Cross	0.014	–0.079	0.455	0.863+
Border Claims	(0.528)	(0.070)	(0.298)	(0.488)
Net Change in Cross	–0.456	0.009	–0.586	–0.488
Border Claims (–1)	(0.429)	(0.061)	(0.448)	(0.328)
Leverage	–0.143	–0.070*	0.084	–0.215+
	(0.164)	(0.034)	(0.082)	(0.117)
Leverage(–1)	0.419*	0.066+	–0.266	–0.078
	(0.210)	(0.035)	(0.187)	(0.142)
Liquidity Ratio	0.767**	–0.141**	–0.037	0.228*
	(0.297)	(0.029)	(0.189)	(0.115)
Liquidity Ratio(–1)	–0.569**	0.189**	0.244+	0.075
	(0.162)	(0.027)	(0.144)	(0.200)
Return on Assets	0.130	0.01	0.297	0.285*
	(0.158)	–0.021	–0.325	–0.113
Return on Assets(–1)	–0.217	0.047**	–0.199	–0.364**
	(0.160)	(0.018)	(0.265)	(0.060)
Non–Core Liabilities	–0.606	0.289**	–0.055	–0.06
	(0.386)	(0.067)	(0.251)	(0.448)
Non–Core Liabilities(–1)	0.097	–0.249**	0.567+	0.33
	(0.420)	(0.064)	(0.316)	(0.496)
GDP Growth	0.445**	0.009	0.001	0.123
	(0.046)	(0.008)	(0.051)	(0.093)
GDP Growth(–1)	0.006	0.012+	0.02	0.177
	(0.083)	(0.007)	(0.048)	(0.109)
Depreciation Rate	0.135**	–0.002	0.001	0.007
	(0.010)	(0.002)	(0.011)	(0.010)
Depreciation Rate(–1)	–0.005	–0.002+	–0.006	0.012
	(0.014)	(0.001)	(0.014)	(0.016)
Inflation Rate	–0.595**	–0.005	0.016	0.042
	(0.039)	(0.004)	(0.030)	(0.063)
Inflation Rate(–1)	0.687**	0.019**	0.028	0.129
	(0.055)	(0.006)	(0.029)	(0.133)
Cost of Loans(–1)	0.436**			
	(0.068)			
Total Loans(–1)		0.943**		
		(0.034)		
Commercial/Industrial			0.446**	
Loans(–1)			(0.136)	
RE & Mortgage Loans(–1)				0.626**
				(0.039)
Crisis Dummy	0.848**	–0.071+	–0.323	–0.076
	(0.234)	(0.037)	(0.290)	(0.176)
AC(1) test: z–stat(p–value)	-3.21(0.001)	–2.95(0.003)	–1.61(0.108)	–1.47(0.142)
AC(2) test: z–stat(p–value)	-0.39(0.697)	–0.55(0.583)	0.02(0.984)	–1.11(0.268)
#Observations	311	321	170	148

Note: standard errors in parentheses (+ $p<0.10$, * $p<0.05$, ** $p<0.01$)

On the average cost of bank loans—measured as interest and fees on loans divided by total loans—Table 2A shows that the coefficient on lagged NCBF has a significant and negative effect on the cost of bank loans but only when no crisis dummy is used. This implies that when net cross-border bank claims increase, the price of credit or the average interest rate on bank loans, declines. This is possible if more cross-border bank flows increase the supply of bank loans lowering their cost. If cross-border bank flows come in because of greater growth prospects in the economy, raising the demand for bank loans, and this effect dominated the increased supply of bank loans, one would expect to see a significant and positive coefficient on lagged NCBF instead. But we do not observe this here.

When VIX is used instead, the result in Table 3A shows that the coefficient on VIX is positive and significant but again, only when no crisis dummy is used. The cost of bank loans is sensitive to this global factor likely through a supply channel as well, i.e., when VIX is high and risk appetite is low, capital inflows decline, banks have less funds to loan out, and the price of credit rises. It could also be that when risks are higher and risk appetite is low, banks charge a higher interest rate on bank loans to incorporate the higher risk premium. Perhaps adding to pro-cyclicality in which banks contract lending when the economy is down and risk is high, thereby exacerbating a recession, is that banks may feel that they will not be held liable for failing to provide loans and ample liquidity in a recession. Central bank responses, which typically require setting aside more capital and loan-loss provisioning in a recession, also exacerbate a recession.

The results in Tables 2A, 2B, 3A, and 3B show that the coefficient on lagged bank liquidity is significant and negative at first and then significant and positive on the cost of bank loans, regardless of whether NCBF or VIX is used in the regression or whether a crisis dummy is used or not. This implies that while there is initially a liquidity effect, such that when banks have a lot of liquidity, the cost of bank loans falls, this liquidity effect is reversed and the cost of bank loans increases.

Table 2B shows that the coefficient on the crisis dummy is significant in regressions explaining the cost of bank loans, regardless of whether VIX or NCBF is used as an explanatory variable and in one regression explaining total bank loans when NCBF is used. A crisis increases the cost of bank loans and reduces the amount of total bank loans.

The results in Tables 2A and 2B, show that bank loans to the real estate and mortgage sector increase contemporaneously when there are net cross-border bank inflows (NCBF) regardless of whether a crisis dummy is used in the regression or not. In contrast, NCBF does not have a significant effect on either total loans or loans to the commercial and industrial sector. The finding of a significant positive effect specifically on bank loans to the real estate sector, not other sectors, from cross-border bank flows may have adverse implications on financial stability given the link between bank lending and the potential creation of housing booms on the one hand, and financial instability on the other, as the booms go bust.

TABLE 3A.VIX regressions (cost and quantity of loans)

	Cost of loans	Total loans	Com/Ind loans	RE & Mort loans
Volatility Index	0.691**	–0.080**	–0.213	0.099
	(0.160)	(0.028)	(0.218)	(0.107)
Volatility Index (–1)	–0.142	–0.019	0.195+	0.392
	(0.198)	(0.029)	(0.101)	(0.341)
Leverage	–0.062	–0.075*	0.058	–0.207
	(0.165)	(0.034)	(0.075)	(0.132)
Leverage(–1)	0.335+	0.069*	–0.246	–0.09
	(0.197)	(0.034)	(0.177)	(0.155)
Liquidity Ratio	0.814*	–0.134**	–0.014	0.164
	(0.338)	(0.026)	(0.193)	(0.121)
Liquidity Ratio(–1)	–0.612**	0.179**	0.309	0.186
	(0.138)	(0.028)	(0.197)	(0.216)
Return on Assets	–0.016	0.015	0.297	0.283*
	(0.127)	(0.022)	(0.334)	(0.132)
Return on Assets(–1)	–0.085	0.043*	–0.192	–0.371**
	(0.142)	(0.018)	(0.276)	(0.075)
Non–Core Liabilities	–0.802*	0.297**	0.005	–0.1
	(0.402)	(0.066)	(0.230)	(0.484)
Non–Core Liabilities(–1)	0.345	–0.258**	0.513+	0.387
	(0.421)	(0.060)	(0.309)	(0.528)
GDP Growth	0.530**	–0.007	–0.001	0.211
	(0.057)	(0.009)	(0.089)	(0.141)
GDP Growth(–1)	0.003	0.014*	0.023	0.198
	(0.068)	(0.006)	(0.043)	(0.147)
Depreciation Rate	0.137**	–0.004*	0.004	0.018
	(0.009)	(0.002)	(0.018)	(0.013)
Depreciation Rate(–1)	–0.017	–0.001	0.002	0.016
	(0.012)	(0.001)	(0.012)	(0.022)
Inflation Rate	–0.539**	–0.014**	0.013	0.079
	(0.050)	(0.004)	(0.027)	(0.077)
Inflation Rate(–1)	0.705**	0.017**	0.054	0.182
	(0.054)	(0.006)	(0.038)	(0.182)
Cost of Loans(–1)	0.466**			
	(0.067)			
Total Loans(–1)		0.940**		
		(0.034)		
Commercial/Industrial Loans(–1)			0.441**	
			(0.139)	
RE & Mortgage Loans(–1)				0.628**
				(0.032)
AC(1) test: z–stat(p–value)	–3.21(0.001)	–2.87(0.004)	–1.59(0.111)	–1.47(0.142)
AC(2) test: z–stat(p–value)	–0.62(0.533)	–0.53(0.597)	0.34(0.737)	–1.10(0.271)
#Observations	311	321	170	148

Note: standard errors in parentheses (+ $p<0.10$, * $p<0.05$, ** $p<0.01$)

TABLE 3B.VIX regressions with dummies (cost and quantity of loans)

	Cost of loans	Total loans	Com/Ind loans	RE & Mort loans
Volatility Index	0.262	–0.066**	–0.208	0.042
	(0.187)	(0.023)	(0.209)	(0.109)
Volatility Index (–1)	–0.313	–0.013	0.187	0.528
	(0.233)	(0.029)	(0.120)	(0.388)
Leverage	–0.103	–0.074*	0.059	–0.225+
	(0.163)	(0.034)	(0.079)	(0.123)
Leverage(–1)	0.371+	0.069*	–0.248	–0.071
	(0.201)	(0.035)	(0.174)	(0.143)
Liquidity Ratio	0.755*	–0.132**	–0.019	0.229+
	(0.310)	(0.025)	(0.214)	(0.129)
Liquidity Ratio(–1)	–0.558**	0.179**	0.314	0.132
	(0.140)	(0.028)	(0.195)	(0.197)
Return on Assets	0.058	0.012	0.294	0.320*
	(0.140)	(0.021)	(0.344)	(0.139)
Return on Assets(–1)	–0.16	0.046*	–0.192	–0.375**
	(0.155)	(0.018)	(0.276)	(0.074)
Non–Core Liabilities	–0.653+	0.292**	0.001	–0.044
	(0.383)	(0.069)	(0.255)	(0.457)
Non–Core Liabilities(–1)	0.156	–0.254**	0.517+	0.334
	(0.407)	(0.063)	(0.312)	(0.501)
GDP Growth	0.445**	–0.004	–0.002	0.215
	(0.060)	(0.010)	(0.088)	(0.142)
GDP Growth(–1)	–0.047	0.015*	0.02	0.233
	(0.076)	(0.007)	(0.048)	(0.159)
Depreciation Rate	0.131**	–0.003+	0.003	0.022
	(0.010)	(0.002)	(0.017)	(0.015)
Depreciation Rate(–1)	–0.007	–0.001	0.001	0.03
	(0.011)	(0.001)	(0.016)	(0.027)
Inflation Rate	–0.595**	–0.012**	0.014	0.077
	(0.054)	(0.004)	(0.029)	(0.076)
Inflation Rate(–1)	0.658**	0.018**	0.052	0.214
	(0.062)	(0.006)	(0.046)	(0.194)
Cost of Loans(–1)	0.434**			
	(0.070)			
Total Loans(–1)		0.941**		
		(0.033)		
Commercial/Industrial Loans(–1)			0.441**	
			(0.139)	
RE & Mortgage Loans(–1)				0.625**
				(0.034)
Crisis Dummy	0.853*	–0.028	–0.024	0.247
	(0.333)	(0.036)	(0.269)	(0.161)
AC(1) test: z–stat(p–value)	–3.16(0.002)	–2.89(0.004)	–1.59(0.112)	–1.50(0.133)
AC(2) test: z–stat(p–value)	–0.48(0.632)	–0.55(0.582)	0.30(0.762)	–1.10(0.272)
#Observations	311	321	170	148

Note: standard errors in parentheses (+ $p<0.10$, * $p<0.05$, ** $p<0.01$)

The results in Tables 3A and 3B show that while none of the coefficients of VIX are significant in explaining bank loans to the real estate sector, the coefficient on contemporaneous VIX is significant and negative in the regressions in which total loans is the dependent variable, whether a crisis dummy is included or not. This implies that when VIX is high and risk appetite is low, banks reduce the amount of total loans they extend. This is consistent with a narrative in which there is a smaller amount of global liquidity flows into the domestic banking system and so the supply of loans declines, but it is also consistent with one in which the quantity of bank loans demanded declines when there is greater risk and which banks respond to by reducing the amount of loans extended.

In addition, the coefficient on lagged VIX is significant and is positive in Table 3A in the regression explaining loans to the commercial and industrial sector, but only when no crisis dummy is used. This result implies that an increase in VIX, or a fall in risk appetite, increases bank lending to the commercial and industrial sector. This is worrisome because it implies that even though risk appetite falls, banks increase lending to the commercial and industrial sector.

The coefficient on contemporaneous ROA is always significant and positive in the regressions explaining the amount banks loan to the real estate and housing sector, regardless of whether NCBF or VIX is used as an explanatory variable in the regression, and whether or not a crisis dummy is included. This is a robust finding as it holds regardless of the measure of global liquidity used. The coefficient on lagged ROA is always significant and negative in these regressions. This implies that higher bank profitability first reduces but this effect is reversed in the next period, increasing bank lending to the real estate and housing sector, and creating the potential for pro-cyclical housing booms.

The only other case in which ROA affects bank lending is the significant and positive coefficient on lagged ROA in regressions explaining the amount of total bank loans, regardless of whether NCBF or VIX is used in the regression and whether a crisis dummy is included or not. Again, this has a potential to create or exacerbate booms.

Bank liquidity—the ratio of a bank's cash to its core liabilities—seems to matter in the case of bank lending to the real estate and housing sector when NCBF is used as an explanatory variable, and when VIX is used as an explanatory variable but only when a crisis dummy is included. The coefficient on contemporaneous bank liquidity ratio is significant and positive. In addition, the coefficient on lagged bank liquidity is again significant and positive (although the coefficient on contemporaneous bank liquidity is significant and positive) in regressions explaining total bank loans, regardless of whether NCBF or VIX is used as an explanatory variable and whether a crisis dummy is used or not. This finding shows the potential for the creation credit and asset booms and affect financial stability when banks have high liquidity ratios.

In general, the quantity or value of total loans is affected by lagged bank leverage, lagged bank liquidity, and contemporaneous bank non-core liabilities in a significant and positive way. These raise the risk of potentially creating credit and asset booms and financial instability.

Of these, the results in Tables 2A, 2B, 3A, and 3B show that contemporaneous non-core liabilities consistently and significantly positively affect the value of total loans while lagged non-core liabilities have the same effect on loans to the commercial and industrial sector, regardless of whether NCBF or VIX is used in the regressions, and whether a crisis dummy is used or not. This finding, while robust, is disturbing since non-core liabilities are a less stable and usually more expensive way of sourcing bank funds. This finding of bank dependence on funding through non-core liabilities potentially raises the risk of financial instability.

The same tables show that the coefficient on lagged bank leverage is significant and positive in regressions with total bank loans as the dependent variable, regardless of whether crisis dummies are used or not, or whether NCBF or VIX is used in the regression explaining total bank loans. This seems to indicate pro-cyclical bank leverage-when leverage bank increases, bank loans or assets likewise increase—which would potentially fuel a boom. However, the coefficient on contemporaneous bank leverage is significant and negative, implying that any pro-cyclicality between bank leverage and bank lending is not sustained and reverses a year later.

4.2. Highlights of results in Tables 4A and 4B

The regressions in Tables 4A and 4B attempt to explain two aspects of bank behavior, namely, bank asset growth and bank leverage. The earlier results indicate that ROA is important in explaining the amount of loans to both the real estate and housing sector and to a lesser extent, total bank loans. Bank leverage, on the other hand, especially pro-cyclical bank leverage, is directly related to the propagation of asset booms and busts. Both may tell us something about the possibility of financial vulnerability or financial instability. The regressions in Table 4A include NCBF as an explanatory variable while those in Table 4B using VIX.

Table 4A shows that contemporaneous NCBF lowers bank asset growth. This finding shows that bank inflows impact domestic bank asset growth and tend to reduce it. To some extent, NCBF probably substitutes for bank loans. In contrast, none of the coefficients in the various regressions using VIX to explain bank asset growth are significant in Table 4B.

TABLE 4A. Cross border regressions (bank asset growth and leverage)

	Asset growth	Asset growth	Asset growth	Leverage	Leverage	Leverage
Net Change in Cross Border Claims	–0.088*	–0.192**	–0.197**	0.019	–0.678+	–0.146
	(0.036)	(0.060)	(0.073)	(0.107)	(0.403)	(0.260)
Net Change in Cross Border Claims(–1)	0.084*	0.034	0.032	0.01	0.01	–0.059
	(0.033)	(0.038)	(0.029)	(0.125)	(0.143)	(0.139)
Liquidity Ratio	0.049**	0.067**	0.016	–0.104+	–0.231**	–0.078
	(0.015)	(0.024)	(0.017)	(0.056)	(0.080)	(0.050)
Liquidity Ratio(–1)	–0.044**	–0.023	0.019	0.03	0.223*	0.079
	(0.016)	(0.019)	(0.027)	(0.058)	(0.093)	(0.072)
Return on Assets	–0.042**	–0.042	–0.018	–0.094*	–0.017	–0.071
	(0.012)	(0.031)	(0.029)	(0.043)	(0.108)	(0.091)
Return on Assets(–1)	0.036**	0.067**	0.051*	0.099*	0.111*	0.087
	(0.013)	(0.024)	(0.026)	(0.048)	(0.055)	(0.061)
Non–Core Liabilities	0.157**	0.242**	0.247**	1.589**	1.589**	1.394**
	(0.018)	(0.054)	(0.069)	(0.195)	(0.240)	(0.112)
Non–Core Liabilities(–1)	–0.169**	–0.248**	–0.245**	–1.424**	–1.499**	–1.331**
	(0.022)	(0.055)	(0.067)	(0.250)	(0.231)	(0.099)
GDP Growth	0.003	0.007	0.007	0.006	–0.042	–0.017
	(0.003)	(0.009)	(0.008)	(0.012)	(0.027)	(0.024)
GDP Growth(–1)	–0.013**	–0.010+	–0.011	0.001	–0.078	0.000
	(0.003)	(0.006)	(0.008)	(0.022)	(0.049)	(0.023)
Depreciation Rate	0.000	0.004	0.003	0.006	0.004	0.006
	(0.001)	(0.003)	(0.002)	(0.004)	(0.011)	(0.007)
Depreciation Rate(–1)	0.000	–0.001	–0.001	–0.005+	–0.007	–0.005
	(0.001)	(0.001)	(0.001)	(0.003)	(0.008)	(0.006)
Inflation Rate	1.628**	–1.783+	–1.937	–3.928*	–1.47	–0.354
	(0.363)	(1.054)	(1.456)	(1.562)	(2.932)	(2.279)
Inflation Rate(–1)	–1.545**	1.168	1.007	2.806*	4.634	3.636*
	(0.254)	(1.040)	(1.661)	(1.091)	(3.218)	(1.801)
Cost of Loans	0.016**	–0.018+	–0.019	–0.040*	–0.015	–0.004
	(0.004)	(0.011)	(0.015)	(0.016)	(0.029)	(0.023)
Cost of Loans(–1)	–0.015**	0.012	0.01	0.028*	0.047	0.037*
	(0.003)	(0.010)	(0.017)	(0.011)	(0.032)	(0.018)
Total Loans	0.558**			–0.107		
	(0.034)			(0.275)		
Total Loans(–1)	–0.550**			–0.029		
	(0.038)			(0.251)		
Commercial/Industrial Loans		0.004			0.019	
		(0.015)			(0.024)	
Commercial/Industrial Loans(–1)		–0.003			0.000	
		(0.012)			(0.027)	
RE & Mortgage Loans			0.003			–0.019
			(0.012)			(0.028)
RE & Mortgage Loans(–1)			–0.006			0.011
			(0.009)			(0.015)
Leverage	–0.047**	–0.068*	–0.078*			
	(0.013)	(0.027)	(0.032)			
Leverage(–1)	0.054**	0.082**	0.087*	0.869**	0.931**	0.870**
	(0.011)	(0.029)	(0.034)	(0.081)	(0.082)	(0.030)
Asset growth				–1.381*	–1.563**	–0.835*
				(0.590)	(0.477)	(0.349)
Asset growth(–1)	–0.078**	0.011	0.001	–0.261+	–0.123	–0.245
	(0.026)	(0.085)	(0.125)	(0.148)	(0.232)	(0.187)
AC(1) test: z–stat(p–value)	–2.93(0.003)	–2.82(0.005)	–2.39(0.017)	–2.03(0.042)	–2.74(0.006)	–2.21(0.027)
AC(2) test: z–stat(p–value)	–0.85(0.396)	–0.72(0.473)	0.03(0.979)	0.82(0.413)	0.25(0.806)	–0.25(0.805)
#Observations	295	165	144	295	165	144

