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The Philippine Review of Economics

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The impacts of secondary education reforms on schooling and income of women and men in the Philippines

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In 1988 and 1989, the Philippine government implemented free public and subsidized private secondary schooling through two major policies, namely Republic Act (RA) 6655 and RA 6728. This study investigates the long-run impacts of the two policies on schooling attainment and income using a regression discontinuity design (RDD). It draws data from the Annual Poverty Indicators Survey 2008 and 2011. We present two main findings. First, younger cohorts of women and men, who are policy beneficiaries, have significantly higher educational attainment relative to non-beneficiaries. Second, an additional year of schooling significantly increases individual income of women in the informal sector and men in the formal sector. In brief, our findings suggest that the policies are effective in enhancing schooling attainment, but the downstream impacts appear to have accrued substantially to women employed in the informal sector and men employed in the formal sector.

JEL classification: I21, I25, I26, I28, O1
Keywords: schooling, income, gender, regression discontinuity design

1. Introduction

Education is widely recognized as an important factor in advancing human capital. It plays a crucial role in helping individuals gain marketable skills that may lead to better prospects of employment and higher income [Fasih 2008]. Governments and international organizations have placed high emphasis on prioritizing education in their policy agenda. The United Nations (UN), for instance, has set targets in improving the quality of and access to education through the Millennium Development Goals (MDGs) and the Sustainable

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Development Goals (SDGs). Specifically, Goal 2 of the MDGs aims to ensure that by 2015, children in all countries will be able to complete primary schooling [UN 2015]. Likewise, Goal 4 of the SDGs aims to continue the agenda of the MDGs by ensuring inclusive and equitable quality education for all from 2015 to 2030 [UN 2017]. Such goals of the UN focus on increasing access to quality education that can enhance individual productivity and improve labor market outcomes.

In 1986, the Philippines started to invest more in higher education to enhance the skills of its labor force through two major policies. First, in 1988, the government implemented the Free Public Secondary Education Act or Republic Act (RA) 6655, which eliminates tuition fees in all public high schools. Second, in the following year, it supported private schools through the passing of the Government Assistance to Students and Teachers in Private Education (GASTPE) Act or RA 6728, which subsidizes private schooling. These two policies reduce the relative price of schooling, easing the resource constraints of households in sending their children to school [Revilla and Estudillo 2016]. Notably, the two programs serve as the most important educational reforms since the implementation of free public primary schooling during the American colonial period (1898-1946) ["Historical perspective of the Philippine educational system" n.d.].

In terms of labor market outcomes, the least educated Filipinos, like many others worldwide, are employed in lowly paid jobs, while those with higher educational attainment work in highly paid occupations. Moreover, the less educated continue to earn less than the more educated. Evidently, education serves as the single most important factor that influences employment opportunities and income differentials [Luo and Terada 2009] and the two policies may help in improving labor market prospects for all children.

To our knowledge, no rigorous impact assessment of RA 6655 and RA 6728 had been conducted in the Philippines. This study aims to explore the impact of free and subsidized secondary education on schooling attainment and, in turn, to assess the downstream impacts of schooling on individual earnings. We conduct the analysis for the whole population as well as for the subgroups of women and men. Our main hypothesis is that RA 6655 and RA 6728 are expansionary educational reforms that increase schooling attainment and, eventually, improve individual income across genders.

The study utilizes a quasi-experimental approach called the regression discontinuity design (RDD), which allows us to select a cut-off, based on the year of policy implementation, to observe the effects on the group affected by the policy. In particular, fuzzy RDD uses an instrumental variable based on individuals' exposure to free and subsidized secondary schooling policies to address the endogeneity of schooling. Briefly, the main findings of this study are the following: First, the policies have the impact of significantly increasing the educational attainment of women and men beneficiaries vis-à-vis non-beneficiaries. Second, schooling causally increases individual income of informally employed women and formally employed men.

Our study contributes to the extant literature in several ways. First, in contrast to studies that analyze mostly short-term effects, our analysis captures long-term effects of educational policies on schooling and income. Second, to our knowledge, this study is one of the first in the Philippines to link specific educational policies to earnings using the regression discontinuity approach. Third, while earlier studies show mere associations, our results reflect causal relations between education and individual income. Fourth, the same model in our study may be used to analyze more recent schooling policies such as the K to 12 program and the free college tuition act in the Philippines once data become available.