Note: standard errors in parentheses (+ $p<0.10$, * $p<0.05$, ** $p<0.01$)

TABLE 4B. VIX regressions (bank asset growth and leverage)

	Asset growth	Asset growth	Asset growth	Leverage	Leverage	Leverage
Volatility Index (VIX)	–0.003	0.006	–0.040	–0.134	–0.200	–0.001
	(0.014)	(0.026)	(0.039)	(0.088)	(0.180)	(0.089)
Volatility Index(–1)	–0.017	0.016	–0.040	0.137	0.051	–0.050
	(0.012)	(0.036)	(0.040)	(0.135)	(0.114)	(0.094)
Liquidity Ratio	0.059**	0.076**	0.029	–0.109*	–0.219**	–0.079
	(0.014)	(0.024)	(0.019)	(0.055)	(0.077)	(0.055)
Liquidity Ratio(–1)	–0.059**	–0.059**	–0.010	0.042	0.163*	0.058
	(0.015)	(0.020)	(0.023)	(0.058)	(0.080)	(0.071)
Return on Assets	–0.039**	–0.046	–0.022	–0.080+	–0.041	–0.079
	(0.011)	(0.030)	(0.029)	(0.044)	(0.097)	(0.087)
Return on Assets(–1)	0.039**	0.064*	0.049+	0.083+	0.106+	0.084
	(0.014)	(0.025)	(0.027)	(0.044)	(0.054)	(0.058)
Non–Core Liabilities	0.159**	0.234**	0.250**	1.579**	1.555**	1.392**
	(0.020)	(0.050)	(0.066)	(0.182)	(0.226)	(0.110)
Non–Core Liabilities(–1)	–0.171**	–0.240**	–0.247**	–1.414**	–1.464**	–1.328**
	(0.023)	(0.054)	(0.065)	(0.236)	(0.219)	(0.097)
GDP Growth	–0.001	0.017	–0.003	0.002	–0.066	–0.017
	(0.004)	(0.016)	(0.016)	(0.016)	(0.049)	(0.040)
GDP Growth(–1)	–0.009**	0.013	–0.003	0.022+	–0.012	0.003
	(0.003)	(0.010)	(0.010)	(0.012)	(0.033)	(0.023)
Depreciation Rate	0.000	0.004	0.000	0.006	–0.009	0.005
	(0.001)	(0.003)	(0.003)	(0.004)	(0.011)	(0.010)
Depreciation Rate(–1)	0.001	0.001	–0.001	–0.005	0.000	–0.006
	(0.001)	(0.002)	(0.003)	(0.003)	(0.005)	(0.007)
Inflation Rate	1.595**	–1.901	–2.082	–3.663*	–1.079	–0.306
	(0.356)	(1.177)	(1.483)	(1.596)	(3.398)	(2.434)
Inflation Rate(–1)	–1.500**	1.338	1.248	2.908**	5.249	3.749*
	(0.284)	(1.116)	(1.678)	(1.076)	(3.435)	(1.829)
Cost of Loans	0.016**	–0.019	–0.021	–0.037*	–0.011	–0.003
	(0.004)	(0.012)	(0.015)	(0.016)	(0.034)	(0.024)
Cost of Loans(–1)	–0.015**	0.013	0.012	0.029**	0.053	0.038*
	(0.003)	(0.011)	(0.017)	(0.011)	(0.034)	(0.018)
Total Loans	0.559**			–0.157		
	(0.035)			(0.251)		
Total Loans(–1)	–0.553**			0.024		
	(0.039)			(0.230)		
Commercial/Industrial		0.001			0.005	
Loans		(0.014)			(0.023)	
Commercial/Industrial		0.001			0.017	
Loans(–1)		(0.011)			(0.034)	
RE & Mortgage Loans			–0.001			–0.02
			(0.012)			(0.030)
RE & Mortgage Loans(–1)			–0.003			0.012
			(0.009)			(0.013)
Leverage	–0.048**	–0.064*	–0.079**			
	(0.013)	(0.026)	(0.030)			
Leverage(–1)	0.057**	0.076**	0.085**	0.867**	0.921**	0.867**
	(0.010)	(0.029)	(0.032)	(0.080)	(0.078)	(0.032)
Asset growth				–1.331*	–1.390**	–0.805*
				(0.527)	(0.396)	(0.321)
Asset growth(–1)	–0.087**	0.024	0.002	–0.254+	–0.084	–0.214
	(0.027)	(0.088)	(0.124)	(0.138)	(0.220)	(0.178)
AC(1) test: z–stat(p–value)	–2.99(0.003)	–2.86(0.004)	–2.47(0.014)	–2.03(0.043)	–2.67(0.008)	–2.30(0.022)
AC(2) test: z–stat(p–value)	–0.62(0.533)	–0.68(0.499)	–0.65(0.517)	0.81(0.419)	0.47(0.636)	–0.39(0.698)
#Observations	295	165	144	295	165	144

Note: standard errors in parentheses (+ $p<0.10$, * $p<0.05$, ** $p<0.01$)

Contemporaneous bank liquidity and bank non-core liabilities, and lagged return on bank assets (ROA) also increase bank asset growth when NCBF is used. The fact that bank asset growth depends on non-core liabilities may lead to a vulnerability of banks to non-deposit sources of lending and potentially create credit and asset booms and lead to financial instability. Table $B shows that these findings, especially the one on contemporaneous non-core liabilities in all regressions, are robust since they hold even when VIX is used as an explanatory variable instead of NCBF.

Contemporaneous bank leverage is negatively related to bank asset growth as expected, but lagged bank leverage has the opposite effect. Hence, even though a lagged positive relationship may indicate possible pro-cyclicality of bank leverage and asset growth, the effect is not persistent. The same results are obtained in Table 4B when VIX is used instead of NCBF.

While the coefficient on lagged total loans has a significant and negative effect on bank asset growth, that on contemporaneous total loans is significant and positive, as expected. The latter could potentially lead to credit and asset booms or exacerbate them and threaten financial stability. The results hold regardless of whether NCBF or VIX is used in the regression.

The coefficient on contemporaneous cost of loans is significant and positive in both Tables 4A and 4B, implying that as interest rate on loans rises, bank asset growth rises, but that on lagged is significant and negative. On the one hand, the former finding may indicate some degree of monopoly power and the ability of banks to pass on higher interest rates to borrowers, presumably if there are few alternative sources of finance other than banks. However, the latter finding indicates that bank asset growth first increases when the cost of loans or interest charged on loans falls, which is possible if the demand for more bank loans initially more than makes up for a lower interest rate charged on loans. In any case, the cost of loans variable does not have a consistent effect on bank asset growth.

As for bank leverage, In Table 4A, NCBF affects bank leverage in a significant and negative and countercyclical way in one regression while Table 4B shows that VIX does not have a significant effect on bank leverage. Evidently, there is no strong and consistent relationship between global liquidity or global risk appetite on the one hand, and bank leverage, on the other.

Contemporaneous bank asset growth has a significant and negative effect on bank leverage, regardless of whether NCBF or VIX is used. This likewise does not raise any red flags as far as pro-cyclicality of bank leverage is concerned.

However, while lagged non-core liabilities have a significant and negative coefficient, contemporaneous non-core liabilities have a significant and positive coefficient in all cases in which it is used as an explanatory variable in the regression for bank leverage. The latter finding implies that bank leverage increases when banks are able to source funding from non-core liabilities, a less stable source of bank funding. This may have adverse implications on financial stability.

Lagged bank liquidity affects bank leverage in a significant and positive way using either NCBF or VIX, but contemporaneous bank liquidity affects bank leverage in a significant and negative way whether NCBF or VIX is used. Even if bank liquidity increases bank leverage initially, it is not persistent.

Lagged bank leverage has a significant and positive effect on bank leverage indicating a degree of persistence in bank leverage, regardless of whether NCBF or VIX is used.

Taken together, the effect of both contemporaneous bank non-core liabilities on bank leverage, given the persistence of bank leverage, may have adverse implications for financial stability.

5. Conclusion

This study examines the channels through which net cross-border bank flows and VIX, working through the domestic banking system, could potentially lead to the creation or exacerbation of credit and asset booms that may threaten financial stability. It uses bank firm-level data for the Philippines over the period 1991-2018.

The study finds that NCBF and VIX tend to lower the cost of loans or the average interest rate on loans, likely through a liquidity effect.

The study finds several channels through which NCBF and/or VIX could potentially lead to the creation or exacerbation of credit and asset booms that may threaten financial stability. These include:

Net cross-border bank flows increase the amount of bank loans to the real estate and housing sector whether a crisis dummy is used or not. Both bank ROA and bank liquidity—the ratio of cash to core liabilities—also increase bank loans to the real estate and housing sector.

VIX, in contrast, does not affect bank loans to the real estate and housing sector. The results in one regression show that the amount of bank commercial and industrial loans increases when VIX is high and risk appetite is low. Perhaps banks tend to push out more loans to this sector to protect their bottom line even when risks are high and risk appetite is low. But this may lead to less prudent lending and financial instability.

Non-core liabilities tend to increase the amount of total bank loans and loans to the commercial and industrial sector, which may contribute to the creation of credit and asset booms here, but do not significantly affect the amount of bank loans to the real estate and housing sector. Similarly, higher levels of lagged leverage and lagged bank liquidity also raise the amount of total bank loans, raising the risk of potential credit and asset booms and financial instability.

As far as bank asset growth is concerned, bank liquidity, non-core liabilities, lagged ROA, and contemporaneous total loan growth increase bank asset growth and also raises the risk of potential credit and asset booms and financial instability.

In terms of explaining bank leverage, a contemporaneous increase in non-core liabilities also tends to raise bank leverage, and therefore, the risk of potential credit and asset booms and financial instability.

The use of macroprudential measures—in particular, monitoring bank non-core liabilities as well as bank liquidity ratio and bank ROA, and lending to the real estate sector, and ensuring that liquidity effects of NCBF do not mask risk and lead to imprudent lending—as well as capital flow management measures, as NCBF affects bank loans to the real estate sector and bank asset growth, is warranted in order to prevent bank credit and asset booms from being created or exacerbated, which may threaten growth and financial stability. Non-core deposits are not as reliable a source of funding for banks compared with core deposits. Non-core bank liabilities consistently affect the amount of total loans and loans to the commercial and industrial sector as well as bank asset growth and bank leverage. Too large a dependence on non-core deposits as a funding source could imperil a bank's financial viability and could generate boom and bust cycles in the economy if this funding source were to suddenly dry up.

While the period considered in this study is pre-Covid, the study may have some insight into how the process just described works in reverse, i.e., when there is a global recession and demand for loans and risk appetite for them are both low. Instead of capital inflows chasing higher yields in emerging markets such as the Philippines, capital will tend to flow out and stop. We have seen how bank lending to the real estate and other sectors has declined since the pandemic hit. Prices of condominiums and other forms of real estate have flattened. Unfortunately, in this case of a physical shock via Covid, the curve that needs to be flattened-the Covid infections curve-has not flattened. Because of this, and despite the Philippines' so-called "strong fundamentals" going into the pandemic, and the deployment of a massive amount of liquidity and the increase in government spending, the Philippines has the worst economic outcomes and prospects in Southeast Asia. When the West experiences a strong recovery, it is unclear that capital flows will come to the country if its own recovery is weak and in stark contrast with those of our neighbors, such as Vietnam. There are limits to what conventional macro tools can do in response to a physical shock. Even though countries deployed these macro tools in the same way and to the same extent, the fact that other countries who managed first to contain the pandemic more effectively and have had better economic outcomes is a lesson for us to learn.

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Optimal saving and sustainable foreign debt

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This paper develops and discusses an open-economy growth model in a modified Arrow learning-by-doing framework, in which workers learn through experience on the job, thereby increasing their productivity. Applying optimal control to maximize the discounted stream of intertemporal consumption, the model yields domestic saving rates of 18-22 percent of GDP, which are feasible targets in developing and emerging market economies. Sustainable gross foreign debt is in the range of 39-50 percent of GDP. Saving, debt, and growth policies are suggested.

JEL classification: E130, O410
Keywords: Neoclassical growth; open economy; learning-by-doing; optimal control; growth policies

1. Introduction

High ratios of external debt to gross domestic product (GDP) in several Asian countries, exacerbated by the current COVID19 pandemic, have contributed to the initiation, propagation, and severity of financial and economic crises in the last two and a half decades, reflecting runaway fiscal deficits and excessive foreign borrowing by both public and private sectors.[1] The servicing of large debt stocks has diverted scarce resources from investment and economic growth.

[1] "Amid rising debt risks in low-income developing countries and emerging markets, the IMF and the WB have been implementing a multipronged approach (MPA) to address debt vulnerabilities. Amplification of debt risks owing to COVID19 has upped the urgency to implement the MPA and highlights the importance of debt sustainability and transparency for long-term financing for development. At the same time, it should be noted that countries have limited capacities which are further stretched by COVID19 and that implementation of the MPA by itself may not be sufficient to address debt vulnerabilities and risks from global economic shocks." [IMF 2020]

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Applying and calibrating the formal framework developed by Villanueva [2003] and Mariano and Villanueva [2005] to Philippine data, Villanueva and Mariano [2007] (henceforth VM1) explored the joint dynamics of external debt, capital accumulation, and growth.[2] The relative simplicity of the VM1 model made it convenient to analyze the links between domestic adjustment policies, foreign borrowing, and growth.[3] Using the Golden Rule criterion suggested by Phelps [1966], VM1 calculated the optimal domestic saving rate at 34 percent of GDP and the ratio of gross external debt at 44 percent of GDP, consistent with maximum steady-state real consumption per effective labor. In a comment on the VM1 paper, Lui [2007] noted that the ambitious saving rate of 34 percent may be due to the inattention to consumer preferences and attitudes toward risk. An optimal control procedure explicitly incorporating preference and risk is developed and discussed in Ramsey [1928]-Cass [1965]-Koopmans [1965], henceforth RCK. The RCK setup maximizes the discounted stream of lifetime consumption in search of optimal saving. This Golden Utility level of saving is a function of deep parameters such as, among others, the rate of time preference and the coefficient of relative risk aversion, or its reciprocal, the elasticity of intertemporal substitution.[4] How do these deep parameters affect the optimal saving rate? Is it possible that the relatively high domestic saving rate estimated by VM1 is exaggerated by the absence of explicit consideration of consumer tastes and attitudes toward risk?

To answer the above questions, this paper presents an open-economy growth (henceforth VM2) model, employing the RCK optimal control procedure and modifying the Arrow [1962] learning-by-doing framework in which workers learn through experience on the job, thereby increasing their productivity. The VM2 model finds that the Golden Rule domestic saving rate of 34 percent of GDP estimated by the VM1 model is associated with an implicitly high value of the elasticity of intertemporal substitution or an unrealistically low degree of relative risk aversion. Using a range of elasticities of intertemporal substitution estimated by Szpiro [1986], the VM2 model implies much lower Golden Utility domestic saving rates of 18-22 percent of GDP.[5] This range of optimal saving rates is dynamically

[2] The VM1 model was developed and discussed in a paper, External Debt, Adjustment, and Growth, presented at the Conference on Fiscal Policy and Management in East Asia, hosted jointly by the National Bureau of Economic Research and the Philippine Institute for Development Studies, and held in Manila on June 23-25, 2005. That paper was subsequently published as Ch. 6 in Ito and Rose (eds.) [2007].

[3] Ito and Rose (eds.) [2007: 4] comment: "Villanueva and Mariano use a model that focuses on external debts, while providing an explicit set of economic dynamics that links borrowing to growth, capital accumulation and productivity. They apply their model to Philippine data. Their key findings are eminently reasonable; they imply that increased saving by the public and private sectors is the only way to escape future disaster. If this seems like common sense, it is; the depressing realization is that increasing savings is still a task beyond the ability of most governments."

[4] Using a Constant Relative Risk Aversion (CRRA) utility function.

[5] Corresponding to the estimated intertemporal substitution elasticity of 0.5, 0.7, and 0.9 from Table 1, Section 5.

efficient and achievable in developing and emerging market economies. The associated sustainable net foreign debt to GDP ratio is in the range of 12-23 percent of GDP.[6] Given the 27 percent average ratio of gross foreign assets to GDP during 1970-2004 for the Philippines [Lane and Milesi-Ferretti 2006], the sustainable gross foreign debt is in the range of 39-50 percent of GDP.[7]

Section 2 is a brief survey of the relevant literature. The model is introduced and explained in Section 3, followed by an analysis and discussion of its transitional and steady-state dynamics in Section 4. Section 5 derives optimal saving rates and sustainable foreign borrowing. Section 6 concludes with implications for saving, debt, and growth policies. As background, an Appendix provides a quick review of the workhorse neoclassical growth (Solow [1956]-Swan [1956] henceforth S-S) model.

2. A brief survey of the literature

The evolution of aggregate growth theory involves three levels: (1) closed *vs*. open economy; (2) fixed-exogenous saving rate vs. optimally derived endogenous saving rate; and (3) exogenous natural rate via exogenous technical change vs. endogenous natural rate via endogenous technical change or endogenous labor participation (see Box 1).[8]

BOX 1. Aggregate growth models: summary features

	C	O	EXS	ENS	EXT	ENT	EXP	ENP
Ramsey [1928]	*			*	*		*	
Solow [1956]	*		*		*		*	
Swan [1956]	*		*		*		*	
Arrow [1962]	*		*		*		*	
Cass [1965]	*			*	*		*	
Koopmans [1965]	*			*	*		*	
Conlisk [1967]	*		*			*	*	
Romer [1986]	*			*		*	*	

[6] For derivation and discussion, see text and notes to Table 1, Section 5.

[7] Net foreign debt = gross foreign debt (liabilities) minus gross foreign assets (US$). Using gross international reserves as a proximate measure of gross foreign assets, Philippine gross foreign assets at end-2019 were 23.3 percent of GDP [BSP 2019]. Taking 17.5 percent of GDP as the sustainable net foreign debt to GDP ratio (corresponding to 0.7 for the intertemporal substitution elasticity in Table 1, Section 5), the associated sustainable gross foreign debt of 40.8 percent of GDP falls within the sustainable gross range of 39~50 percent of GDP. Philippine gross foreign debt at end-2019 was 22.2 percent of GDP [BSP 2019], well below the sustainable gross range, suggesting ample room for additional foreign borrowing.

[8] Box 1 contains definitions of these three levels and related terminology.

	C	O	EXS	ENS	EXT	ENT	EXP	ENP
Lucas [1988]	*			*		*	*	
Otani &Villanueva [1989]		*	*			*	*	
Grossman & Helpman [1990]	*			*		*	*	
Otani & Villanueva [1990]		*	*			*	*	
Romer [1990]	*			*		*	*	
Grossman & Helpman [1991]	*			*		*	*	
Rivera-Batiz & Romer [1991]	*			*		*	*	
Rebelo [1991]	*		*		*		*	
Aghion & Howitt [1992]	*			*		*	*	
Knight, Loayza & Villanueva [1993]	*		*		*		*	
Villanueva [1994]	*		*			*	*	
Barro & Sala-i-Martin [1995]	*			*		*	*	
Villanueva [2003]		*	*			*	*	
Mariano & Villanueva [2005]		*	*			*	*	
Villanueva & Mariano [2007]		*	*			*	*	
Villanueva [2020]	*		*		*			*
Villanueva [2021]	*		*			*	*	

C = Closed, O = Open, EXS = Exogenous Saving, ENS = Endogenous Saving,
EXT = Exogenous Natural Rate via Exogenous Technical Change,
EXP = Exogenous Natural Rate via Exogenous Labor Participation
ENT = Endogenous Natural Rate via Endogenous Technical Change,
ENP = Endogenous Natural Rate via Endogenous Labor Participation,
L (effective labor) = APN, A = technology or productivity multiplier (index number),
P = labor participation ($0 < \mathrm{P} \leq 1$), N = population, $\dot{L}/L = \dot{A}/A + \dot{P}/P + \dot{N}/N$, $\dot{L}/L$ = natural rate,
$\dot{N}/N = n$ = exogenous population growth rate.