This study has five remaining sections. Section 2 presents a background on the major public and private secondary education policies implemented in 1988 and 1989. Section 3 provides the literature review of policy impacts. Section 4 describes the empirical strategy and data. Section 5 discusses the results. Finally, Section 6 concludes the study.

2. Background on the major secondary education reforms

With the aim of making secondary education accessible to all, the Philippine government implemented the Free Public Secondary Education Act, also called RA 6655, in May 1988. This law ensures that public secondary schools, including national high schools, general comprehensive high schools, and high schools funded by local government units, are free from tuition and other school fees. RA 6655 took effect in school year 1988-1989. Likewise, in recognition of the importance of the private sector in providing and promoting quality education, the government implemented the GASTPE Act or RA 6728 in June 1989. Specifically, the law provides assistance to students in private secondary schools through tuition fee supplements, the High School Textbook Assistance Fund, and the Educational Service Contracting (ESC) scheme. The ESC scheme allows the Department of Education to enter into contracts with private schools and settle fees of students who cannot be accommodated by public high schools due to congestion or children who live in areas with no public schools. To finance the implementation of the policies, budgets were realigned within the education ministry, additional budget adjustments were incorporated in the succeeding fiscal years, and other budget sources were tapped (i.e., taxes collected from airports, coconut levies, etc.) [Free Public Secondary Education Act of 1988 1988; Government Assistance To Students and Teachers In Private Education Act 1989]. Since the implementation of RA 6655 and RA 6728 in 1988 and 1989, the Philippines has evidently experienced rising gross enrollment rates in secondary school [Revilla and Estudillo 2016]. This is indicative of the positive impact of the two policies on enrollment.

It is worth noting that the Philippine secondary education system has recently gone through another major reform. In 2013, the government passed the Enhanced

Basic Education Act or the K to 12 program which extends secondary education from four to six years. Hence, the country's education system now follows the basic 6-6-4 structure: six years of primary, six years of secondary, and six years of undergraduate. Pre-primary and basic education are compulsory, while public pre-primary, basic, and higher education are tuition-free.

Given this structure and the year of implementation of our major reforms, the cut-off year in our regression discontinuity design should be the year of birth of those individuals who were at least in fourth year high school or around 15 years old in 1989. Thus, those individuals born in and after 1974 are part of our treatment group (beneficiaries of the reform), while those born before 1974 are part of our control group (non-beneficiaries). It is important to mention that the beneficiaries of the program are those who entered the labor force after the economic liberalization in 1986 and, thus, were able to benefit from the rising returns to education due to liberalization.

3. Impacts of education policies

One commonly used method in impact evaluation of education policies is the randomized control trial (RCT). Using this method, Duflo, Dupas, and Kremer [2021] show that Ghana's scholarship program increases educational attainment by 1.3 years and the probability of completing secondary school by 55 percent. The recipients are also more likely to increase their earnings significantly. For vocational students, total earnings rise by about 19 percent, while their rate of returns to education is around 13 percent.

Further, several studies that use instrumental variables (IV) have been conducted to analyze returns to schooling. For instance, Acemoglu and Angrist [2001] estimate the impact of compulsory schooling laws on earnings using quarter of birth (i.e., birth month falls on first, second, third, or fourth quarter of the year) and differences in compulsory attendance and child labor laws across the US as IV. They reveal that a year of compulsory education raises annual earnings of students by approximately ten percent.

Finally, the regression discontinuity design is another method frequently applied in the analysis of education reforms. Filmer and Schady [2014] use sharp regression discontinuity design to explore the effects of a three-year scholarship program in Cambodia. Results indicate a substantial increase in schooling attainment of 0.6 years. However, they show no significant impact on employment and earnings. The study of Ozier [2018] on the impact of secondary school completion on employment in Kenya reveals that men in their 20s, who have completed secondary school, are 50 percent less likely to be in low-skill self-employment. The likelihood of formal employment is positive, although insignificant, in all specifications. In the case of Uganda, Keats [2018] mentions that the universal primary education reform increases women's educational attainment by 0.6 years and improves women's employment outcomes. To be specific, additional schooling increases the

probability of working by 9.2 percent, of having salaried work by 33 percent, and of receiving cash payment by 13 percent.