Ramsey [1928] began with a closed economy, optimally derived endogenous saving rate, exogenous technical change growth model, joined later by Cass [1965], and Koopmans [1965], henceforth RCK. Next were the closed-economy, fixed-exogenous saving rate, exogenous technical change models of Solow [1956] and Swan [1956], henceforth S-S, and of Arrow [1962]. These were followed by the closed-economy, fixed-exogenous saving rate, endogenous technical change growth models of Conlisk [1967] and Villanueva [1994], and by the open-economy, fixed-exogenous saving rate, endogenous technical change models of Otani and Villanueva [1989], Villanueva [2003], Mariano and Villanueva [2005], and Villanueva and Mariano [2007]. Villanueva [2020] is a closed-economy and fixed-exogenous saving rate growth model that generalizes the S-S model by incorporating an endogenously determined natural rate through endogenous labor

participation.[9] Villanueva [2021] presents a closed-economy, fixed-exogenous saving rate, endogenous technical change growth model with two inputs: physical capital stock and combined stock of human and intellectual capital. In flow terms, these correspond to Solow's [1991] physical, human, and intellectual investments. The model finds that a higher saving rate raises both the steady-state and transitional growth rate through increases in physical capital, and human and intellectual capital (higher labor productivity). Finally, the present contribution is an open-economy growth model with optimally derived endogenous saving rates and sustainable foreign borrowing.

S-S is a closed-economy growth model where domestic saving finances aggregate investment. This reference model assumes a fully exogenous natural rate via exogenous labor-augmenting (Harrod-neutral) technical change, which determines the equilibrium or steady-state growth rate of per capita output.[10]

Conlisk [1967] was first to introduce endogenous technical change in a closed-economy neoclassical growth model. Employing a constant-returns, well-behaved neoclassical production function $Y = F(K,L) = Lf(k)$, where Y = GDP, K = capital, and L = effective[11] labor, the Conlisk [1967] model consists of the following relations:

$$\dot{K}/K = sY/K - \delta = s\,f(k)/k - \delta \text{ and } \dot{L}/L = h\,Y/L + \mu + n = hf(k) + \mu + n,$$

where $L = AN$, A = technology or productivity index, N = working population, $k = K/L$, δ = rate of depreciation, μ = rate of exogenous technical or productivity change, n = population growth rate, and a dot over a variable = time derivative, $\dot{K} = (d(K)/dt$. A fixed fraction, s, of Y is invested in K and another proportion, h, of Y is used to increase A.[12]

The equilibrium or steady-state growth rate of GDP is,

$$\dot{Y}/Y^* = \dot{K}/K^* = \dot{L}/L^* = h\,Y/L^* + \mu + n = hf(k^*) + \mu + n,$$

which is a positive function of the equilibrium capital-labor ratio k^*. The latter is a function of all the model's structural parameters s, h, μ, n and δ, and of the form of the intensive production function $f(k^*)$.

[9] All other growth models in Box 1 assume exogenous labor participation.

[10] A major strength of the S-S model is its rich transitional dynamics, elegant simplicity, as well as empirical relevance. For details, see Appendix.

[11] In efficiency units. Denoting K as capital and L as effective labor, if a 2020 man-hour is equivalent as an input in the production function to two man-hours in the base period, say, 2000, then the ratio K/L is the amount of capital per half-hour 2020 or per man-hour 2000.

[12] Representing expenditures, for example, on secondary and tertiary education, on-the-job training, and health [Villanueva 1994]. The proportion h is a composite parameter that translates expenditures in dollars into units of L in man-hours.

Villanueva [1994] developed and discussed a variant of the Conlisk [1967] model, combining it with a modified Arrow [1962] learning-by-doing model wherein experience on the job plays a critical role in raising labor productivity, that is,

$$\dot{A}/A = \varnothing k + \mu, \qquad 0 < \varnothing < 1$$

where $\varnothing$ is a learning coefficient. The idea is that as the *per capita* stock of capital with embodied advanced technology gets larger, the learning experience makes workers more productive.[13] Together with $\dot{N}/N = n$, the equilibrium or steady-state growth rate of GDP is,

$$\dot{Y}/Y^* = \dot{K}/K^* = \dot{L}/L^* = \varnothing k^* + \mu + n,$$

which is similar to the Conlisk growth expression above, with $hf(k^*)$ replaced by $\varnothing k^*$. In efforts to explain the endogenous technical change in the context of an optimal choice of the consumption path, the literature on endogenous growth exploded during the eighties and nineties, beginning with contributions by Romer [1986], Lucas [1988], Romer [1990], Grossman and Helpman [1990], Rivera-Batiz and Romer [1991], Aghion and Howitt [1992], and Barro and Sala-i-Martin [1995]. These endogenous growth models conclude that the economy's steady-state output can grow as fast as or faster than, the capital stock, and public policies with regard to saving and investment affect long-run economic growth. In the *AK* model [Rebelo 1991], output grows at the same rate as the capital stock *K*, equal to *sA*, where s (larger than the saving rate of the S-S model by the amount of investment in human capital) is the fraction of income saved and invested, and *A* is a technological constant. There are the R&D models of Romer [1986], Grossman and Helpman [1991], Aghion and Howitt [1992], and Barro and Sala-i-Martin [1995], in which firms operating in imperfectly competitive markets undertake R&D investments that yield increasing returns, which are ultimately the source of long-run per capita output growth. Among all classes of closed-economy growth models, the equilibrium properties of fixed [Conlisk 1967 and Villanueva 1994] and optimally derived saving rate-endogenous growth models are similar.[14] The next development was to open up Conlisk's [1967] and Villanueva's [1994] growth models to foreign trade and global lending. An early attempt was made by Villanueva [2003]. The fixed-saving rate model of Villanueva [2003] is an open-economy variant of Conlisk's [1967] endogenous technical change model and Arrow's [1962] learning-by-doing model wherein on-the-job experience plays a critical role in raising labor productivity over time.

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[13] Using $L = AN$ and $k = K/L$, rewrite the above equation as $\dot{A} = \varnothing(K/N) + \mu A$.

[14] Lucas [1988] specifies effective labor $L = uhN$, where h is the skill level, u is the fraction of non-leisure time devoted to current production, and $1 - u$ to human capital accumulation. The $(1 - u)h$ variable is VM2 model's variable A in $L = AN$ in Section 3. This variable is T in Villanueva [1994], defined as technical change or labor productivity multiplier.

In Villanueva [2003], the aggregate capital stock is the accumulated sum of domestic saving and net external borrowing (current account deficit). At any moment, the difference between the expected marginal product of capital, net depreciation, and the marginal cost of funds in the international lending market determines the proportionate rate of change in the external debt-capital ratio.[15] When the expected net marginal product of capital matches the marginal cost of funds at the equilibrium capital-labor ratio, the proportionate increase in net external debt (net external borrowing) is fixed by the economy's equilibrium output growth, and the external debt/output ratio stabilizes at a constant level. Although constant in long-run equilibrium, the external debt ratio shifts with changes in the economy's propensity to save out of national disposable income, the marginal cost of funds in the world lending market, depreciation rate, growth rates of the working population, and exogenous technical change, and the parameters of the risk premium, production, and technical change functions.

A major shortcoming of the Villanueva [2003] model is its inability to pin down the saving rate and equilibrium external debt to GDP ratio that is consistent with maximum consumer welfare. The Villanueva-Mariano [2007] (VM1) model corrected this shortcoming by employing Phelp's [1966] *Golden Rule* maximization criterion. On the balanced growth path, if consumption per unit of effective labor (or any monotonically increasing function of it) is taken as a measure of the social welfare of society, the domestic saving rate that maximizes the consumption per unit of effective labor is chosen. Consistent with this, the optimal outcome is a sustainable ratio of net external debt to total output. Using parameters for the Philippines to calibrate the model, the VM1 growth model's steady-state solution is characterized by a constant capital-effective labor ratio, an optimal domestic saving rate, and a unique external debt-capital ratio.[16] The latter ratio interacts with long-run growth and domestic adjustment and is determined jointly with other macroeconomic variables, including a country's set of structural parameters.

A weakness of the VM1 growth model is its lack of micro-foundation, a criticism leveled by Lui [2007]. The RCK setup is suitable to determine unique values of the optimal saving rate and foreign debt to GDP ratio. As Box 1 shows, all the micro-founded optimally derived saving–rate growth models are closed-economy models. The VM2 model extends a micro-founded growth model such as RCK to an open economy with access to foreign trade and global lending. Most importantly, the VM2 model incorporates a modified Arrow learning-by-doing feature. Imports of capital goods with embodied advanced technology allow learning-by-doing to raise labor productivity and, thus, long-run growth (see Figure 2, Section 4, and related discussion).

[15] The marginal cost of funds is the risk-free interest rate plus a risk premium. For details, see Equation (8) and footnote 31, Section 3.

[16] For research on the sustainability of external debt using various statistical procedures, see Manasse and Schimmelpfenning [2003], Reinhart et al. [2003], Kraay and Nehru [2004], Patillo et al. [2004], and Manasse and Roubini [2005]. For an excellent survey, see Kraay and Nehru [2004].

3. The VM2 model

Before presenting the VM2 model, the following background is a useful summary of the closed-economy RCK model and the original Arrow learning-by-doing framework. In the RCK model with a *CRRA* utility function and fully exogenous labor-augmenting technical change and population growth, the equations for the optimal growth of consumption, c, and capital intensity, k, consistent with maximum discounted stream of intertemporal consumption are:

$$\dot{c}/c = 1/\theta\left[f'(k) - \delta - \rho - \theta(n+\mu)\right];\ \dot{k} = f(k) - c - (\delta + n + \mu)k,$$

wherein $\mathrm{c}=C/L, \mathrm{k}=K/L, \mathrm{f(k)}=F(K,L)/L, F(.)$ = unit-homogeneous production function, C = is consumption, K = physical capital, L = effective labor = AN,[17] A = labor productivity or technology index, N = population, ρ = time preference or discount rate, θ = degree of relative risk aversion, δ = capital's depreciation rate, $\dot{A}/A = \mu$, and $\dot{N}/N = n$. The asymptotic (equilibrium) values c^* and $k^*$are the roots of the above equations equated to zero:

$$f'(k^*) - \delta - \rho - \theta(n+\mu) = 0;\ f(k^*) - c^* - (\delta + n + \mu)k^* = 0$$

Given a specific form of $f(k^*)$, the first equation solves for k^*. Plugging k^* in the second equation solves for c^*. Given k^* and a well-behaved, *constant-returns* neoclassical production function, the equilibrium growth rate of per capita output, $\dot{Y}/Y^* - n$ is fixed entirely by the rate of exogenous Harrod-neutral technical change, μ, and is independent of consumer preferences and technology.[18] Nearly six decades ago, Arrow [1962] proposed a learning-by-doing growth model,

$$\dot{A}/A = \varnothing\left(\dot{K}/K\right) + \mu,\ \ 0 < \varnothing < 1, \qquad (1)$$

in which $\varnothing$ is a learning coefficient. Equation (1) states that the proportionate growth in labor productivity is the sum of the learning coefficient $\varnothing$ multiplied by the proportionate growth in the capital stock plus a constant rate of exogenous technical or productivity change μ. The faster the growth of the capital stock, the more intensive the learning experience on the job, and the higher the growth in labor productivity is.

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[17] Generally, the L definition should be $L = APN$, where P is the labor participation rate, which measures the percentage of the population in the labor force ($0 < P \leq 1$). The working population is PN. When $P = 1$, $L = AN$. Whatever P is, it is usually assumed in current literature as an exogenous constant, whose rate of change is zero. For an endogenous and variable P, see Villanueva [2020].

[18] $\dot{Y}/Y^* = \dot{K}/K^* = \dot{L}/L^* = \dot{A}/A + \dot{N}/N = \mu + n$

Given Equation (1), definition $L = AN$, and assumptions, $\dot{N}/N = n$, $\dot{A}/A = \mu$, a constant steady-state capital intensity $k^* \left(= K/L\right)^*$ implies the following equilibrium growth rate of output:

$$\dot{K}/K^* = \dot{L}/L^* = \dot{A}/A^* + n = \dot{Y}/Y^* = g^{y*} = (\mu + n) / (1 - \varnothing).^{19} \quad (2)$$

Although a multiple of the S-S equilibrium output growth rate ($\mu + n$), equilibrium output growth, $\dot{Y}/Y^* = g^{y*}$ remains equal to a constant involving only three parameters μ, $\varnothing$, and n. That is, g^{y*} is independent of the preference and risk parameters ρ and θ, and the form of the intensive production $f(k^*)$.[20] Besides, the Arrow model has the property that, $(d[g^{Y*} - n]/dn = [\varnothing/((1 - \varnothing))] > 0$, i.e., an increase in the population growth rate n raises the long-run growth rate of per capita output, $g^{y*} - n$.[21] This prediction is counterintuitive and rejected by empirical evidence.[22]

Turning now to the VM2 growth model, assume the following institutional arrangements of an open and perfectly competitive economy with rational agents. One good is produced that is partly consumed and the remainder exported, using an aggregate production function with inputs of labor, and imported capital goods with embodied advanced technology. Enterprises rent capital from households and hire workers to produce output in each period. Households own the physical capital stock and receive income from working, renting capital, and managing the enterprises. To finance imports of capital goods, households use export earnings and borrow from abroad.[23]

The VM2 model's key innovation is a modification of Arrow's learning-by-doing equation as follows:

$$\dot{A} = \varnothing \left(K/N\right) + \mu A \qquad (3)$$

The difference between Arrow Equation (1) and VM2 Equation (3) is the endogenous component [the first term on the right-hand side (RHS)]. Both equations

[19] The unit-homogeneous production function $Y = F(K, L)$ is subject to constant returns to K and L jointly, implying balanced growth in Y, K, and L.

[20] Refer back to the basic RCK model, second paragraph of the current section.

[21] Subtracting n from both sides of Equation (2) yields $(g^{y*} - n) = \left[\mu/((1 - \varnothing))\right] + \left[\varnothing/((1 - \varnothing))\right]n$.

[22] See Conlisk [1967], Otani and Villanueva [1990], Knight et al. [1993] and Villanueva [1994].

[23] The numeraire is the foreign price of the imported capital good. Thus, if Pd is the price of the domestic consumer good, Pf is the price of the foreign good, and e is the exchange rate expressed as quantity of local currency units per unit of foreign currency, Pd/ePf is multiplied by residents' saving to obtain domestic saving (in constant dollars). Foreign borrowing denominated in foreign currency is deflated by Pf to get the real value. Similarly, the marginal real cost of foreign borrowing is the sum of the world interest rate and risk premium in foreign currency less the rate of change in Pf. Since model simplicity and long-run growth are our primary concerns, the VM2 model abstracts from the effects of movements of these variables by arbitrarily assigning unitary values to these price and exchange rate indices without loss of generality. Incorporation of these variables in the VM2 model is straightforward and is done in Otani and Villanueva [1989]. Imports of capital goods are financed by the European Ex-Im Bank and American Ex-Im Bank, global commercial banks, and international and regional development banks.

have an exogenous component in the second term on the RHS involving the labor-augmenting technical change or productivity parameter μ. In the first term's endogenous component, instead of assuming that learning-by-doing is proportional to the growth rate of the aggregate capital stock, $\dot{K}/K$ as in Arrow Equation (1), the VM2 model assumes that the endogenous component is proportional to the level of the aggregate capital stock per capita, K/N. This is particularly relevant to developing countries whose K is imported and embodies the most advanced technology produced by the advanced industrial countries. A large stock of K/N enables workers in developing countries to engage in learning-by-doing on a significant scale.[24] In these countries, starting from a low level of K/N, even a very high growth rate of the capital stock would barely make a dent on learning-by-doing to have significant effects on labor productivity and growth rate of aggregate per capita output. The R&D sector in developing countries is virtually nonexistent. Owing to its large real resource (including financial) costs, R&D development is left for the rich industrial countries to pursue. The resource-poor developing countries have a cheaper alternative: Import capital goods with embodied advanced technology, learn from using these goods in the production process, and thereby raise labor productivity and long-run growth. The presence of learning through experience on the job has three major consequences: First, equilibrium or steady-state growth becomes endogenous and is influenced by preferences, technology, and government policies. Second, the speed of adjustment to growth equilibrium is faster, and enhanced learning-by-doing further reduces adjustment time.[25] Third, capital's income share is higher than the optimal saving rate to compensate capital for the additional GDP growth generated by endogenous growth and learning by doing.[26]

The VM2 model's aggregate production function adopts the S-S model's assumption of constant returns to K and L jointly, and diminishing returns to K and L separately, and in the context of perfectly competitive markets with full wage-price flexibility.[27] Like the S-S, Conlisk [1967], and Villanueva [2003] models, the VM2 model employs a well-behaved unit-homogeneous neoclassical production function $Y = F(K, L) = Lf(k)$, where Y, K, L, and k have been defined earlier, subject to the Inada [1963] conditions: $\lim \partial F / \partial K = \infty$ as $K \to 0$; $\lim \partial F / \partial K = 0$ as $K \to \infty$; $f(0) \geq 0$; $f'(k) > 0$ and $f''(k) < 0$ for all $k > 0$.

The Cobb-Douglas production function, used to calibrate the VM2 model, satisfies these conditions.

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[24] The empirical results from Villanueva [1994] suggest that the learning coefficient $\varnothing$ is positively influenced by the openness of the economy (sum of exports and imports) and expenditures on education and health, and negatively by fiscal deficits, all three variables expressed in percent of GDP.

[25] See Villanueva [1994] for analytical approach and simulation that explain reduced adjustment time towards the steady state.

[26] See Section 5 for proof.

[27] Unlike the models of Romer [1986], Grossman and Helpman [1991], Aghion and Howitt [1992], and Barro and Sala-i-Martin [1995] that are subject to increasing returns to capital operating in imperfect markets.

From the definition $L = AN$, noting that $\dot{N} = nN$,

$$\dot{L}/L = g^L = \dot{A}/A + n. \tag{4}$$

Substituting Equation (3) into Equation (4),

$$\dot{L}/L = g^L = \varnothing k + \mu + n. \tag{5}$$

In the steady-state, $\mathrm{k} = \mathrm{k}^*$ (a constant), and from the *constant-returns* assumption,

$$\dot{K}/K^* = \dot{L}/L^* = \dot{Y}/Y^* = g^{Y*} = \varnothing k^* + \mu + n, \tag{6}$$

i.e., the steady-state growth rate of per capita output $= g^{Y*} - n = \varnothing k^* + \mu$. Comparing Equations (2) and (6), the key difference is the presence of equilibrium capital intensity k^* in the expression for the equilibrium growth rate of per capita output in the VM2 model, and the absence of k^* in the growth equation of the Arrow model. The VM2 model solves for optimal values of k^*, c^*, and d^* [Equations (24)-(26)] in an open-economy RCK optimal control setup using a CRRA utility function, wherein k^*, c^*, d^* and $g^{Y*} - n$ are functions of consumer tastes, technology, and policy parameters. Besides this key property, the VM2 model implies a more empirically plausible prediction (opposite to Arrow's) that an increase in the population growth rate depresses the long-run growth rate of per capita output, $d(g^{Y*} - n)/dn = \varnothing(\partial k^*)/\partial n < 0$[28] because $\partial k^*/\partial n < 0$ as shown in Figure 4, Section 4.

The budget constraint of a representative household is:

$$C + \dot{K} + \delta K = rK + wL + \Pi + \dot{D} - iD, \tag{7}$$

C = consumption, K = physical capital, D = net foreign debt (foreign liabilities less foreign assets)[29], r = capital's rental rate, w = real wage rate, Π = total profit in managing and owning the enterprises, and i = real effective interest rate.

Equation (7) is the budget constraint that total uses of funds equal total sources of funds. Total uses are consumption and gross investment. Total sources are GDP and foreign borrowing net of interest payments. Restating Equation (7), $rK + wL + \Pi = C + \dot{K} + \delta K - (\dot{D} - iD)$, where $(\dot{D} - iD) = M - X =$ balance of payments identity, M = imports (of capital goods), X = exports, $M - X$ = current account balance, and $\dot{D}$ = change in net foreign liabilities. Gross capital formation $\dot{K} + \delta K = rK + wL + \Pi - C + \dot{D} - iD$, i.e., capital accumulation is financed by an unconsumed output that is exported, and by foreign borrowing net of interest payments on debt.

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[28] Subtract n from both sides of Equation (6) and take its derivative with respect to n. For empirical evidence that $d\left(g^{Y*} - n\right)/dn < 0$, see Conlisk [1967], Otani and Villanueva [1990], Knight et al. [1993] and Villanueva [1994].

[29] If foreign assets exceed foreign liabilities, D is negative.

The real interest i is the global real interest rate i^f plus a risk premium equal to a proportion λ of the foreign debt stock $d = D/L$.[30]

$$i = i^f + \lambda d \qquad 0 < \lambda < 1 \tag{8}$$

The second term on the RHS of Equation (8) is the risk premium representing the combined effects of risk factors and financial markups that foreign lenders take into account prior to extending loans. When i^f is held constant, a higher debt stock d, by raising the probability of default, increases the risk premium and thus i.

Dividing both sides of Equation (7) by L,

$$c + \dot{k} + (\delta + g^L)k - \dot{d} - g^L d = rk + w + \pi - id, \tag{9}$$

wherein,

$$\dot{d} = \beta(r - \delta - i)d \qquad 0 < \beta \leq \infty, \tag{10}$$

and, as before, lower case letters are expressed as ratios to effective labor L, and g^L is given by Equation (4).

Equation (10) postulates that foreign borrowing is undertaken in response to a positive differential between the expected capital's net marginal product and the effective real interest rate, with the coefficient β measuring the response speed (an aggregate lending offer function from global lenders).

Inserting Equation (10) into Equation (9):

$$c + \dot{k} + (\delta + g^L)k - \beta(r - \delta - i)d - g^L d = rk + w + \pi - id \tag{11}$$

The representative household maximizes a discounted stream of lifetime consumption C, subject to constraints Equations (9) and (10), in which instantaneous utility is of the CRRA form (for brevity, time t is suppressed for all variables):

$$N(0)^{(1-\theta)} \int_0^\infty \frac{\left(\frac{C}{L}\right)^{(1-\theta)}}{(1-\theta)} A^{(1-\theta)} e^{-\rho^* t} \mathrm{dt} \tag{12}$$

For the integral to converge, the standard restriction $\rho^* = \rho - (1-\theta)\mathrm{n} > 0$ is imposed. In maximizing Equation (12) subject to Equations (9) and (10), each household takes as parametrically given the time paths *of r, w, π, i* and *A*. When making decisions about consumption, capital accumulation, and net foreign borrowing, the representative household is small enough to affect *r, w, π, i* and *A*.

[30] The risk-free interest rate is i^f . The risk premium is i - i^f. The LIBOR (to be ended in 2021 and replaced by new benchmark rates), US Prime Rate, US Federal Funds Rate, or US Treasury, deflated by changes in an appropriate price index in the United Kingdom or United States of America, typically represents the risk-free interest rate. The risk premium is country-specific and a positive function of a country's external debt burden and other exogenous factors capturing market perceptions of country risk.

The household's Hamiltonian is

$$H = e^{-p*t}\left[\frac{c^{1-\theta}}{(1-\theta)}\right]A^{(1-\theta)} + \varphi_1[rk + w + \pi - c - id - (\delta + g^L)k$$

$$+\beta(r - \delta - i)d + g^L d] - \varphi_2[\beta(r - \delta - i)d] \qquad (13)$$

After substituting Equations (3), (4), and $\rho^* = \rho - (1-\theta)$n, the first-order conditions are,

$$\dot{c}/c = (1/\theta)\left[\left(r - \delta - \rho - \theta n - \theta\left(\varnothing k + \mu\right)\right)\right] \qquad (14)$$

$$\dot{k} = rk + w + \pi - c - id + \beta(r - \delta - i)d + g^L d - (\delta + g^L)k \qquad (15)$$

$$\dot{d} = \beta(r - \dot{\delta} - i)d \qquad (16)$$

The economy-wide resource constraint is:

$$C + \dot{K} + \delta K = F(K, L) - iD + \dot{D} \qquad (17)$$

Dividing both sides by *L*,

$$c + \dot{k} + (\delta + g^L)k = f(k) - id + \dot{d} + g^L d. \qquad (18)$$

In competitive equilibrium, $r = f'(k)$, and $w = f(k) - kf'(k)$, implying $\pi = 0$. Substituting these expressions for *r*, *w*, and π into Equations (14)—(16) and (18), the optimal time paths for *c*, *k*, and *d* are:

$$\dot{c}/c = (1/\theta)[(f'(k) - \delta - \rho - \theta n - \theta(\varnothing k + \mu) \qquad (19)$$

$$k = f(k) - c - id + \beta\left[(f'(k) - \delta - i)\right]d + g^L d - (\delta + g^L)k \qquad (20)$$

$$\dot{d} = \beta(f'(k) - \delta - i)d, \qquad (21)$$

wherein $g^L = \varnothing k + \mu + n$ and $i = i^f + \lambda d$. The transversality conditions are:

$$\lim_{t\to\infty} e^{-\rho^* t}\varphi_1 k = 0 \qquad (22)$$

$$\lim_{t\to\infty} e^{-\rho^* t}\varphi_2 d = 0 \qquad (23)$$

[31] The time paths for φ_1 and φ_2 are given by $\dot{\varphi}_1 = \rho^*\varphi_1 - \partial H/\partial k$, $\dot{\varphi}_2 = \rho^*\varphi_2 - \partial H/\partial d$, wherein $\partial H/\partial k$ and $\partial H/\partial d$ are functions of *k* and *d*. As a standard condition, the no-Ponzi game is imposed, i.e., non-negative present values of the household holdings *k* and *d*.

In the absence of learning by doing $\varnothing = 0$ and net foreign debt ($d = 0$), the above model reduces to the closed-economy RCK model that allows for population growth n and fully exogenous technical progress μ, with the key property that the equilibrium growth rate of per capita output is fixed entirely by μ and is independent of preferences, technology[32], and policy.[33]

The system (19-21) represents the reduced model in c, k, d, and time t. The asymptotic (equilibrium) values c^*, k^*, and d^* are the roots of Equations (19)-(21) equated to zero:

$$f'(k^*) - \delta = \rho + \theta\mu + \theta n + \theta\varnothing k^* \quad (24)$$

$$f'(k^*) - \delta = i = i^f + \lambda d^* \quad (25)$$

$$f'(k^*) - c^* + (d^* - k^*)(\varnothing k^* + \mu + n) - d^*(i^f + \lambda d^*) - \delta k^* = 0 \quad (26)$$

The model's phase diagrams, shown as Figures 1-4, are based on calibrated values specified in Equations (24)-(26), using the following parameters:
$\alpha = 0.3$, $\delta = 0.04$, $\mu = 0.005$, $\theta = 1.4$[34], $\varnothing = 0.01$, $\rho = 0.03$, $\beta = 1$, $\lambda = 0.25$, $i^f = 0.05$, and $n = 0.02$.

The parameter α = exponent in the Cobb-Douglas production function $f(k) = k^\alpha$. The other parameters are: δ = capital's depreciation rate, μ = rate of exogenous labor-augmenting technical change, θ = coefficient of relative risk aversion, $\varnothing$ = learning coefficient, ρ = rate of time preference, β = speed of adjustment of foreign borrowing to the gap between capital's net marginal product and the effective cost of foreign borrowing, λ = linear response of the borrowing spread to the debt stock i^f = world interest rate, and n = growth rate working population. The solutions are $k_0^* = 2.7$ and $s^* = 0.20$.[35] For comparison, the following solutions for the VM1 model are $k^{**} = 6.8$ and $s^{*'} = 0.34$. Note that the lower steady-state value of capital intensity is consistent with the prediction that the *Golden Utility* capital intensity level is lower than the *Golden Rule* level (see Figure 1). While the latter maximizes consumption per effective labor at c^{**}, the former maximizes consumer utility at c_0^* and is dynamically efficient.

[32] Form of the production function $f(k^*)$.

[33] The optimal paths for c and k are: $\dot{c}/c = 1/\theta\left[f'(k) - \delta - \rho - \theta(n + \mu)\right]$ and $\dot{k} = f(k) - c - (\delta + n + \mu)k$. These are identical expressions for the optimal growth of consumption and capital intensity delineated at the beginning of the current section.

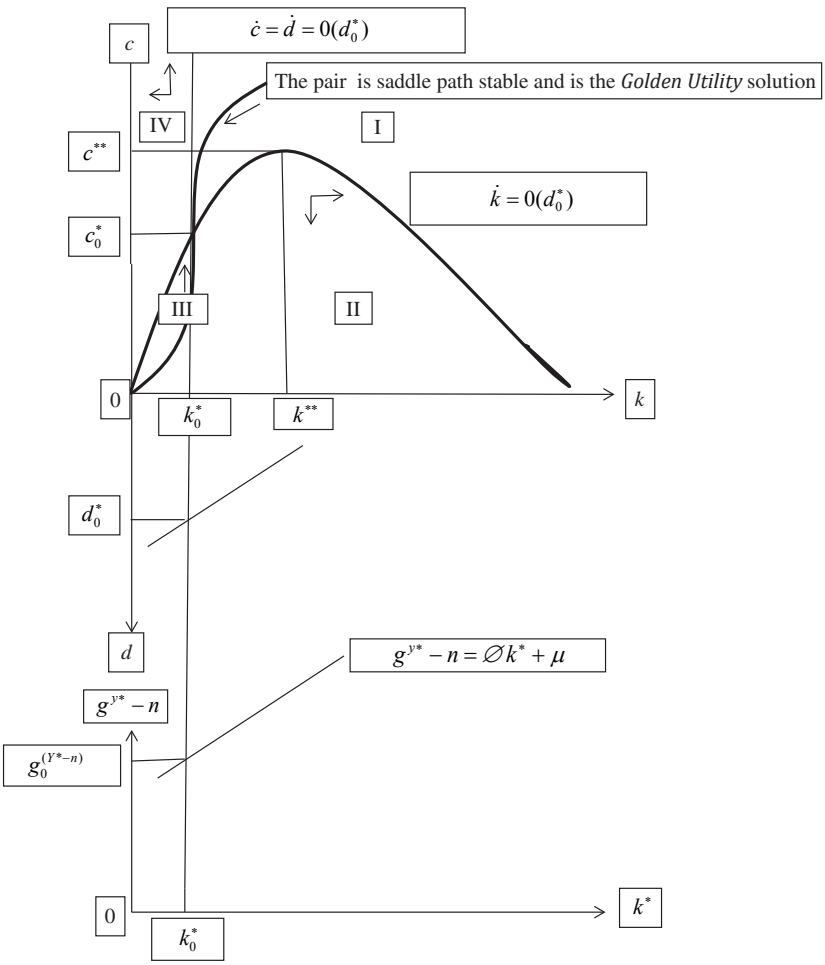
[34] Corresponding to the estimate of 0.7 for the intertemporal substitution elasticity [Szpiro 1986] shown in Table 1, Section 5.

[35] Microsoft's Solver tool is used to solve the first-order conditions. The program searches the optimal k^*, c^*, and d^* such that Equations (24)-(26), are met. The Solver tool uses the Generalized Reduced Gradient nonlinear optimization code developed by Leon Lasdon and Allan Waren.

Figure 1 is the phase diagram of the VM2 model. The upper panel plots the $\dot{k} = 0$ curve and the $\dot{d} = \dot{c} = 0$ curve in k, c space. Equations (24)-(25) imply:

$$i^f + \lambda d^* = \rho + \theta\mu + \theta n + \theta \varnothing k^*. \qquad (27)$$

FIGURE 1. Long-run equilibrium



This is the $\dot{d} = \dot{c} = 0$ curve. For a given d, say d_0^*, it is a vertical line in the k, c space in the upper panel of Figure 1. The bell-shaped curve represents the $\dot{k} = 0$ relationship, which is drawn for a given level of d, say d_0^* [Equation (26)]. This curve's slope has the property that $\partial c / \partial k \geq 0$ for $k \leq k^{**}$, and $\partial c / \partial k < 0$ for $k > k^{**}$. The middle panel plots the $\dot{d} = 0$ line in the k, d space with a negative slope. That is to say, when d rises above d_0^* and pushes up the real interest rate above capital's net marginal product at k_0^*, $\dot{d} < 0$ and d tends to fall. For d to remain constant, capital's net marginal product must increase, requiring k *to* decrease below k_0^*. Thus, the $\dot{d} < 0$ line slopes downward. The lower panel plots the growth rate of per capita output $g^{Y^*} - n = \varnothing k^* + \mu$. This curve slopes upward.

Figure 1 shows the equilibrium values k_0^*, c_0^* in the upper panel, d_0^* in the middle panel, and $g_0^{(Y^*-n)}$ in the lower panel. The pair (k_0^*, c_0^*) is saddle path stable and is the *Golden Utility* solution.[36] While c_0^* is below the maximum *Golden Rule* [Phelp 1966] level at c^{**}, c_0^* maximizes intertemporal utility and is thus dynamically efficient. The equilibrium capital intensity k_0^* is a function of all the parameters of the VM2 model, including the parameters of the utility function, namely the discount rate and the coefficient of relative risk aversion or its reciprocal, the elasticity of intertemporal substitution, and other parameters, including the learning coefficient, the global real interest rate, and the parameters and form of the production function. Since the equilibrium growth rate of per capita output $g^{Y^*} - n$ equals $\varnothing k^* + \mu$, any public policy that enhances the equilibrium capital intensity k^* and the learning coefficient $\varnothing$ raises the long-run growth rate of per capita output. This stands in sharp contrast to the open-economy RCK model with *no* learning by doing ($\varnothing = 0$), wherein $g^{Y^*} - n = \mu$.[37]

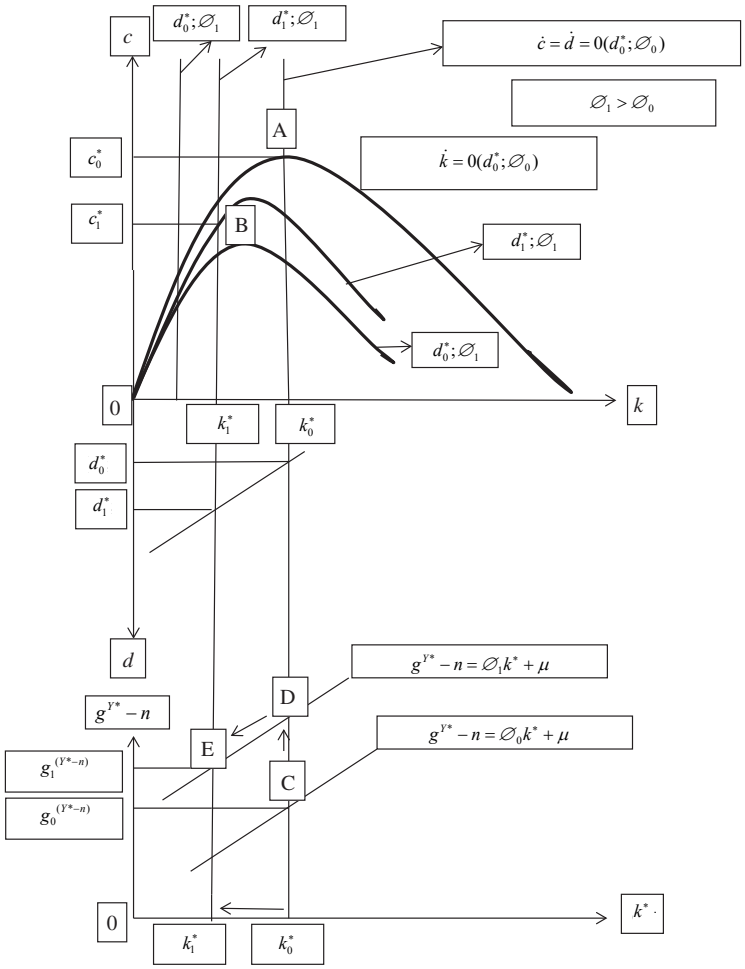
4. Comparative dynamics

Figure 2 illustrates the growth effect of an increase in learning by doing. In the upper and middle panels, the intersection at $A(k_0^*, c_0^*)$ shows the initial equilibrium point corresponding to a given level of the learning coefficient $\varnothing_0$ and equilibrium debt stock d_0^*. In the lower panel, the equilibrium growth rate of per capita output is and $g_0^{(Y^*-n)}$ given by the capital intensity level k_0^*.

[36] The transversality conditions rule out quadrants II and IV in Figure 1.

[37] In this special case, the $g^{Y^*} - n$ line in the lower panel of Figure 1 turns horizontal with intercept equal to μ.

FIGURE 2. Growth effect of an increase in learning by doing



Now, assume that public policy subsidizes on-the-job training at enterprises, resulting in an increase in the learning coefficient from $\varnothing_0 \to \varnothing$. From Equations (3), (5), and (19), labor productivity and g^L go up, slowing consumption growth, i.e., $\dot{c}/c < 0$. For $\dot{c}/c = 0$, k^* has to decrease, so that capital's marginal product rises. In the upper panel of Figure 2, the $\dot{c} = \dot{d} = 0(d_0^*; \varnothing_0)$ curve shifts leftward to $\dot{c} = \dot{d} = 0(d_0^*; \varnothing_1)$. In the middle panel, when k^* declines, capital's marginal product goes up, encouraging larger amounts of foreign borrowing, that is, $d > 0$. For $d = 0$, the real marginal cost of borrowing must increase, and so must d^*, as shown in the middle panel. Going back to the upper panel, as d^* goes up from d_0^* to d_1^*, $\dot{c} = \dot{d} = 0(d_0^*; \varnothing_1)$ the shifts rightward to $\dot{c} = \dot{d} = 0(d_1^*; \varnothing_1)$.

What happens to the $\dot{k} = 0$ curve? In the upper panel, when the learning coefficient increases, the higher effective labor growth implies $\dot{k} < 0$; for $\dot{k} = 0$, consumption has to fall; and the $\dot{k} = 0$ curve shifts downward to $\dot{k} = 0(d^*_0; \varnothing_1)$. However, increased foreign borrowing leads to higher debt stock at d^*_1, finances higher levels of consumption and capital intensity, so that the $\dot{k} = 0$ curve shifts upward to $\dot{k} = 0(d^*_0; \varnothing_1)$. The new equilibrium shifts to point B (k^*_1, c^*_1), with both equilibrium consumption per effective worker and equilibrium capital intensity lower than at point A.

In the lower panel, the increase in the learning coefficient from $\varnothing_0$ to $\varnothing_1$ shifts the per capita output growth curve upward from $g_0^{(Y^*-n)} - n = \varnothing_0 k_0^* + \mu \rightarrow g_1^{(Y^*-n)} = \varnothing_1 k^* + \mu$. Equilibrium shifts from $C(k^*_0, g_0^{(Y^*-n)})$ to $E(k_1^*, g_1^{(Y^*-n)})$, characterized by lower capital intensity and higher per-capita output growth.

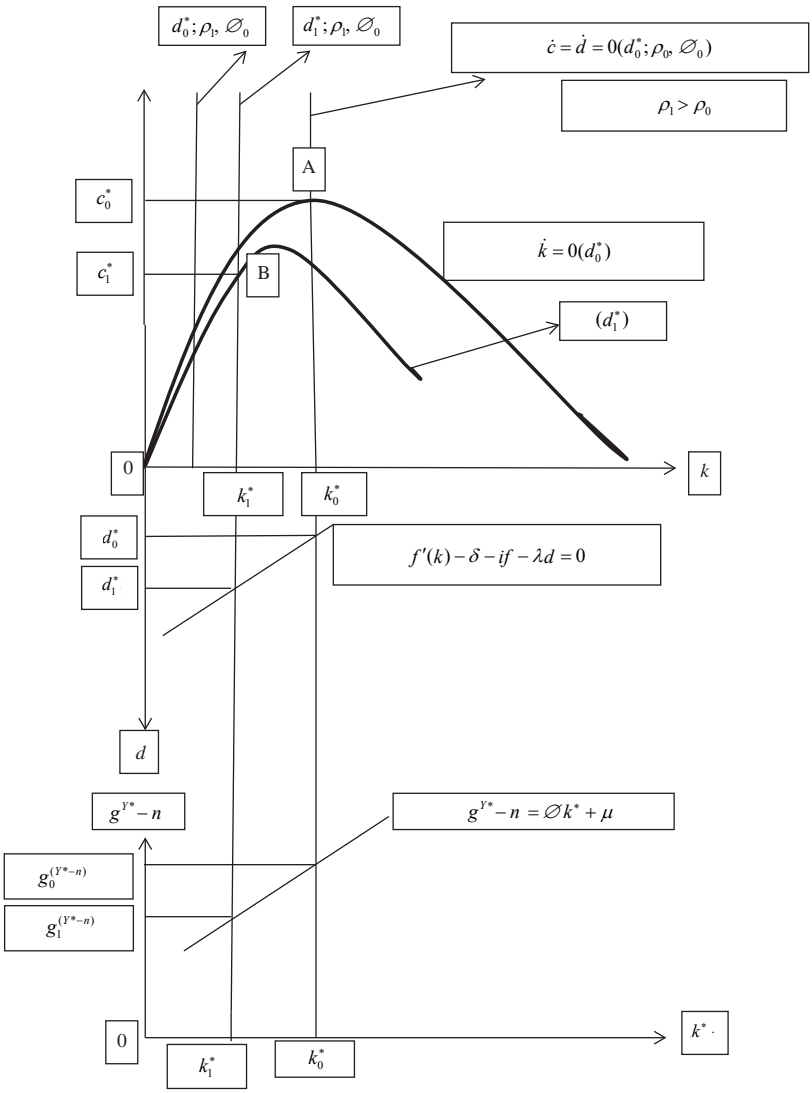
At the old equilibrium capital intensity k_0^*, the transition jumps from C to D, the latter characterized by per capita output growth temporarily higher than the next equilibrium rate $g_1^{(Y^*-n)}$ at E. As capital intensity goes down from k_0^* to k_1^*, per capita output growth declines toward $g_1^{(Y^*-n)} > g_0^{(Y^*-n)}$.[38] Thus, an increase in the learning coefficient leads to a short-run overshooting of the new and higher long-run per capita output growth rate.