In the Philippines, analysis of schooling policies and outcomes that utilize experimental and quasi-experimental approaches are still limited. For instance, Maluccio [1998] exploits distance to secondary school as a main instrument in analyzing returns to education in the Bicol region of the Philippines. He observes that estimates of returns to schooling increase substantially when instruments are used to address the endogeneity of schooling. His dataset, however, is not nationally representative. Meanwhile, Sakellariou [2006] uses a national survey dataset from the Philippines in 1999 to examine the causal effect of schooling on wages. For his IV method, he uses the implementation of free secondary schooling policy in 1988 and secondary enrollment levels when the individual was 12 years old as instruments. Consistent with previous evidence, he finds that IV estimates are typically higher than ordinary least squares (OLS) estimates. He specifies that returns to education are around six to eight percent for OLS and 16 percent for IV. The aim of this paper is to supplement these earlier findings using an RDD in the Philippine context.

4. Empirical strategy and data

4.1. Empirical strategy

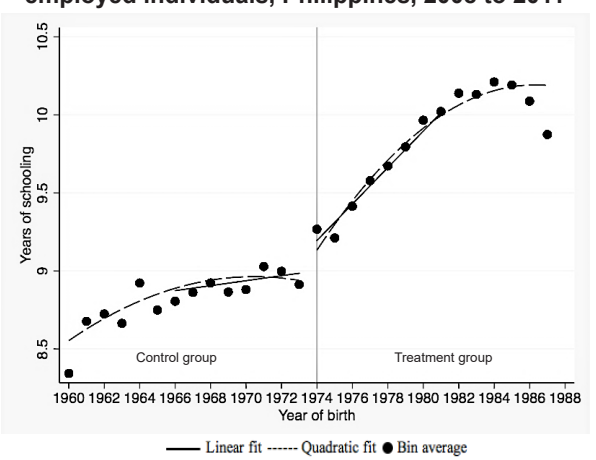
The goals of the study are, first, to investigate the relationship between the free and subsidized secondary education policies and years of schooling attainment, and second, to examine the causality between educational attainment and labor market outcomes (i.e., formal work income and informal work income). However, the main challenge in these kinds of analyses is the endogeneity of schooling. Essentially, this means that crucially important observed and unobserved factors (such as ability, IQ, parental characteristics, etc.) are captured in the error term and their impacts may confound those of years of schooling. This problem may lead to biased estimates of the regression coefficients.

To address this issue, we employ the regression discontinuity design (RDD), which is a quasi-experimental method that measures causal effects of interventions. The main intuition behind the RDD is that those observations near a certain cut-off or threshold are, on average, similar between control and treated groups in most respects (i.e., motivation, exposure to economic and environmental factors, etc.) and are made different solely because of the intervention. Hence, if outcomes exhibit a discontinuity at the cut-off, it might be reasonable to infer that this is due primarily to the intervention. In other words, outcomes would be continuous if it were not for the policy. One limitation of the RDD is that the effect is strictly evaluated only around the threshold. Nonetheless, this method has gained popularity in empirical research in recent decades.

In our estimation of the causal effect of an additional year of schooling, we take advantage of the timing of the free public secondary education and GASTPE reforms to conduct an RDD. Our running variable in this case is year of birth, which is considered exogenous and randomized (as an individual cannot choose or manipulate his or her year of birth).[1] We mention that in all our calculations, years of birth are normalized and re-centered at the discontinuity so that coefficients may be interpreted directly. As for our cut-off (c), we use the year of policy implementation (1989) as basis for selection. Children born in or after 1974 are aged 15 or younger in 1989 and are, thus, able to take advantage of the reforms (treated group). We note that in 1989, children at age 15 are normally at their fourth and last year in high school. Conversely, those born before 1974 are aged 16 or older in 1989 and are expected to have completed secondary school (control group). This older cohort has limited exposure to the policy.

Given our cut-off of 1974, we establish our control group as the cohort at the left-hand side of the cut-off that did not receive treatment and our treatment group as the cohort at the right-hand side that received treatment (Figure 1).

FIGURE 1. Fit of the first stage regression: Year of birth and education, employed individuals, Philippines, 2008 to 2011



Note: Figure drawn using data from the Annual Poverty Indicators Survey 2008 and 2011.

[1] We argue that there is low likelihood of manipulation of year of birth around the cut-off since the Philippine basic education system requires the birth certificate upon enrollment to Grade 1 to verify that the child enters primary school at the required age. In addition, data from the World Bank show that the percentage of primary school repeaters in the Philippines is lower than the world average. In 1989, the percentage of primary school repeaters among girls are 2.0 percent in the Philippines and 6.4 percent in the world, while the percentage among boys are 1.6 percent in the Philippines and 7.7 percent in the world. The same trend persists a decade later. These information ensure that individuals are less likely to move from one side of the cut-off to another [UNESCO Institute for Statistics 2020].

In hindsight, as individuals on the left-hand and right-hand side of the cut-off have similar features and their year of birth is exogenous, the implementation of RA 6655 and RA 6728 yields variations in highest grade completed across age groups, and that is as good as randomized [Lee 2008]. Our RDD hinges on this key assumption. In particular, we follow a fuzzy RDD. In a fuzzy RDD setting, treatment assignment does not mean that individuals actually got treated. This means that there may be some observations at the right-hand side of the cut-off that are untreated and some at the left-hand side that are treated.[2] For instance, if some individuals who are born before 1974 experience a delay in schooling, then they might have been able to avail themselves of the reforms. Likewise, there may be individuals born after 1974 who did not take advantage of the programs. Examples are those who chose to attend expensive private school despite the availability of free public school and subsidized private school. Thus, the probability of treatment jumps by less than 1 at the cut-off [Imbens and Lemieux 2008].

Fuzzy RDD provides a local average treatment effect (LATE), which means that the impact is estimated only for a group of compliers or subgroup of beneficiaries (i.e., in this case, those who avail the free and subsidized schooling upon its implementation). The formal model for the causal effect of an additional year of schooling in the fuzzy RDD is:

$$\tau_{FRD} = \frac{lim_{x\downarrow c} E\,[Y \mid Birthyear = x] - lim_{x\uparrow c} E\,[Y \mid Birthyear = x]}{lim_{x\downarrow c} E\,[Sch \mid Birthyear = x] - lim_{x\uparrow c} E\,[Sch \mid Birthyear = x]} \quad (1)$$

Equation 1 denotes that the causal impact, τ_{FRD}, is the ratio of (i) the difference in the outcome from a regression on the treatment-determining or running variable (year of birth) and (ii) the difference in the treatment (schooling) from a regression on the running variable. Both differences are estimated with respect to the cut-off [Keats 2018].

Hahn, Todd, and Van der Klaauw [2001] show that τ_{FRD} can be estimated using an instrumental variables (IV) approach (i.e., two-stage estimation). In our analysis, we employ the IV two-stage least squares (2SLS) to analyze the impact of schooling on income. The causal effect, τ_{FRD}, is equivalent to the estimator β_{FRD}, provided that the bandwidth and order of the polynomial are the same in both the first and second stages. Correspondingly, the set of equations in the IV 2SLS is:

$$Y = \alpha + \beta_{FRD}\,\widehat{Sch} + \varepsilon \quad (2)$$

$$Sch = \gamma + \delta Z + g\,(Birthyear - c) + v \quad (3)$$

Equation 3 represents the first stage, where *Sch* refers to years of schooling and *Z* is a dummy variable that takes the value of 1 if birthyear ≥ 1974 and 0 if

[2] This is in contrast to sharp RDD where probability of assignment jumps from 0 to 1 at the cut-off.

birthyear < 1974. Note that Z is exogenous and also serves as our instrumental variable. The regression parameter δ captures the impact of Z on *Sch*. We expect δ to be significant to satisfy the correlation condition in the 2SLS. This means that the effect of our IV (Z), which depends on our running variable (*Birthyear*), is only through the treatment variable (*Sch*). In Equation 2, our second stage, we specify Y as the outcome of interest (*income*) and $\widehat{Sch}$ as the predicted values of *Sch* from the first stage. $\widehat{Sch}$ is now independent of the error term (i.e., no longer endogenous) since we estimate it using an exogenous IV that is not correlated with the error term from the main equation. Importantly, our parameter of interest β_{FRD} represents the causal effect of an additional year of schooling on the outcome. Finally, $g(\cdot)$ denotes the polynomial function under consideration, given our cut-off year (c = 1974), and v and ε represent the error terms for the first and second stage.