Figure 3 illustrates the effects of higher discounting of future consumption or higher degree of relative risk aversion (lower elasticity of intertemporal substitution). The initial equilibrium is at point A (k^*_0, c^*_0), shown in the upper panel, corresponding to an initial value for ρ_0 and a given level of the debt stock d^*_0, shown in the middle panel. The equilibrium growth rate of per capita GDP at $g_0^{(Y^*-n)}$, corresponding to capital intensity k^*_0, is shown in the lower panel. The increase in ρ shifts the $\dot{c} = \dot{d} = 0$ curve to the left, lowering both c^* and k^*. A lower k^* implies a higher d^*, as shown in the middle panel. When d^* rises from d^*_0 to d^*_1, the $\dot{c} = \dot{d} = 0$ curve shifts to the right, while the $\dot{k} = 0$ curve shifts downward. The new equilibrium intersection is at point B (k^*_1, c^*_1). Both the equilibrium consumption per effective worker and equilibrium capital intensity are lower. In the lower panel, as k^* falls from k^*_0 to k^*_1, learning by doing drops and so does the equilibrium rate of per capita output, from $g_0^{(Y^*-n)}$ to $g_1^{(Y^*-n)}$.[39] The economic explanation is that higher discounting of future consumption means higher degree of relative risk aversion due, for instance, to increased uncertainty and macroeconomic and financial instability. The domestic saving rate falls, lowering the equilibrium capital intensity, lower imports of advanced capital goods and the associated decline in learning by doing. The equilibrium growth rate of per capita output goes down. The opposite economic adjustment follows from a reduction in uncertainty aided, for example, by a strong set of policies aimed at strengthened macroeconomic and financial stability.

[38] Adjustment is traced by the segment DE.

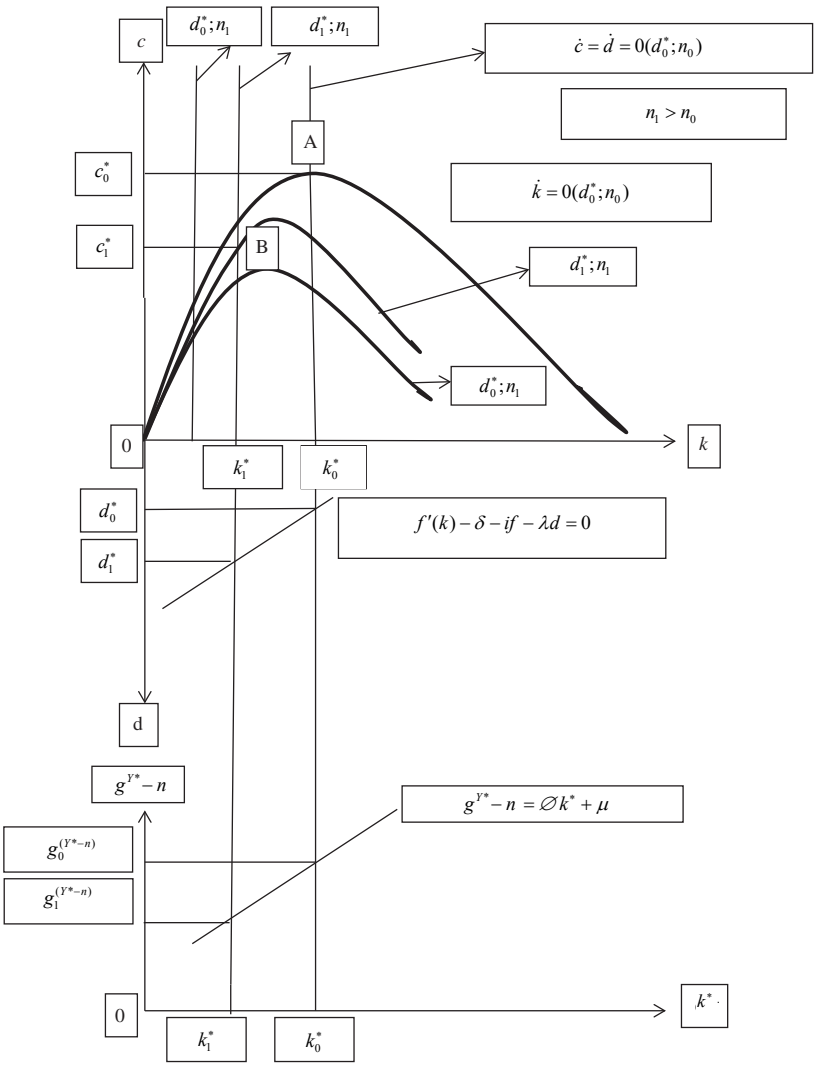
[39] Reflecting a downward movement along the $(g^{Y^*} - n)$ curve.

FIGURE 3. Growth effect of higher discounting or lower intertemporal substitution elasticity



Finally, the VM2 model yields a more empirically plausible prediction that an increase in population growth lowers the steady-state growth rate of per capita output, as illustrated in Figure 4, a result that is particularly relevant to developing countries.

FIGURE 4. Growth effect of an increase in population growth



In the upper panel, an increase in n from n_0 to n_1 shifts the $\dot{c}=\dot{d}=0$ curve to the left and the $\dot{k}=0$ curve downwards. As k falls, d rises; a higher d^* shifts the $\dot{c}=\dot{d}=0$ curve to the right and the $\dot{k}=0$ upwards. The new equilibrium settles at point B, characterized by a lower c^* and k^* and, as shown in the middle panel, a higher d^*. In the lower panel, the decline in the equilibrium stock of capital per effective worker cuts learning by doing and leads to lower equilibrium growth rates of productivity and per capita output.[40]

[40] The growth effect of a higher depreciation rate of capital is similar.

5. Optimal saving and sustainable foreign debt

Assuming a Cobb-Douglas production function $f(k) = k^{\alpha}$ and from Equations (19)-(20), the endogenously derived optimal saving rate is given by:

$$s^* = \{[\{i^* - g^{Y*})(d^* / k^*) + \delta + g^{Y*}] / (\rho + \delta + \theta g^{Y*})\}\alpha, \qquad (28)$$

in which $g^{Y*} = \varnothing k^* + \mu + n$ and $i^* = i^f + \lambda d^*$. If $d^* = 0$ (closed economy), $\rho > 0$, $\theta > 1$, and $\varnothing = 0$ (all technical change is exogenous), then

$$s^{**} = \{(\mu + n + \delta) / [(\theta(\mu + n) + \delta + \rho)]\}\alpha. \qquad (29)$$

Evaluated in the steady state, the fraction in braces of Equation (28) is in range 0.60-0.74, depending on the elasticity of intertemporal substitution, and the fraction in braces of Equation (29) falls in range 0.55-0.67, so that s^* is in range 0.18-0.22 and s^{**} in range 0.17-0.20 (see Table 1). The optimal saving rate in the presence of partly endogenous learning by doing is larger than the optimal saving rate in a world of entirely exogenous learning by doing. The intuitive reason is this: learning-by-doing uses some portion (about a percentage point of GDP) of society's resources (endogenous variable), so a larger proportion of society's income must be saved for this purpose.

As noted in Section 1, the sustainable net foreign debt to GDP ratio is in range of 12-23 percent of GDP. Lane and Milesi-Ferretti's [2006] estimate for the Philippine average ratio of gross foreign assets to GDP during 1970-2004 is 27 percent, implying that the sustainable gross foreign debt is in range of 39-50 percent of GDP.[41]

TABLE 1. Sensitivity of optimal results[a]

	Elasticity of intertemporal substitution[b]		
	0.5	0.7	0.9
s^*	0.1805	0.1963	0.2236
s^{**}	0.1659	0.1813	0.2000
d^* / y^*	0.2277	0.1754	0.1228
d^* / k^*	0.1237	0.0868	0.0541
$(i^* - i^f)^c$	0.0729	0.0584	0.0427
$g^{Y*} - n$	0.0289	0.0323	0.0370

s^* = optimal saving ratio in an open economy with partly endogenous technical change,
s^{**} = optimal saving ratio in an open economy with fully exogenous technical change,
d^* / y^* = debt-GDP ratio, d^* / k^* = debt/capital ratio, i^* = real interest rate, i^f = real global interest rate, $g^{Y*} - n$ = per capita output growth rate.

[a] Based on maximization of a discounted stream of lifetime consumption [Equation (12)], subject to Equations (9)-(10), in which instantaneous utility is of the CRRA form. Microsoft's Solver tool is used to solve the first-order conditions for a maximum.

[b] Estimates from Szpiro [1986].

[c] Risk premium [Equation (8)], reflecting combined effects of risk factors and financial markups.

[41] Refer back to footnote 7 for the most recent [2019] Philippine gross foreign assets and debt ratios.

If $\rho = 0$, $\theta = 1$ (utility function is ln c), and $\varnothing \geq 0$, then the optimal saving rate is:

$$s^{***} = \alpha, \qquad (30)$$

the S-S result. In the RCK framework, if the time preference discount is close to zero (but not zero) and the utility function is ln c, the saving rate must be set equal to the income share of capital, whether or not learning by doing is partly endogenous. It is also true that $s^{***} > s^{*} > s^{**}$.

As the elasticity of intertemporal substitution increases, Table 1 reveals the following:

- Optimal saving ratio and the equilibrium growth rate of per capita GDP rise; and
- The debt to GDP ratio declines.[42]

When $\rho = 0, \theta = 1,$ and $\varnothing \geq 0,$ Equation (28) says that the optimal saving rate is not only a function of the deep parameters $\rho, \theta, \varnothing, \mu, \delta,$ and n, as well as k^{*}, but must be set equal to a fraction of capital's income share α, with the fraction equal to $\{[\{i^{*} - g^{Y*})(d^{*} / k^{*}) + \delta + g^{Y*}] / (\rho + \delta + \theta g^{Y*})\}$.[43] An alternative interpretation is that capital's income share should be a multiple of the optimal saving rate in order to compensate capital for the additional GDP growth generated by endogenous growth and learning by doing. Setting capital's income share equal to the saving rate, implicit in the S-S model, would be welfare-reducing because of the under-compensation of capital.

6. Concluding remarks

This paper has developed and discussed the VM2 model, which is an open-economy growth model, employing the RCK optimal control setup and modifying Arrow's learning-by-doing framework in which workers learn through experience on the job to raise their productivity.

- The VM2 model produces empirically plausible and testable predictions about per capita GDP growth effects of parameters describing preferences, technology, and population growth, as well as public policies that affect equilibrium capital intensity and, directly or indirectly, the model's parameters, especially the extent of learning-by-doing associated with the economy's stock of capital per effective labor. Such predictive hypotheses can be tested empirically using panel data.[44]
- The high *Golden Rule* domestic saving rate of 34 percent of GDP reported in the VM1 model is associated with high elasticity of intertemporal substitution (a low degree of relative risk aversion). Lower empirical estimates of the

[42] Households become less risk-averse, so they save more and borrow less, raising the growth rate of per capita GDP, and lowering the debt to GDP ratio. To be precise, a higher saving rate increases the equilibrium capital-labor ratio, lowering the marginal product of capital, foreign borrowing, and the debt to GDP ratio.
[43] In Figure 1, this condition is associated with maximum utility at c^{*}_{0}.
[44] For the mechanics and application of a panel data procedure, see Knight et al. [1993].

elasticity of intertemporal substitution imply lower *Golden Utility* domestic saving rates of 18-22 percent of GDP that are dynamically efficient and feasible targets for most governments in Asia and emerging markets. The sustainable gross foreign debt is in the range of 39-50 percent of GDP.

- The domestic saving rate should be set below the share of capital in total output, owing to positive externalities arising from learning by doing associated with capital intensity. Equivalently put, income going to capital as a share of total output should be a multiple of the amount saved and invested in order to compensate capital for the additional output generated by endogenous growth and induced learning-by-doing.
- Fiscal consolidation and strong incentives for private saving are essential to achieving maximum per capita GDP growth. Reliance on foreign savings (foreign borrowing) has limits, particularly in a global environment of high interest rates and risk premiums.
- When real borrowing costs are positively correlated with rising external indebtedness, foreign borrowing is even more circumscribed, and efficient foreign debt management is critically important.
- When risk spreads are large despite the high expected marginal product of capital, there is a role for public policies to achieve and maintain macroeconomic and financial stability to mollify risk-averse global lenders.
- The international community should increase aid including subsidized loans earmarked for imports of advanced capital goods, workers' education, on-the-job training, and health, provided that economic policies are sound.
- In view of current low global interest rates and the actual gross foreign debt remaining well below the sustainable level (as a ratio to GDP) in the Philippines, there is room for additional foreign borrowing to cover imports of advanced capital goods, subsidies to on-the-job training at enterprises, and costs of controlling the COVID19 pandemic and other public health expenditures. Such measures will increase learning-by-doing and labor productivity, leading to a short-run overshooting of a long-run, higher rate of per capita GDP growth.
- The record of the Philippines on fiscal consolidation, external accounts surplus and high and sustained growth is remarkable, earning high marks from credit-rating agencies. Thus, a temporary breach of the limits on foreign borrowing in the current environment of COVID19 is allowed. It is expected that such a breach disappears as the COVID pandemic passes.

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APPENDIX: A QUICK REVIEW OF THE S-S GROWTH MODEL

The S-S model consists of the following relationships:

$$Y = K^{\alpha} L^{(1-\alpha)} \quad (1)$$

$$L = AN \quad (2)$$

$$I = S = sY \quad (3)$$

$$\dot{K} = I - \delta K \quad (4)$$

$$\dot{A}/A = \lambda \quad (5)$$

$$\dot{N}/N = n \quad (6)$$

$$k = K / L \quad (7)$$

Y = GDP, K = capital, L = effective labor, A = exogenous Harrod-neutral labor-augmenting productivity multiplier, N = population, k = capital intensity, α = output elasticity with respect to capital, $1-\alpha$ = output elasticity with respect to effective labor[45], s = gross fixed saving to income ratio, δ = depreciation rate, λ = change in A, and n = population growth rate.

Y is produced according to a Cobb-Douglas production in Equation (1), using K and L as inputs.[46] Equation (2) defines L as the product AN.[47] Equation (3) expresses the warranted rate in which investment is equal to saving, the latter being a fixed proportion, s, of income Y. Equations (4)-(6) are dynamic equations for the state variables K and L. Dividing Equation (4) by K, using Equations (1), (3) and (7),

$$\frac{\dot{K}}{K} = S\frac{Y}{K} - \delta = sk^{(\alpha-1)} - \delta \quad (8)$$

Equation (8) is termed the warranted rate. Time differentiating Equation (2) and substituting Equations (5) and (6) yield,

$$\frac{\dot{L}}{L} = \lambda + n. \quad (9)$$

Equation (9) is termed the natural rate.

Time differentiating Equation (7) and substituting Equations (8) and (9) yield the proportionate change in the capital intensity k,

$$\frac{\dot{k}}{k} = \frac{\dot{K}}{K} = \frac{\dot{L}}{L} = sk^{(\alpha-1)} - (\lambda + n + \delta) \quad (10)$$

From Equations (1) and (7), output in intensive form is:

$$Y/L = k^{\alpha} \quad (11)$$

[45] Under assumed marginal factor productivity pricing and wage-price flexibility, the parameters α and $(1-\alpha)$ represent the income shares of capital and labor, respectively.

[46] Any function $Y = F(K,L)$ satisfying the Inada [1963] conditions (Section 3) will suffice.

[47] Refer back to footnote 17.

Time differentiating Equation (11) and substituting Equation (9) yield the (instantaneous or transitional) growth rate of output at any positive k(t):

$$\dot{Y}/Y = (\lambda + n) + \alpha\, k/k \tag{12}$$

Substituting Equation (10),

$$\dot{Y}/Y\ \alpha[sk^{(\alpha-1)} - \delta] + (1-\alpha)(\lambda + n) \tag{13}$$

which is the growth of Y weighted by the income shares of capital α and labor $(1-\alpha)$.[48]

In the steady state, k is constant at $k^*(k/k = 0)$[49], and by the constant-returns assumption,

$$\dot{K}/K* = \dot{L}/L* = \dot{Y}/Y* = g* = \lambda + n. \tag{14}$$

Equation (14) is the steady state output growth rate, at which the warranted and natural rates are equal, and the economy is on a full-employment, balanced growth path.[50]

Substituting Equation (8) into Equation (14), setting $k = k^*$,

$$sk*^{(\alpha-1)} = \lambda + n + \delta. \tag{15}$$

Solving for the equilibrium capital intensity,

$$k^* = \left[\frac{s}{(\lambda + n + \delta)}\right]^{\frac{1}{(1-\alpha)}}. \tag{16}$$

Equation (16) states that the equilibrium (steady state) capital intensity k^* is a positive function of the saving rate s, and a negative function of λ, n, and δ.

From Equations (1), (2), (5), (7), and (16), equilibrium per capita output is given by:

$$\frac{Y}{N}* = A(0)e^{\lambda t}\frac{s}{(\lambda + n + \delta)}^{\frac{1}{(1-\alpha)}}. \tag{17}$$

In the S-S model, even though the steady state output growth is exogenously fixed by effective labor growth $\lambda + n$, independent of the saving rate s, the steady state per capita output $Y/N*$ is a positive function of the saving rate s.

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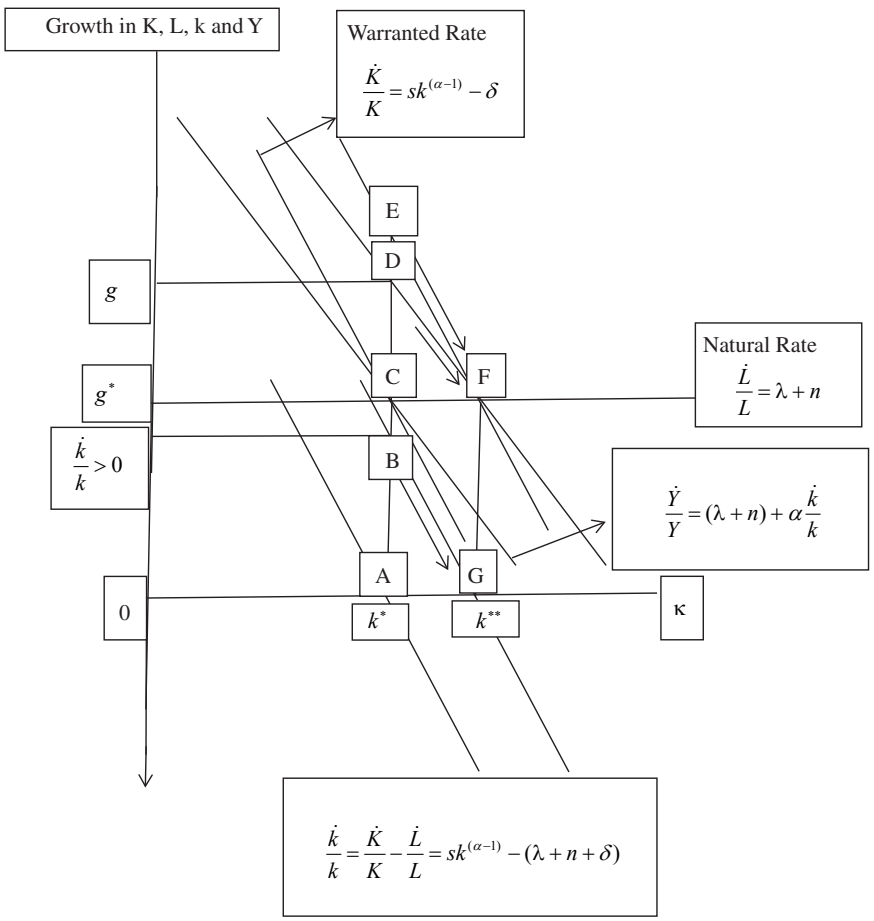
[48] Alternatively, Equation (13) may be derived by time differentiating Equation (1) and substituting Equations (8) and (9) into the result.

[49] The Inada [1963] conditions enumerated in Section 3 ensure a unique and globally stable k*.

[50] This is the S-S solution to the knife-edge problem posed by Harrod [1939]-Domar [1946], who employ a fixed output-capital ratio to conclude that balanced growth, macroeconomic stability, and full employment are not assured and may happen only by accident. S-S offers a variable output-capital ratio [Equation (8)], i.e., a fully adjusting warranted rate, as a solution. Another solution is found in Villanueva [2020] via a fully adjusting natural rate through endogenous labor participation, complementing a fully adjusting S-S warranted rate.

Figure 5 is the phase diagram showing the S-S model's equilibrium behavior and growth dynamics. It illustrates the steady-state and transitional growth effects of an increase in the saving rate. The vertical axis graphs the rates of change in output = $\dot{Y}/Y$ [Equation (12)], warranted rate = $\dot{K}/K$ [Equation (8)], natural rate = $\dot{L}/L$ [Equation (9)], and capital intensity = $\dot{k}/k$ [Equation (10)]. The horizontal axis measures the level of capital intensity = k [Equation (7)].[51]

FIGURE 5. Equilibrium and growth dynamics
S-S Model: effects of an increase in saving rate



[51] The $\dot{K}/K$ line and $\dot{k}/k$ line are downward-sloping and parallel to each other because they have a common slope $s(\alpha-1)k^{(\alpha-2)}$. Both lines are steeper than the $\dot{Y}/Y$ line, whose slope is equal to $\alpha\ s(\alpha-1)k^{(\alpha-2)}$, where α is a positive fraction.

The steady-state (equilibrium) of the S-S model occurs at points A(k^*, 0) and C(k^*, g^*), at which the warranted and natural rates are equal (warranted rate line intersects natural rate line at point C), k^* is equilibrium capital intensity (the $\frac{\dot{k}}{k}$ line intersects the k-axis at point A), and g^* is equilibrium (steady-state) output growth (reading off the $\frac{\dot{Y}}{Y}$ line). Equilibrium at point A(k^*, 0) is unique and globally stable, ensured by the Inada (1963) conditions. Any capital intensity k different from k^* will bring k back to k^* because of the adjustments of the output-capital ratio and hence, of the saving-capital ratio $Y / K = sk^{(\alpha-1)}$, as capital's marginal and average products deviate from their equilibrium values at k^*. The warranted rate adjusts to the natural rate to bring balanced growth back to points A(k^*, 0) and C(k^*, g^*).

Assume an increase in the saving rate *s*, say, through fiscal policy (via higher public sector saving rate). The warranted rate, output growth, and capital intensity growth lines will shift upward to the right, while the natural rate remains stationary. The new steady-state occurs at points G(k^{**}, 0) and F(k^{**}, g^*), characterized by a higher equilibrium capital intensity with the *same* equilibrium output growth rate because the natural rate is fixed at $\lambda + n = g^*$. More interesting is the transition to the new steady state. At the starting capital intensity k^*, in the short-run, a higher saving rate raises the warranted rate to point E (segment k^*E), which is larger than the natural rate (segment k^*C). Capital intensity growth turns positive (segment k^*B). Consequently, output growth goes up to g (segment k^*D, reading off the output growth line), temporarily higher than g^*. As capital intensity increases, the marginal returns on investment decline. The output-capital ratio falls, decreasing the warranted rate. This downward adjustment of the warranted rate (along the segment EF) continues until it equals the natural rate at F, at which point the growth rate of output reverts to its original rate g^* (traced by the segment DF). Meanwhile, the growth rate of capital intensity turns less and less positive until it is zero at G (traced by the segment BG), characterized by a higher level of capital intensity at k^{**}.

Figure 5 shows that, although the steady-state output growth rate is fixed at $\lambda + n$, invariant with respect to the saving rate *s,* the output growth at any time is a function of *s* and all the other structural parameters of the model δ, λ, and *n.*[52] From Equations (10) and (13) and Figure 5, an increase in the saving rate s will raise the growth rate of capital intensity $\dot{k}/k$ and the transitional output growth rate $\dot{Y}/Y$. This rich dynamics is a major strength of the S-S model.[53]

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[52] In Figure 5, map the $\dot{k}/k$ line onto the $\dot{Y}/Y$ line.

[53] As noted earlier, this transitional dynamics is absent in the AK model of the new endogenous growth theory [Rebelo 1991]. Solow's illustrative example of the growth effects of an increase in productivity (invention of a computer), quoted by Villanueva [2021], is an example of such transitional dynamics. The VM2 model preserves the S-S transitional dynamics. The new VM2 result is a higher steady state output growth rate in response to a higher saving rate, a generalization of the S-S model (see Villanueva [2020] for the same result in a closed economy).

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Fighting COVID-19: patterns in international data

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This paper provides an empirical evaluation of countries' performance in fighting COVID-19, utilizing a performance index (which we call the Disaster Index) based on four health and economic indicators: deaths per population size, deaths per confirmed cases, and quarterly real gross domestic product (GDP) and monthly unemployment rate relative to pre-pandemic values. International data patterns are studied for these four indicators and the Disaster Index to analyze trends and basic empirical relationships. The approach is descriptive and primarily based on graphs, scatter diagrams, and correlation analysis. The ten best performers based on the Disaster Index for the first half of 2020 were (ranked 1st to 10th): Singapore, Taiwan, Belarus, Korea, New Zealand, Japan, Norway, Israel, Czechia, and Lithuania. The worst twelve performers were (bad to worst): Sweden, US, Canada, Philippines, France, Columbia, Spain, Belgium, United Kingdom, Ecuador, Italy, and Peru.

Thus, high-income Asian countries performed relatively better than low-income Asian countries, European, and American countries in the first half of 2020. Reasons for this geographical divide are very important and must be studied more carefully and closely, as successful methods in better performing countries will provide some lessons for other countries. It also would be interesting to see how this Disaster Index profile shifts in 2021 as vaccination and economic relief accelerate in countries like the United States. The pandemic exhibited the vulnerabilities in the world and reemphasized the vital significance of international coordination and cooperation in a globalized world. Recent trends show that most countries still have a long way to go to control the virus. Vaccination is a reassuring fresh hope, a potential game-changer, though requiring careful, painstaking, and timely implementation.

JEL classification: C00, E00, F00, I1, O57
Keywords: COVID-19, Disaster Index, data patterns, trends, correlations, cluster analysis

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1. Introduction[1]

The pandemic exhibited the vulnerabilities in the world and reemphasized the vital significance of international coordination and cooperation in a globalized world (Asian Development Bank [2020]; European Commission [2020]; European Central Bank [2020]; Federal Reserve Board of Governors [2020]; Global Health Security [2019]; International Monetary Fund [2020a, 2020b]; OECD [2020a, 2020b]; United Nations [2020]; World Bank [2020a, 2020b, 2021]; see Mariano & Ozmucur for additional references).

The world had 110 million cases and 2.5 million deaths by February 17, 2021. These numbers have been rising steadily. The deaths per hundred thousand are 31.23 (312 in a million) for the world and deaths per hundred confirmed cases are 2.21. No country is immune to this virus. There are data on 192 countries. The situation is fluid everywhere. A country may have a low number for a few weeks, but this may change suddenly. Vaccination is fresh hope, a potential game-changer, though requiring careful and painstaking implementation.

In our earlier study [Mariano & Ozmucur 2020] evaluating countries' performance in fighting a deadly virus, we introduced the Disaster Index (DI), based on four indicators: two for health—deaths per hundred thousand population and as a share of confirmed cases; and two for economic activity namely, quarterly real GDP relative to the fourth quarter of 2019 and unemployment rate relative to December 2019. In this paper, we take a closer look at the trends and basic empirical relationships that can be extracted from the observed data patterns. The approach is descriptive and primarily based on graphs, scatter diagrams, and correlation analysis. There is no argument of causality, except the fact that all data considered are for an earlier year (most of them are for 2019, and some are for 2018) than target variables, which are for 2020.

The paper is organized as follows. Section 2 is devoted to trends in indicators and the DI. Relationships and patterns in international data are discussed in Section 3. Some additional thoughts on the pandemic are given in Section 4 on related issues such as the trade-off between economic loss and health risk, the relevance of budget deficit and domestic debt, and modeling concerns for forecasting and policy analysis. A summary of findings and concluding remarks appears in the final section.

The ten best performers based on the DI for the first half of 2020 were (from #1 to #10): Singapore, Taiwan, Belarus, Korea, New Zealand, Japan, Norway, Israel, Czechia, and Lithuania. The worst twelve performers, with the highest DI, were (from bad to worst): Sweden, US, Canada, Philippines, France, Colombia, Spain, Belgium, United Kingdom, Ecuador, Italy, and Peru.

[1] The empirical analysis here, carried out in March 2021, utilizes available data up to February 2021 in view of the sustained upsurge of COVID-19. A complete set of tables and figures is included in the expanded working paper version which can be provided by the authors on request.

Thus, high-income Asian countries performed relatively better than low-income Asian countries, European, and American countries in 2020, first half. Reasons for this geographical divide are very important and must be studied more carefully and closely, as successful methods in better performing countries will provide some lessons for other countries. It also would be interesting to see how this DI profile shifts in 2021 as vaccination and economic relief accelerate in countries like the United States.

2. Trends in selected indicators and the Disaster Index

2.1. Deaths per hundred thousand and deaths from confirmed cases

Two common statistics used for international comparisons are the number of deaths in relation to population and the number of deaths in relation to confirmed cases (Table 1). Data are obtained from the Johns Hopkins University COVID Research Center. In addition to the two series, ranks of countries in ascending order and the clusters (based on K-means and using Stata software) are also given in the table (see Mariano & Ozmucur [2020] for details). A map for countries shows clusters for deaths per hundred thousand (Figure 1).

TABLE 1. Confirmed cases and deaths: country ranks and clusters as of February 17, 2021

	COUNTRY	CONFIRMED	DEATHS	DEATHS PER 100 THOUSAND	DEATHS PER 100 THOUSAND-CLUSTERS	DEATHS PER 100 THOUSAND-RANKS	CASE FATALITY	CASE FATALITY-CLUSTERS	CASE FATALITY-RANKS
1	Afghanistan	55,518	2,428	6.53	1	60	4.37	3	166
2	Albania	94,651	1,582	55.19	2	119	1.67	2	81
3	Algeria	111,069	2,945	6.97	1	63	2.65	2	135
4	Andorra	10,555	107	138.95	5	159	1.01	1	34
5	Angola	20,389	494	1.60	1	28	2.42	2	124
6	Antigua and Barbuda	443	9	9.35	1	69	2.03	2	105
7	Argentina	2,033,060	50,432	113.34	4	149	2.48	2	127
8	Armenia	169,391	3,150	106.72	4	145	1.86	2	93
9	Australia	28,911	909	3.64	1	47	3.14	3	146
10	Austria	436,139	8,260	93.36	3	139	1.89	2	96
11	Azerbaijan	232,337	3,185	32.03	2	105	1.37	1	62
12	Bahamas	8,383	179	46.42	2	115	2.14	2	112
13	Bahrain	114,361	410	26.12	2	99	0.36	1	7
14	Bangladesh	541,434	8,298	5.14	1	51	1.53	1	75
15	Barbados	2,331	25	8.72	1	66	1.07	1	39
16	Belarus	270,921	1,867	19.68	1	93	0.69	1	20
17	Belgium	741,205	21,750	190.42	5	173	2.93	3	141
18	Belize	12,188	313	81.71	3	132	2.57	2	132
19	Benin	5,039	62	0.54	1	11	1.23	1	51

	COUNTRY	CONFIRMED	DEATHS	DEATHS PER 100 THOUSAND	DEATHS PER 100 THOUSAND-CLUSTERS	DEATHS PER 100 THOUSAND-RANKS	CASE FATALITY	CASE FATALITY-CLUSTERS	CASE FATALITY-RANKS
20	Bolivia	237,706	11,274	99.30	4	140	4.74	3	167
21	Bosnia and Herzegovina	126,413	4,935	148.47	5	166	3.90	3	159
22	Botswana	25,802	226	10.03	1	73	0.88	1	26
23	Brazil	9,921,981	240,940	115.02	4	150	2.43	2	125
24	Brunei	184	3	0.70	1	13.5	1.63	2	79
25	Bulgaria	232,096	9,703	138.14	5	158	4.18	3	164
26	Burkina Faso	11,630	138	0.70	1	13.5	1.19	1	48
27	Myanmar	141,659	3,192	5.94	1	58	2.25	2	118
28	Cabo Verde	14,785	140	25.75	2	98	0.95	1	29
29	Cameroon	32,098	479	1.90	1	35	1.49	1	71
30	Canada	836,594	21,395	57.73	2	122	2.56	2	131
31	Central African Republic	4,996	63	1.35	1	27	1.26	1	54
32	Chad	3,689	131	0.85	1	20	3.55	3	152
33	Chile	782,039	19,644	104.88	4	144	2.51	2	128
34	China	100,639	4,831	0.35	1	8	4.80	3	168
35	Colombia	2,202,598	57,949	116.72	4	152	2.63	2	134
36	Comoros	3,393	133	15.98	1	88	3.92	3	160
37	Republic of the Congo	24,423	695	13.25	1	86	2.85	2	139
38	Democratic Republic of the Congo	8,419	123	0.15	1	7	1.46	1	68
39	Costa Rica	200,454	2,737	54.75	2	117	1.37	1	61
40	Côte d'Ivoire	31,365	179	0.71	1	15	0.57	1	15
41	Croatia	237,999	5,357	131.00	4	155	2.25	2	117
42	Cuba	39,941	274	2.42	1	40	0.69	1	18
43	Cyprus	32,707	225	18.92	1	91	0.69	1	19
44	Czechia	1,099,654	18,430	173.45	5	170	1.68	2	82
45	Denmark	205,871	2,309	39.83	2	110	1.12	1	44
46	Djibouti	5,981	63	6.57	1	61	1.05	1	36
47	Dominican Republic	231,095	2,975	27.99	2	101	1.29	1	57
48	Ecuador	268,073	15,392	90.09	3	137	5.74	4	169
49	Egypt	175,059	10,101	10.26	1	74	5.77	4	170
50	El Salvador	58,023	1,758	27.38	2	100	3.03	3	142
51	Equatorial Guinea	5,694	87	6.65	1	62	1.53	1	74
52	Estonia	53,444	508	38.46	2	109	0.95	1	30
53	Eswatini	16,606	634	55.80	2	120	3.82	3	157
54	Ethiopia	148,490	2,223	2.04	1	37	1.50	1	72
55	Finland	51,047	720	13.05	1	85	1.41	1	65
56	France	3,548,452	82,961	123.85	4	154	2.34	2	120
57	Gabon	12,865	75	3.54	1	46	0.58	1	16
58	Gambia	4,469	138	6.05	1	59	3.09	3	145

	COUNTRY	CONFIRMED	DEATHS	DEATHS PER 100 THOUSAND	DEATHS PER 100 THOUSAND-CLUSTERS	DEATHS PER 100 THOUSAND-RANKS	CASE FATALITY	CASE FATALITY-CLUSTERS	CASE FATALITY-RANKS
59	Georgia	266,462	3,377	90.51	3	138	1.27	1	55
60	Germany	2,352,766	65,829	79.38	3	131	2.80	2	138
61	Ghana	77,046	555	1.86	1	31	0.72	1	21
62	Greece	173,905	6,181	57.62	2	121	3.55	3	154
63	Guatemala	168,103	6,158	35.70	2	108	3.66	3	156
64	Guinea	15,020	85	0.68	1	12	0.57	1	14
65	Guinea-Bissau	2,950	46	2.45	1	41	1.56	2	76
66	Guyana	8,262	188	24.13	1	96	2.28	2	119
67	Haiti	12,192	247	2.22	1	39	2.03	2	103
68	Honduras	161,727	3,913	40.81	2	111	2.42	2	123
69	Hungary	389,622	13,837	141.65	5	163	3.55	3	153
70	Iceland	6,039	29	8.20	1	65	0.48	1	10
71	India	10,937,320	155,913	11.53	1	80	1.43	1	66
72	Indonesia	1,233,959	33,596	12.55	1	82	2.72	2	137
73	Iran	1,534,034	59,117	72.27	3	129	3.85	3	158
74	Iraq	649,982	13,192	34.32	2	107	2.03	2	104
75	Ireland	211,113	3,980	82.00	3	133	1.89	2	94
76	Israel	734,575	5,441	61.25	2	126	0.74	1	22
77	Italy	2,739,591	94,171	155.83	5	169	3.44	3	150
78	Jamaica	19,773	378	12.88	1	84	1.91	2	97
79	Japan	418,435	7,139	5.64	1	55	1.71	2	85
80	Jordan	352,219	4,491	45.11	2	114	1.28	1	56
81	Kazakhstan	252,821	3,144	17.20	1	90	1.24	1	52
82	Kenya	103,188	1,797	3.50	1	45	1.74	2	87
83	South Korea	84,946	1,538	2.98	1	43	1.81	2	92
84	Kosovo	64,868	1,548	83.89	3	135	2.39	2	121
85	Kuwait	179,488	1,014	24.51	1	97	0.56	1	13
86	Kyrgyzstan	85,564	1,444	22.86	1	94	1.69	2	83
87	Latvia	77,697	1,486	77.13	3	130	1.91	2	98
88	Lebanon	343,601	4,092	59.75	2	124	1.19	1	49
89	Lesotho	10,350	254	12.05	1	81	2.45	2	126
90	Liberia	1,985	85	1.76	1	29	4.28	3	165
91	Libya	128,036	2,051	30.71	2	103	1.60	2	77
92	Lithuania	191,264	3,095	110.95	4	147	1.62	2	78
93	Luxembourg	53,062	612	100.70	4	142	1.15	1	46
94	Madagascar	19,598	292	1.11	1	26	1.49	1	70
95	Malawi	29,421	968	5.34	1	52	3.29	3	148
96	Malaysia	269,165	983	3.12	1	44	0.37	1	8
97	Maldives	18,082	58	11.25	1	79	0.32	1	5
98	Mali	8,241	342	1.79	1	30	4.15	3	163
99	Malta	20,047	297	61.42	2	127	1.48	1	69
100	Mauritania	17,016	431	9.79	1	70.5	2.53	2	129