Further, two critical aspects of the RDD approach are the choice of bandwidth (data window) and polynomial specification. Several methods may be undertaken to determine the optimal bandwidth h^* and the order of the polynomial. In our study, we use the Imbens and Kalyanaraman (IK) approach, which suggests that the optimal bandwidth should minimize the mean squared error [Imbens and Kalyanaraman 2012]. Based on this minimization criterion, IK derived a plug-in equation that estimates the optimal bandwidth in the fuzzy RDD setting. Calonico et al. [2017] note that the IK method works well in realistic settings. To estimate h^* and the coefficient on h^*, we utilize the *rdbwselect* and *rdrobust* commands in Stata which are based on an upgraded version of the IK bandwidth selection approach developed by Calonico et al. [2017].[3] This upgraded version takes into consideration some crucial aspects of our study, including adjustments in estimates and biases when adding covariates, execution time for large sample sizes, and bandwidth selection options for fuzzy RDD.

To determine the order of the polynomial, Lee and Lemieux [2010] emphasize that examining near the cut-off is better because this distance provides higher certainty that observations at the left-hand and right-hand side are similar, except for the exposure to the treatment. In this scenario, the left-hand side group better represents the counterfactual state of not having the treatment. If we estimate close to the cut-off, the number of polynomial terms needed for estimation decreases (i.e., local linear specification). Local linear regression is shown to have attractive properties and proven to be rate optimal[4] [Porter 2003].

In our analysis, we present results only from the optimal bandwidth. We mention, however, that the results from other nearby bandwidths, with linear and

[3] For the IV estimation, we conducted both direct *rdrobust* and manual IV 2SLS. The results across both methods, including the coefficients and significance of coefficients, were consistent. To organize our presentation for both stages, we opted to present the results from the manual IV 2SLS because *rdrobust* does not show the first stage results in detail. Conducting manual IV 2SLS in addition to *rdrobust* also serves as a robustness check.

[4] The optimal rate denotes that the bias is reduced to a level not worse than that commonly found in non-parametric conditional mean estimation [Porter 2003].

quadratic specifications, are generally similar to those of the optimal bandwidth. This verifies the consistency of our findings and contributes as robustness checks. These additional tables are available upon request from the authors.

As summarized by Keats [2018], the validity of fuzzy RDD estimates hinges on the following assumptions. First is the exogeneity of the treatment status. There should be no manipulation in the treatment status of individuals. Second is the smoothness assumption, which ensures that factors that may elicit effects on both educational attainment and outcomes vary smoothly across the threshold. Third, and last, is the significance of β_{FRD}. This means that the additional year of schooling solely and significantly affects the changes in outcomes. As our model addresses the endogeneity issues and tests of assumptions, our estimates could effectively deliver causal effects.

4.2. Data

4.2.1. Datasets

In our main analyses, we utilize the Annual Poverty Indicators Survey (APIS) conducted by the Philippine Statistics Authority (PSA). The APIS is a nationally representative survey that collects household-level and individual-level information on the socioeconomic characteristics and living conditions of Filipinos. The sampling design of the earlier APIS (i.e., 2008 to 2011) is based on the 2003 master sample for household surveys derived from the 2000 Census of Population (Census). It follows a three-stage scheme. The first and second stages are the selection of primary sampling units (PSUs) and sample enumeration areas (EAs). The PSUs and EAs are chosen with probability proportional to the number of households in the Census. The third and final stage is the selection of sample housing units using systematic sampling (Philippine Statistics Authority [2008, 2011, 2017]).

To increase our sample size and reduce noise, we pool data from both the APIS 2008 and 2011.[5] As estimates in the IV approach, while consistent, may be biased, a large sample size is crucial [Angrist and Krueger 2001]. In total, the APIS 2008 has 40,613 households and 190,171 individuals, while the APIS 2011 has 42,063 households and 193,097 individuals. We extract and calculate our individual-level variables, such as years of schooling, employment status, income, age, year of birth, region, location, and gender, from our pooled dataset.

Meanwhile, we choose available data on father's and mother's educational attainment and household location of residence (i.e., urban or rural) to test the smoothness assumption. As mentioned earlier, these selected variables should vary smoothly across the cut-off to ensure that the policies only affect individual

[5] APIS 2008 and 2011 were the full datasets available to us (authors) when the study was conceptualized in 2017. The datasets have a complete set of variables on employment and income, include geographical codes up to the barangay level, and have large sample size (>190,000 individuals) unlike other APIS rounds that we were able to observe at that time.

schooling (our endogenous variable of interest) and that schooling solely drives changes in income. If these other variables jump across the cut-off, then the policies or certain events in 1974 may have also affected other factors which can later contribute to changes in income. As the reforms primarily impact schooling attainment, parental characteristics and location should not vary significantly across the cut-off and, hence, should not affect our long-term outcomes. We again use the pooled APIS 2008 and 2011 to find the educational attainment of parents whose children are born within a given bandwidth. For location of residence, we use only APIS 2011 since APIS 2008 does not have data on urban residence. Lastly, one way to verify the significance of the jump across our cut-off is to find evidence of discontinuity in other datasets. In this case, we use the APIS 2017 (the latest dataset available as of writing).