	COUNTRY	CONFIRMED	DEATHS	DEATHS PER 100 THOUSAND	DEATHS PER 100 THOUSAND-CLUSTERS	DEATHS PER 100 THOUSAND-RANKS	CASE FATALITY	CASE FATALITY-CLUSTERS	CASE FATALITY-RANKS
101	Mauritius	603	10	0.79	1	19	1.66	2	80
102	Mexico	2,004,575	175,986	139.46	5	160	8.78	4	173
103	Moldova	171,514	3,678	103.73	4	143	2.14	2	113
104	Montenegro	69,770	910	146.22	5	165	1.30	1	58
105	Morocco	479,071	8,504	23.60	1	95	1.78	2	89
106	Mozambique	51,800	551	1.87	1	32	1.06	1	38
107	Namibia	36,366	392	16.01	1	89	1.08	1	40
108	Nepal	272,945	2,055	7.32	1	64	0.75	1	23
109	Netherlands	1,049,120	15,050	87.34	3	136	1.43	1	67
110	New Zealand	2,340	26	0.53	1	10	1.11	1	42
111	Nicaragua	6,398	172	2.66	1	42	2.69	2	136
112	Niger	4,706	169	0.75	1	17	3.59	3	155
113	Nigeria	148,296	1,777	0.91	1	21	1.20	1	50
114	North Macedonia	97,456	3,003	144.17	5	164	3.08	3	144
115	Norway	67,140	593	11.16	1	78	0.88	1	27
116	Oman	137,929	1,544	31.97	2	104	1.12	1	43
117	Pakistan	565,989	12,436	5.86	1	57	2.20	2	116
118	Panama	333,251	5,655	135.39	5	156	1.70	2	84
119	Papua New Guinea	955	10	0.12	1	5.5	1.05	1	35
120	Paraguay	146,216	2,971	42.71	2	113	2.03	2	106
121	Peru	1,238,501	43,880	137.17	5	157	3.54	3	151
122	Philippines	552,246	11,524	10.81	1	76.5	2.09	2	110
123	Poland	1,596,673	41,028	108.03	4	146	2.57	2	133
124	Portugal	788,561	15,522	150.97	5	168	1.97	2	101
125	Qatar	158,138	256	9.20	1	68	0.16	1	3
126	Romania	765,970	19,526	100.27	4	141	2.55	2	130
127	Russia	4,053,535	79,659	55.14	2	118	1.97	2	100
128	Rwanda	17,594	240	1.95	1	36	1.36	1	60
129	San Marino	3,352	72	213.11	5	174	2.15	2	114
130	Sao Tome and Principe	1,520	19	9.00	1	67	1.25	1	53
131	Saudi Arabia	373,368	6,441	19.11	1	92	1.73	2	86
132	Senegal	31,476	760	4.79	1	50	2.41	2	122
133	Serbia	424,020	4,261	61.03	2	125	1.00	1	33
134	Sierra Leone	3,825	79	1.03	1	23.5	2.07	2	107
135	Singapore	59,810	29	0.51	1	9	0.05	1	1
136	Slovakia	279,696	6,063	111.31	4	148	2.17	2	115
137	Slovenia	180,520	3,733	180.57	5	172	2.07	2	108
138	Somalia	5,373	163	1.09	1	25	3.03	3	143
139	South Africa	1,494,119	48,313	83.62	3	134	3.23	3	147
140	South Sudan	5,710	79	0.72	1	16	1.38	1	64
141	Spain	3,096,343	65,979	141.21	5	162	2.13	2	111

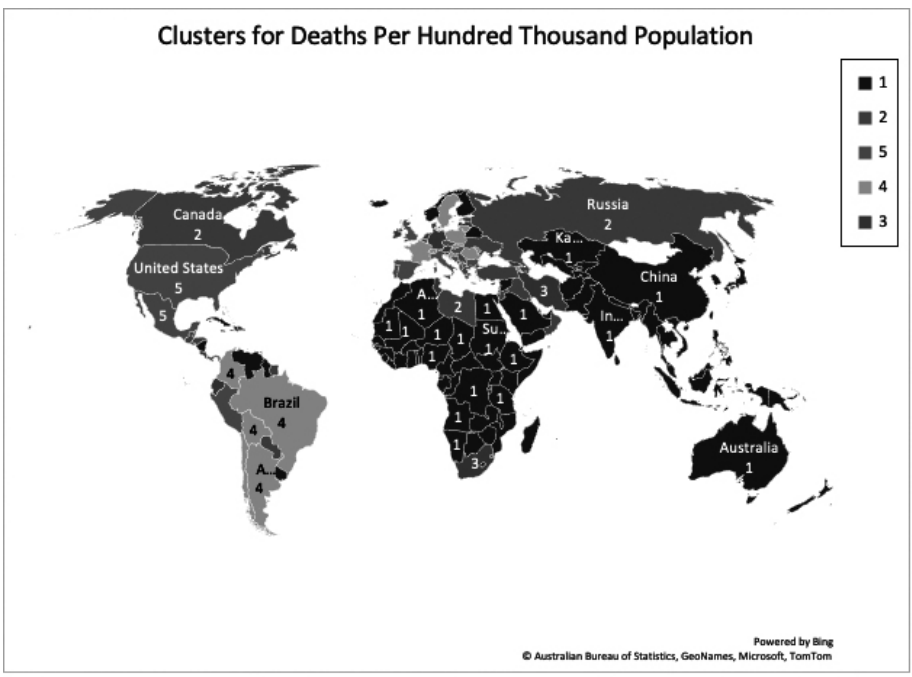
	COUNTRY	CONFIRMED	DEATHS	DEATHS PER 100 THOUSAND	DEATHS PER 100 THOUSAND-CLUSTERS	DEATHS PER 100 THOUSAND-RANKS	CASE FATALITY	CASE FATALITY-CLUSTERS	CASE FATALITY-RANKS
142	Sri Lanka	77,184	409	1.89	1	33.5	0.53	1	12
143	Sudan	30,052	1,863	4.46	1	48	6.20	4	171
144	Suriname	8,820	167	28.99	2	102	1.89	2	95
145	Sweden	617,869	12,487	122.62	4	153	2.02	2	102
146	Switzerland	544,282	9,817	115.27	4	151	1.80	2	91
147	Syria	14,951	984	5.82	1	56	6.58	4	172
148	Taiwan	937	9	0.04	1	3	0.96	1	31
149	Tajikistan	13,308	90	0.99	1	22	0.68	1	17
150	Tanzania	509	21	0.04	1	3	4.13	3	162
151	Thailand	24,786	82	0.12	1	5.5	0.33	1	6
152	Togo	5,953	81	1.03	1	23.5	1.36	1	59
153	Trinidad and Tobago	7,656	138	9.93	1	72	1.80	2	90
154	Tunisia	224,329	7,617	65.86	3	128	3.40	3	149
155	Turkey	2,602,034	27,652	33.59	2	106	1.06	1	37
156	United States	27,756,624	488,081	149.18	5	167	1.76	2	88
157	Uganda	40,063	331	0.77	1	18	0.83	1	25
158	Ukraine	1,322,406	25,862	57.96	2	123	1.96	2	99
159	United Arab Emirates	355,131	1,041	10.81	1	76.5	0.29	1	4
160	United Kingdom	4,070,332	118,421	178.11	5	171	2.91	3	140
161	Uruguay	49,725	546	15.83	1	87	1.10	1	41
162	Uzbekistan	79,461	622	1.89	1	33.5	0.78	1	24
163	Venezuela	133,927	1,292	4.48	1	49	0.96	1	32
164	Vietnam	2,311	35	0.04	1	3	1.51	1	73
165	West Bank and Gaza	169,487	1,942	42.50	2	112	1.15	1	45
166	Yemen	2,148	618	2.17	1	38	28.77	5	174
167	Zambia	70,823	974	5.61	1	54	1.38	1	63
168	Zimbabwe	35,315	1,414	9.79	1	70.5	4.00	3	161
169	Burundi	1,855	3	0.03	1	1	0.16	1	2
170	Liechtenstein	2,540	53	139.80	5	161	2.09	2	109
171	Monaco	1,787	21	54.29	2	116	1.18	1	47
172	Saint Lucia	2,549	23	12.65	1	83	0.90	1	28
173	Saint Vincent and the Grenadines	1,457	6	5.44	1	53	0.41	1	9
174	Seychelles	2,058	10	10.33	1	75	0.49	1	11
	World	109,502,318	2,418,776	31.23	2	104	2.21	2	117

Source: Data on confirmed, deaths, deaths per 100 thousand population, and case fatality are obtained from Johns Hopkins University Coronavirus Resource Center. Mortality Analyses - Johns Hopkins Coronavirus Resource Center (jhu.edu). Updated on Wednesday, February 17, 2021, at 06:50 EST. Access date: February 18, 2021.

Clusters and Ranks: Authors' calculations. Microsoft Excel is used for ranks and Stata is used for Cluster analysis. Note: Raw figures for the World are not included in calculations. Rank and cluster for the World is determined by closest country figures.

Cluster analysis is used to determine the natural groupings of observations. Stata has several algorithms for cluster analysis. In *k*-means, the number of groups (clusters), *k*, is determined in the beginning. Here, 5 clusters are chosen, analogous to letter grades in college. Each observation is assigned to the group whose mean is closest. The Euclidean distance measure is used among several distance measures available. Using that, new group means are determined. The procedure continues until no observation changes groups. There are many ways to determine initial group means. Here, initial group centers are determined by k unique random observations.

FIGURE 1. Clusters for deaths per hundred thousand population as of February 17, 2021



The Philippines had about 550 thousand confirmed cases and about 11 thousand deaths by February 17, 2021 (Table 1). Deaths per hundred thousand population were 10.81 (rank of 76.5 out of 174) which put the Philippines in the first cluster. On the other hand, deaths from confirmed cases were 2.09 percent (with rank=110 and cluster=2).

There were six countries with over a hundred thousand deaths by March 8, 2021. These countries were the United States, Brazil, India, United Kingdom, Mexico, and Italy. There were 36 countries with over ten thousand deaths.

Since daily numbers have large fluctuations mostly because of recording, moving averages may be used. The European Centers for Disease Control and Prevention no longer releases daily numbers, but weekly numbers.

Seven-day moving average at time t ($D(t\text{-}6)+D(t\text{-}5)+D(\text{t-}4)+D(t\text{-}3)+\text{D}(t\text{-}2)+D(t\text{-}1)+D(t)$)/7 or the average of the weekly change ($D(t)\text{-}D(t\text{-}7)$)/7 are two equivalent ways of obtaining a better measure. The former is used here. In addition to seven-day, 28-day (four weeks), 56-day (eight weeks), and 84-day (12 weeks) moving averages are calculated to see general tendencies. A comparison may show whether the number of deaths is decreasing or increasing. For example, in Brazil average daily rate was around 1600 for the week ending March 8th, compared with an average daily rate of about a thousand for the 84-week period ending March 8th. This is a very significant increase. On the other hand, India was able to reduce the number from 1200 to less than 200. Furthermore, India had a single peak in 2020. The United States had the highest daily death rates (over 3000) in 2020. The rate was reduced below 2000 in early March. The Philippines had not realized a steady decrease.

Most countries realized a second wave of deaths. After the initial surge in early 2020, countries took measures mostly in the form of lockdowns of schools, restaurants, and hotels. These measures helped to reduce the number of deaths, but they did not last very long. Some countries relaxed and some completely abandoned, which led to the second wave. Recently, smaller numbers for the United States and the United Kingdom may be due to vaccinations. More observations are needed for firm conclusions.

2.2. Percentage changes in real GDP from the fourth quarter of 2019

Real GDP at present is to be compared with real GDP at the end of 2019, before the widespread appearance of the coronavirus. Real GDP in 2020 may be compared with the real GDP average of 2019, or the fourth quarter of 2019. Here, the comparisons will be made with the fourth quarter of 2019. Data are obtained from the World Bank, Global Economic Monitor (GEM) database. All data are in 2010 US dollars and seasonally adjusted. Real GDP is calculated as the percentage change from the value in 2019 Q4 (the sum of these may be considered as the real GDP loss as in Mariano & Ozmucur [2020]).

The Philippines had very high percentage changes from the fourth quarter of 2019, both in 2018 and 2020 (Table 2). Figures for the Philippines for 2018 are very similar to China (they both realized high growth rates). In 2020, starting with the second quarter real GDP in China grew compared with contractions in the Philippines and many other countries. This may be since the virus was in China in 2019 and very serious lockdown measures were taken by China. The large shares of exports in GDP, significant tourism revenues, and remittances may help to explain the large declines in GDP in the Philippines due to COVID-19.

TABLE 2. GDP in 2010 US dollars: percentage change from the fourth quarter of 2019

	BRAZIL	CHINA	GERMANY	ITALY	JAPAN	KOREA	PHILIPPINES	UNITED KINGDOM	UNITED STATES	WORLD
2018Q1	-1.72	-9.44	-0.87	-0.22	1.20	-4.30	-10.57	-2.32	-3.76	-3.82
2018Q2	-1.83	-8.08	-0.40	-0.10	1.24	-3.71	-8.30	-1.94	-3.11	-3.16
2018Q3	-1.03	-7.29	-0.73	-0.15	0.57	-3.16	-7.54	-1.36	-2.61	-2.78
2018Q4	-1.52	-5.48	-0.39	-0.07	1.03	-2.32	-6.27	-1.20	-2.29	-2.23
2019Q1	-0.26	-3.59	0.22	0.12	1.61	-2.65	-5.01	-0.65	-1.58	-1.42
2019Q2	-0.06	-2.48	-0.29	0.32	1.69	-1.66	-3.58	-0.51	-1.21	-0.86
2019Q3	-0.22	-2.13	0.02	0.36	1.87	-1.29	-1.88	-0.02	-0.58	-0.46
2019Q4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020Q1	-1.55	-10.00	-1.99	-5.53	-0.56	-1.28	-5.60	-2.88	-1.26	-2.85
2020Q2	-11.00	0.66	-11.50	-17.85	-8.82	-4.40	-19.65	-21.37	-10.14	-10.40
2020Q3	-4.14	2.55	-3.97	-4.74	-4.03	-2.35	-13.21	-8.69	-3.42	-3.31
2020Q4		6.55	-3.88	-6.62	-1.11	-1.29	-8.38	-7.80	-2.46	-1.87

Source: Authors' calculations using the World Bank, World Economic Monitor (GEM) database. Global Economic Monitor (GEM) | Data Catalog (worldbank.org) Access date: February 24, 2021.

2.3. Change in the rate of unemployment from December 2019

The rate of unemployment is another very significant indicator to see the effects of a pandemic. Data are also available from the World Bank, Global Economic Monitor (GEM) database for most countries. These data are available monthly, but for some major countries (for example, India) they are not available. Here, comparisons with the unemployment rate in December 2019 are made.

There were significant increases in the rate of unemployment due to COVID-19 in all the countries, especially in the Philippines and the United States (Table 3). It should be noted that GEM gives monthly figures for the Philippines by using the same quarterly figure for the months of the quarter. This does not change the basic fact that the rate of unemployment increased by 0.4 percentage points in the first quarter of 2020 and 12.3 percentage points in the second quarter from the fourth quarter of 2019.

TABLE 3. The rate of unemployment: difference from December 2019

	BRAZIL	CHINA	GERMANY	ITALY	JAPAN	KOREA	PHILIPPINES	UNITED KINGDOM	UNITED STATES	WORLD
2019M01	0.69	0.05	0.10	0.69	0.20	0.60	0.30	0.00	0.40	0.19
2019M02	0.65	0.07	-0.28	1.05	0.17	0.10	0.30	-0.10	0.20	0.15
2019M03	0.50	0.05	0.17	0.43	0.23	0.10	0.30	-0.10	0.20	0.13
2019M04	0.41	0.02	-0.19	0.65	0.22	0.30	0.10	-0.10	0.10	0.07
2019M05	0.37	0.01	-0.20	0.55	0.12	0.10	0.10	0.00	0.10	0.05
2019M06	0.27	-0.01	-0.28	-0.10	0.08	0.20	0.10	-0.10	0.00	0.00
2019M07	0.15	-0.02	-0.14	0.27	0.07	0.20	0.40	0.00	0.00	0.02
2019M08	0.22	-0.03	-0.12	0.01	0.04	-0.50	0.40	-0.10	0.10	0.03
2019M09	0.32	-0.03	-0.16	0.11	0.14	-0.20	0.40	-0.10	-0.10	0.03
2019M10	0.34	-0.02	-0.17	-0.24	0.14	-0.20	0.00	-0.10	0.00	0.03
2019M11	0.12	-0.02	-0.06	-0.27	0.06	0.00	0.00	-0.10	0.00	0.02
2019M12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2020M01	-0.13	0.04	0.00	-0.17	0.11	0.20	0.40	0.10	-0.10	0.05
2020M02	-0.14	0.06	-0.09	-0.08	0.18	-0.30	0.40	0.10	-0.10	0.06
2020M03	0.03	0.04	0.48	-2.54	0.33	0.10	0.40	0.10	0.80	0.21
2020M04	0.52	0.26	0.85	-3.33	0.41	0.10	12.30	0.20	11.20	2.06
2020M05	0.96	0.25	1.23	-1.41	0.61	0.60	12.30	0.20	9.70	2.14
2020M06	1.56	0.22	1.19	-0.09	0.58	0.50	12.30	0.40	7.50	1.95
2020M07	2.14	0.56	1.17	1.30	0.66	0.40	4.80	0.60	6.60	1.94
2020M08	2.82	0.55	1.15	1.44	0.73	-0.40	4.80	0.90	4.80	1.77
2020M09	3.13	0.55	1.27	0.49	0.73	0.30	4.80	1.00	4.20	1.65
2020M10	3.10	0.59	1.28	0.10	0.82	0.50	4.50	1.10	3.30	1.53
2020M11	3.14	0.60	1.30	-1.58	0.69	0.50	4.50		3.10	1.42
2020M12		0.62	1.37	-0.68	0.75	0.80	4.50		3.10	1.39

Source: Authors' calculations using the World Bank, World Economic Monitor (GEM) database. Global Economic Monitor (GEM) | Data Catalog (worldbank.org) Accessed February 24, 2021.

2.4. Disaster Index

Individual indicators are very useful, but each one may not capture the entire effect of a phenomenon. Since all four indicators will be used in DI calculations, 56 countries with data on all four indicators available were included (Table 4, see Mariano & Ozmucur [2020] for details). Since the numbers have different units, standardizing makes them more comparable. The mean and standard deviation of indicators for 56 countries were then used to calculate standardized variables and the Index with equal weights (EWI).

TABLE 4. Disaster Index for the first half of 2020

Order	Country	Disaster Index (DI)	Disaster Index (DI) (Rank)	Disaster Index (Cluster)
1	Argentina	0.6847	44	4
2	Australia	-0.6244	16	2
3	Austria	-0.1473	33	3
4	Belarus	-1.1960	3	1
5	Belgium	1.9508	52	5
6	Brazil	0.6442	43	4
7	Bulgaria	-0.2052	32	3
8	Canada	1.0011	47	4
9	Chile	0.4964	42	4
10	China	-0.3906	26	2
11	Colombia	1.4267	50	5
12	Croatia	-0.3212	28	3
13	Cyprus	-0.6458	12	2
14	Czechia	-0.7135	9	2
15	Denmark	-0.5712	23	2
16	Ecuador	2.2086	54	5
17	Egypt	-0.4361	25	2
18	Estonia	-0.6325	13	2
19	Finland	-0.6110	19	2
20	France	1.0737	49	4
21	Germany	-0.2634	30	3
22	Greece	-0.3642	27	3
23	Hungary	-0.2110	31	3
24	Iceland	-0.6268	15	2
25	Ireland	0.1767	40	3
26	Israel	-0.7440	8	2
27	Italy	2.2103	55	5
28	Japan	-0.9479	6	1
29	Korea, South	-1.1645	4	1
30	Latvia	-0.6223	17	2
31	Lithuania	-0.7045	10	2
32	Luxembourg	-0.5735	22	2
33	Malta	-0.3149	29	3

Order	Country	Disaster Index (DI)	Disaster Index (DI) (Rank)	Disaster Index (Cluster)
34	Morocco	0.0503	38	3
35	New Zealand	-0.9712	5	1
36	North Macedonia	0.3980	41	4
37	Norway	-0.8418	7	2
38	Peru	2.9267	56	5
39	Philippines	1.0590	48	4
40	Poland	-0.6311	14	2
41	Portugal	-0.0809	36	3
42	Romania	-0.1327	34	3
43	Russia	-0.6611	11	2
44	Singapore	-1.5380	1	1
45	Slovakia	-0.5994	21	2
46	Slovenia	-0.0447	37	3
47	South Africa	-0.6214	18	2
48	Spain	1.5865	51	5
49	Sweden	0.7849	45	4
50	Switzerland	-0.0978	35	3
51	Taiwan	-1.3779	2	1
52	Tunisia	0.0876	39	3
53	Turkey	-0.5608	24	2
54	United Kingdom	2.0765	53	5
55	Uruguay	-0.6072	20	2
56	United States	0.9551	46	4

Source: Mariano & Ozmucur [2020] Table 9.