4.2.2. Years of schooling calculation

To calculate the years of schooling of an individual, we follow a modified version of Barro and Lee's [1993] categorization. Table 1 presents the schooling categories and corresponding years of education and completed grade levels. We consider the economically active population (i.e., those who are 25 years old and above or those who are 24 years old and below but are no longer attending school) in our computations. We note that Filipino households commonly finish investments in children's schooling at age 24.[6]

TABLE 1. Educational attainment levels, Philippines

Category	Years of schooling	Highest grade completed
No schooling	0	No grade completed, Nursery, Kinder, Preparatory
Partial primary	1	Grade 1
	2	Grade 2
	3	Grade 3
	4	Grade 4
	5	Grade 5
Complete primary	6	Elementary graduate
Partial secondary	7	1st year high school
	8	2nd year high school
	9	3rd year high school

[6] Based on Section D1 of the APIS 2008 and 2011 questionnaire, the question on schooling status is asked only among children aged 3 to 24 years old. Hence, we are able to capture those who are no longer attending school in this age group. However, if an individual is 25 years old or older, no variable indicates his or her schooling status. Thus, we consider all individuals aged 25 and above and assume that most of them have completed their schooling and have entered the labor force.

TABLE 1. Educational attainment levels, Philippines (continued)

Category	Years of schooling	Highest grade completed
Complete secondary	10	High school graduate
Partial tertiary	11	1st year post-secondary; 1st year college
	12	2nd year post-secondary; 2nd year college
	13	Post-secondary graduate; 3rd year college
Complete tertiary	14	4th year college or higher
	15	With some units earned or enrolled in graduate school

Note: Adapted from Barro and Lee [1993].

4.2.3. Employment classification

Our employment classification is based on the work status of individuals in the last six months (i.e., January to June 2008 for APIS 2008 and January to June 2011 for APIS 2011). Broadly, an individual is employed if he or she reports working on a job or business in that given time period.

We then classify employment into formal or informal. The formal sector includes corporations and partnerships, cooperatives and foundations, single proprietorships with employment of ten and over, and single proprietorships with branches ["2010 annual survey of Philippine business and industry - construction sector : final results" 2013]. Based on the APIS questionnaire, formal sector workers are mostly those in private households, private establishments, and government offices or corporations. Likewise, they receive wage or salary on a regular basis along with social security provisions. In contrast, the informal sector includes household unincorporated enterprises, which may be informal own-account enterprises or enterprises of informal employers. These establishments do not hire employees on a permanent basis. They may also employ unpaid family members especially women and children ["Informal sector (operational definition)" n.d]. Based on the APIS questionnaire, informal sector workers are largely self-employed without any employee and employed in own family-operated farm or business.

4.2.4. Income calculation

We calculate per capita income based on an individual's type of employment and sources of income. For formal workers or wage earners, income is computed by adding *basic salaries and wages* and *allowances, honoraria, tips, etc.* For informal workers or non-wage earners, income is estimated by dividing *family's total entrepreneurial and other income* by the *number of non-wage earners in the family*. We impute a worker's non-wage income based on the *family's total entrepreneurial and other income* since these data are not available at the individual-level. On a final note, consistent with Mincer's earnings function, we use the logarithm (log) of income in the regressions to deal with outliers.

5. Results and Discussion

The following tables provide our estimates of program effects. We tackle this section by first analyzing the effect on schooling attainment using *t*-test and then evaluating its downstream effects on income across sectors and genders using RDD.