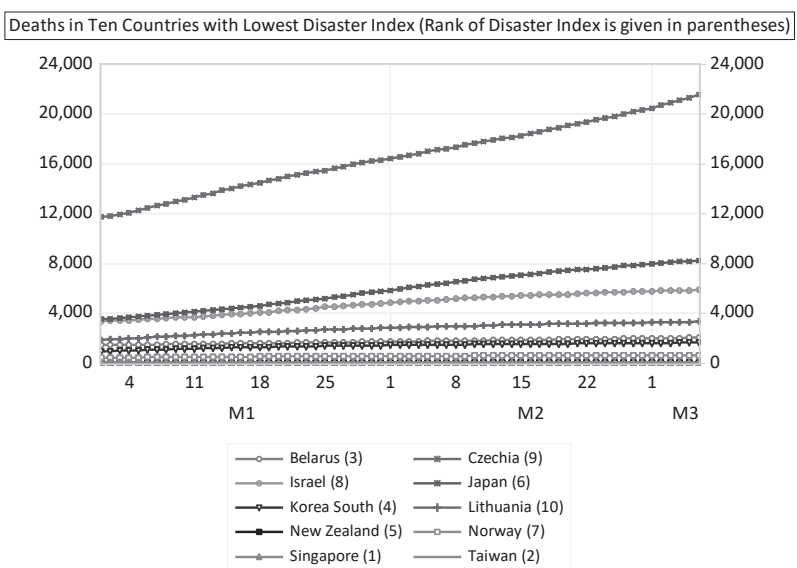
Principal components analysis for four indicators indicates that the first principal component explains 49 percent of the variance, and the second principal component explains 25.6 percent of the variance. The first two components explain close to three-quarters of the total variance. Loadings indicate that the first principal component has a correlation of 0.64 with the deaths per hundred thousand population. The second principal component has the highest correlation with the increase in the unemployment rate (0.83). The first principal component is to be used as the Index (PC1).

The DI is a weighted average of the Index with Equal Weights (EWI) and the first principal component (PC1) of the group of four indicators. The weights are the reciprocal of standard deviations of EWI and PC1.

It is important to look again at countries that we had calculated DIs for during the first half of 2020 [Mariano and Ozmucur 2020]. By studying recent trends, we can see if the country has improved performance or not since the end of the first half of 2020.

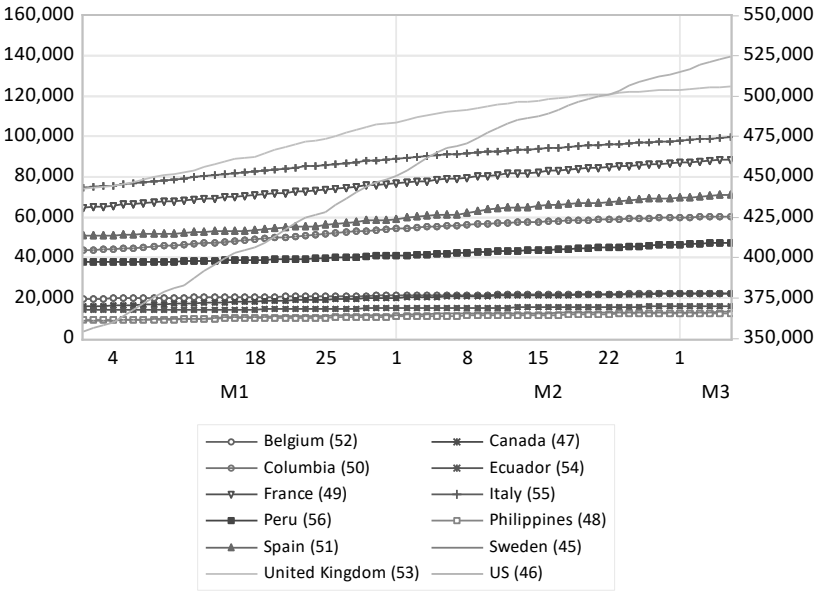
Figure 2 shows the 10 best performers based on the DI for the first half of 2020: Singapore (1), Taiwan (2), Belarus (3), Korea (4), New Zealand (5), Japan (6), Norway (7), Israel (8), Czechia (9), and Lithuania (10). Some countries were able to keep the level of performance. Some, on the other hand, could not. Most notably, Czechia had a very steep trend in the number of deaths during the first months of 2021. Japan and Israel also had positive trends in the number of deaths, but not at the same rate as Czechia (Figure 2).

FIGURE 2. Deaths in ten countries with lowest disaster index, 1/1/2021-3/6/2021



On the other end of the spectrum, countries with the 12 highest DI figures were: Sweden (45), US (46), Canada (47), Philippines (48), France (49), Colombia (50), Spain (51), Belgium (52), United Kingdom (53), Ecuador (54), Italy (55), Peru (56). Instead of 10, 12 were chosen so that Sweden and the US could be on the list (Figure 3). The United States continued its upward trend and reached 525 thousand deaths (right scale) by March 8th. The United Kingdom also continued its upward trend and reached 125 thousand deaths (left scale with other countries except for the US). Italy, Spain, France, and Colombia were the countries with positive trends, although not at the high rates of the United States and the United Kingdom.

FIGURE 3. Deaths in twelve countries with highest Disaster Index (US-right scale, other countries-left scale),1/1/2021-3/6/2021



Note: Rank of Disaster index is given in parentheses.

3. Relationships

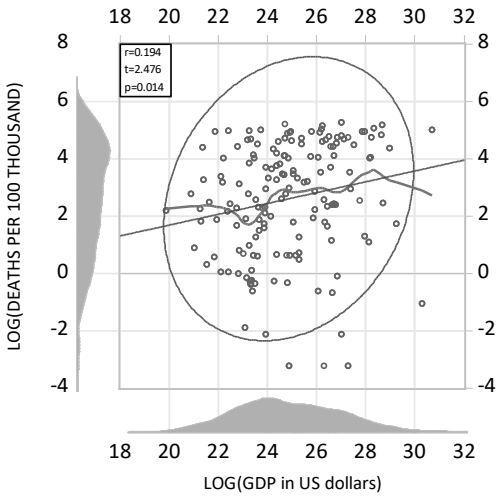
We look for the relationships between selected indicators and four variables that were used in the previous section. The list includes over a hundred indicators from the World Bank World Development Indicators. The comprehensive list includes variables related to GDP and its components, GDP per capita, surface area, population, health, environment, inequality and poverty, economic and social structure. Here we present only a few examples. It should be stressed that there is no argument made about causality, but only the correlation.

3.1. Size of the economy (GDP in US dollars)

Is there a relationship between the size of the economy and the health and economic activity indicators? This can be studied with the help of figures, which may have four components:

The kernel density for GDP in US dollars is given on the horizontal axis, and the kernel density for the deaths per 100 thousand is given on the vertical axis (Figure 4). Kernel densities help to see the distribution of individual variables. Both variables have large variances. Using logarithms reduced those variances significantly.

FIGURE 4. Size of the economy and deaths per hundred thousand



The scatter diagram has points for pairs of variables under consideration. The scatter diagram of 159 pairs of observations shows general tendencies, but in some cases may not be enough to see the degree and direction of the relationship.

The estimated regression line, nearest neighbor fit, and 95 percent confidence ellipse play supporting roles for the direction and to a certain extent degree of the relationship. The regression line shows the linear association between the two variables. It is possible to see that the estimated relationship has a positive slope. The nearest neighbor fit also indicates a positive fit, with some negative relationship at certain intervals of GDP. Outliers can easily be seen by points outside the 95 percent confidence ellipse.

The simple correlation coefficient, t-statistics, and p-value are given in a box. For example, the correlation between logarithms of GDP in US dollars and deaths per hundred thousand is 0.194. Although this may seem like a small figure, with 159 observations the correlation is significant at the five percent level. One can conclude at the 95 percent level of confidence that the correlation is statistically different from zero. In summary, the death rate is generally higher in larger economies.

3.2. Surface area

If the size of the economy is measured by its surface area, one finds a negative correlation. The correlation between logarithms of surface area and deaths per hundred thousand is negative 0.13. It is not statistically significant at the five percent level, but only at ten percent. If the surface area is larger, the death rate is generally lower. The effect is discernable at the 90 percent confidence level, but not at the 95 percent level.

3.3. Population

If the size of the economy is measured by its population, one finds a negative correlation as in the surface area. The correlation between logarithms of surface area and deaths per hundred thousand is negative 0.16. It is statistically significant at five percent (has a p-value of 0.038). If the population is larger, the death rate is generally lower. The relationship is statistically significant at the 95 percent level.

3.4. Share of the older population

A relatively high positive correlation is obtained between the share of the population aged 65 and above and the deaths per hundred thousand. The correlation is 0.555, which is significant at the one percent level (p-value is very close to zero). This is the reason that people ages 65 and above are considered among the highest risk groups.

3.5. Share of urban population

Another variable with a high positive correlation with deaths per hundred thousand is the share of the urban population. The correlation is 0.465, which is also significant at the one percent level (p-value is very close to zero).

3.6. Share of exports of goods and services in GDP

Because of its devastating effects on some sectors, we look for the relationship with those sectors also. The correlation between the share of exports of goods and services in GDP and deaths per hundred thousand is positive (0.172) and statistically significant at the ten percent level.

3.7. Tourism revenues

Another variable with a high positive correlation with deaths per hundred thousand is international tourism receipts in US dollars. The correlation is 0.270, which is significant at the one percent level (p-value is 0.001).

4. Some complementary thoughts on the pandemic

Some additional thoughts primarily based on Mariano & Ozmucur [2020] are presented in this section. Some of these points may seem trivial but events that have taken place warrant reiterating these precautionary observations.

4.1. The fallacy of "lives lost and activity loss tradeoff"

Is the economy a health alternative? The answer is "No". The "health or economy" choice put in front of the people is not the right one. Those are not competitive, but complementary. Public authorities should give guidance and

financial support, and not just let the public find a solution for themselves. It is the duty of the authorities to provide both health and economy to the public during a pandemic. Under normal times, that may not be required, and people, in general, may not demand those. But during a pandemic, authorities should provide those. Here are some of the reasons. A pandemic moves faster if healthcare is not provided to every single one in a society, in this case in the world. If a government asks a company to close its doors because of a pandemic, and not because of misbehavior of the company, is it fair for that company to bear the full burden of that closure? If the answer is no, which is what common sense tells us, then a government should cover some of the burdens to alleviate the pain. The government will cover the cost now, preferably by direct payments to citizens, and then collect taxes when the economy bounces back. This should not even be an issue for advanced economies, but it may be difficult for developing or emerging economies.

Preliminary findings show that health and the economy are not competitive (with a negative correlation). On the contrary, they are complementary as indicated by positive correlation coefficients. The correlation between deaths per hundred thousand population and real GDP loss is 0.42. On the other hand, the correlation between deaths as a percentage of confirmed cases and real GDP loss is 0.25. This is lower, but also statistically significantly different from zero at the five percent level. The correlations between health indicators and the increase in the unemployment rate are not statistically significantly different from zero, but estimated coefficients are not negative, that is suggesting no trade-off.

4.2. Pandemic and the relevance of budget deficit and domestic debt

The pandemic forced every government to take extra measures for the welfare of the people. High rates of unemployment forced governments to increase expenditures and exerted extra pressures on budgets. On the other hand, lower incomes reduced tax revenues for governments, leading to greater deficits. This situation is very common in recessions and downturns, and much amplified during a pandemic. Concepts like "the full employment budget deficit" were introduced for situations like these. Policymakers follow budget deficits closely, but adjustments must be made for the position of the economy in a cycle. It is important to keep in mind the level of the full employment budget deficit.

Government debt will increase with higher deficits. Governments will issue bonds to cover the increased deficit. In the United States, most of the buyers are citizens. The government is borrowing money from its citizens. This may not create a large problem because governments most likely will get those back with higher taxes in the future. What is needed are funds to ease the pain of the people, now. Tomorrow may be too late for the problem.

The deficit and debt can be taken care of later. For now, saving the patient is more important. Pay attention to the urgent problem now, and take care of the less urgent problem later. This simple logic should govern the minds and hearts of policymakers. But subsequent downstream problems must be anticipated and prepared for.

4.3. Pandemic and possible future outcomes

What is expected to happen in the "post-globalization" or "New World"?

There are probably two clear extremes and maybe many possibilities in between these two extremes. The first possibility, but maybe not the most likely, is a world with greater cooperation and coordination among countries. The second possibility, and maybe a more likely outcome, is moving towards a complete isolationist approach leading to countries aiming for self-sufficiency.

In any case, the most important requirement for worldwide recovery from this pandemic is a very close and complex international cooperation and coordination in every conceivable field. Whether this will be realized or not mostly depends on the existence of leaders with vision. Without sound leadership, the world population may have a very long struggle ahead of them.

During the pandemic of 2020, consumer expenditures dropped because of lack of income and rising unemployment, poverty, and uncertainty. Most businesses were closed because of mandatory lockdowns, lack of demand, and greater uncertainty. Since all countries are affected by the pandemic, there is a lack of demand from foreign countries. In terms of Keynesian categories, $GDP = C + I + G + X - M$;[2] C, I and $(X\text{-}M)$ are all lower since the beginning of the pandemic. To bring GDP back to its previous level, government expenditures (G) should increase.

Unfortunately, not all countries can respond adequately to this need for increased government expenditures because some countries were already in a vulnerable position even before the pandemic. Even more troubling is that some countries fail to see the need to expand government expenditures. Until this is realized, people cannot expect even temporary relief. There are also longer-term effects that international organizations are concerned about. If schools are closed for a long period of time, the proportion of well-educated people may decrease, which will have significant adverse effects on the growth prospects of all the countries. This lack of schooling will also perpetuate poverty and inequality.

None of the issues stated here can be solved by the private sector or by shrewd entrepreneurs in broken systems or markets with frictions. These problems can only be solved with capable leaders, sound public policies, and a solid foundation of national and international cooperation and coordination. Public authorities are expected to deliver these to be considered as true leaders.

[2] C- private consumption, I – private investment, G - government expenditures (current and investment), X-exports of goods and services, M-imports of goods and services.

Monetary authorities all over the world have been acting swiftly and surely during this crisis. Unfortunately, monetary policy cannot be effective without a firm and determined fiscal policy and income policy during a period of uncertainty and insufficient aggregate demand. Furthermore, the pandemic is also a human security issue. Treating it as if it were simply a military matter is too narrow. It is necessary to view the security issue more broadly in terms of protecting the people's general well-being, whether the threat comes from a visible enemy or an invisible virus. The world population seems to have a long way to go.

4.4. Incredible numbness or a different indifference

There are close to three million deaths globally (2,593,222 on March 8th, with about 117 million confirmed cases), according to Johns Hopkins University Coronavirus Resource Center [Coronavirus COVID-19 (2019-nCoV) (arcgis.com), Accessed March 8, 2021]. The reason for incredible numbness may be because people neither see patients fighting for their lives nor the dead being buried without their loved ones' presence. This may be part of a more general disturbing trend which may be described in a few sentences: "This is not on TV or social media. Therefore, it is not happening. Social media is the real world. The real world is somehow irrelevant until it hits the person." It does not mean it does not exist if one does not see it. This is true for all the viruses, bacteria, etc. that one can only see under a microscope.

The world needs to wage an all-out war against the virus. The remarkable efforts of some leaders, governors, public authorities, doctors, healthcare workers, first responders, and essential workers may not be enough for this fight.

4.5. The danger of transition from intelligent social beings to thoughtless individualists

Some people talk about freedom, but they do not seem to know much about freedom. One's freedom stops when it hurts the freedom of the next person. This is the case in a pandemic. Thus, freedom cannot be taken lightly as just a matter of choosing whether to wear a mask or not. One cannot behave as if there is no deadly virus. The virus may not hurt a person, but that person should behave as if the virus can hurt him/her because it can be transferred to another person with grave consequences.

The best examples of rules may be seen in traffic and games. There are universal rules in traffic set for the good of all road users. Those rules reduce the number of accidents and fatalities. One is free to drive anywhere provided traffic rules are obeyed. In general, people follow those rules. Same, if not more, is expected during a pandemic. If scientists suggest wearing masks, social distancing, and hygiene, it is best for all in the world if everyone follows those suggestions.

There are rules in every game, football, basketball, etc. One must follow those rules and stop making one's own rules. There is a simple reason for that. All those rules were made for the benefit of all the players after many years of experience. Players follow those rules even if they do not necessarily like them because it benefits a larger number of people than just a few. These are like rules during a pandemic. It helps everyone to follow those rules because people live in a society.

4.6. Modeling issues—structural analysis, policy formulation, forecasting

Modeling issues require answers to some questions. Is this virus a temporary phenomenon or a permanent one? If it is a permanent phenomenon, there is a need for a detailed sectoral breakdown of economic activity. Using real GDP as the only target variable may not be enough. Some sectors may not come back at all. Structural relationships such as the consumption function or investment function may be different from what they were before the pandemic. If it is a temporary phenomenon, what will be the duration of the pandemic? What will be the new relationships? Is it possible to use the old relationships after the end of the pandemic? Different answers to these questions will lead to different models. In the meantime, a historical average of the growth rate may be the best forecast for the average of the period over the next three or five years. Giving forecasts for individual periods may not be suggested until we have answers to all the questions posed here.

For the problem at hand, these suggest a sectoral model and not just a model for real GDP. A model that enables policy simulations may guide us for the appropriate policy to boost the activity if there are reasonably stable relationships.

Is there a need for a new modeling approach? The short answer is "yes", for the simple reason that the world in 2021 is very different from the one in 1980, and models are supposed to be just simple representations of the real world. How should the model be different? The model should probably address globalization and rising uncertainty. Building such a model may be a challenge that we would like to tackle with no guarantee of success. The problem is like the one in data mining. Most internet data are based on non-random samples. The models may be based on non-random samples.

Is it useful to have additional surveys? Under periods of uncertainty, business and consumer surveys may be useful sources of information. They are generally released earlier, and they may be more informative about the possible behavior of consumers and producers. Is it worthwhile to talk to policymakers and decision-makers in the private sector and labor? Is it necessary to add some questions to (online) business and consumer surveys? These subjective views or expectations may be very helpful during a period when accurate hard data may be difficult to get.

Another important question that researchers should ask is: Is the appearance of COVID-19 a random event, or an ignored or missed event, given earlier outbreaks: SARS, MERS, H1N1, Ebola, Swine flu? How many observations do we need to have some positive number in the empirical probabilities of such events? A regional

climate model with the appearance of a virus or bacteria may have predicted an outbreak or pandemic, maybe not the exact timing. Although we think we know a lot about the world, we probably ignored the degree of interrelatedness. Did we miss an event because of a lack of understanding of today's world? These questions have been asked. Hopefully, researchers will work on these and alleviate some of the pain in the future. The coordination of the international community appears to be the key in all aspects of the issues we deal with.

5. Concluding remarks

This paper has provided an empirical evaluation of countries' performance in fighting COVID-19, utilizing a performance index (which we call the Disaster Index) based on four health and economic indicators: deaths per population size, the share of deaths to confirmed cases, and quarterly real GDP and monthly unemployment rate relative to pre-pandemic values. International data patterns are studied for these four indicators and the DI to analyze trends and basic empirical relationships. The approach is descriptive and primarily based on graphs, scatter diagrams, and correlation analysis. The ten best performers based on the DI for the first half of 2020 were (best #1 to #10): Singapore, Taiwan, Belarus, Korea, New Zealand, Japan, Norway, Israel, Czechia, and Lithuania. The worst twelve performers, with the highest DI, were (from bad to worst): Sweden, US, Canada, Philippines, France, Columbia, Spain, Belgium, United Kingdom, Ecuador, Italy, and Peru.

These results support the proposition that high-income Asian countries performed relatively better than low-income Asian countries, European, and American countries. Reasons for this geographical divide are very important and must be studied more carefully and closely, as successful methods in better performing countries will provide some lessons for other countries. It also would be interesting to see how this DI profile shifts in 2021 as vaccination and economic relief accelerate in countries like the United States.

Unfortunately, in absolute terms, countries were not very successful in coping with the virus, with close to three million deaths in the world in about a year despite enormous medical and technological achievements over the years and altruistic and heroic efforts of doctors, healthcare workers, first responders, and other essential workers. Vaccination is fresh hope, a potential game-changer, though requiring careful and painstaking implementation.

The virus is a reminder that national security means the protection of citizens, whether it is from a visible military force or an invisible enemy such as a virus, a disease, or a cyber-attack. In this century, peoples from all nations observed that more emphasis was given to the visible enemy; and with national and international cooperation and coordination, some positive steps were taken with some success. A similar approach must be taken for all adversaries, not just visible, but also invisible ones such as viruses, bacteria, and cyber-attacks.

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