5.1. Effect on schooling

5.1.1. Schooling of members of the labor force

Here we present the effect of the policies on schooling of those in the labor force (employed and unemployed) using *t*-test (Table 2). The *t*-test is a hypothesis test that determines if the difference in means of two groups is statistically different from 0. We utilize the pooled APIS 2008 and 2011 for two sample bandwidths: bandwidth 8 (year of birth: 1966 to 1981) and bandwidth 12 (year of birth: 1962 to 1985). As a demographic overview, when we compare the control and treatment groups in these bandwidths, on average, the control group is 8 to 12 years older than the treatment group. In terms of gender distribution, the proportion of men equals the proportion of women (both at around 50 percent). Meanwhile, based on the *t*-test, the difference in average years of schooling between the control and treatment groups are significant at the one percent level. This means that the average years of schooling of the treated cohort, who benefited from the policy, is statistically higher compared to that of the untreated cohort, who were not exposed to the program. Specifically, for bandwidth 8, years of schooling of the treatment group is 9.61 years, while that of the control group is 8.93 years (0.68-year difference). For bandwidth 12, average years of schooling is 9.80 for the treated and 8.89 for the control (0.91-year difference).

Both women and men exhibit significant increase in years of schooling after policy intervention. In particular, for bandwidth 8, men in the control group have 8.61 years of schooling while those in the treatment group have 9.25 years. Similarly, women in the control group have 9.24 years of schooling while those in the treatment group have 9.98 years. In addition, for bandwidth 12, men in the control group have 8.58 years of schooling while those in the treatment group have 9.42 years. Meanwhile, women in the control group have 9.20 years of schooling while those in the treatment group have 10.19 years. The same rising trend in schooling attainment is true among women and men employed in the formal and informal sectors.

The results imply that the treatment group indeed benefited from the free and subsidized secondary schooling reforms. Decline in the relative price of schooling is the most important pathway through which the reform affect household investments in schooling. First, with the reform, the relative price of schooling declines vis-à-vis other goods (i.e., substitution effect) which lead to the substitution of schooling for other goods, leading to more "purchases of schooling" or higher investments in schooling [Tiongson 2005]. Second, the

decline in the price of schooling leads to increases in household purchasing power (i.e., income effect) that enables household to purchase more schooling. Since schooling is a normal good, the substitution effect and income effect are reinforcing which means that with the reform households will no doubt increase investments in schooling.

Moreover, we note that the average years of schooling for both bandwidths are still less than 10 years. This means that children leave school around their fourth year in high school or right after. They are not able to finish basic education nor proceed to university. This is problematic because individuals in developing countries should acquire more years of schooling to compensate for the low quality of education that they receive [Fasih 2008].

We emphasize that the passing of RA 6655 and RA 6728 substantially improved schooling attainment of recipients. However, the policies are apparently not enough to encourage the most disadvantaged students to stay in school. It appears that complementary programs that address the persisting demand and supply side issues in education should be in place.

TABLE 2. Effect of free and subsidized secondary schooling policies on schooling, by bandwidth, Philippines, 2008 to 2011

		Bandwidth					
		8 (Year of birth: 1966 to 1981)			12 (Year of birth: 1962 to 1985)		
		Control	Treatment	*t*-test	Control	Treatment	*t*-test
Panel A: Demography							
Age	*mean*	40	32	8***	42	30	12***
	sd	(2.70)	(2.75)	(0.02)	(3.74)	(3.77)	(0.02)
	N	37,863	37,448	75,311	54,980	57,047	112,027
Male	*mean*	0.50	0.50	0.00	0.50	0.51	-0.01**
	sd	(0.50)	(0.50)	(0.00)	(0.50)	(0.50)	(0.00)
	N	37,863	37,448	75,311	54,980	57,047	112,027
Panel B: Education							
Years of schooling	*mean*	8.93	9.61	-0.68***	8.89	9.80	-0.91***
	sd	(3.80)	(3.76)	(0.03)	(3.84)	(3.73)	(0.02)
	N	37,863	37,448	75,311	54,980	56,735	111,715
Years of schooling | men	*mean*	8.61	9.25	-0.63***	8.58	9.42	-0.84***
	sd	(3.79)	(3.78)	(0.04)	(3.81)	(3.75)	(0.03)
	N	18,900	18,678	37,578	27,420	28,653	56,073
Years of schooling | women	*mean*	9.24	9.98	-0.73***	9.20	10.19	-0.99***
	sd	(3.78)	(3.70)	(0.04)	(3.85)	(3.67)	(0.03)
	N	18,963	18,770	37,733	27,560	28,082	55,642

TABLE 2. Effect of free and subsidized secondary schooling policies on schooling, by bandwidth, Philippines, 2008 to 2011 (continued)

		Bandwidth					
		8 (Year of birth: 1966 to 1981)			12 (Year of birth: 1962 to 1985)		
		Control	Treatment	*t*-test	Control	Treatment	*t*-test
Years of schooling | formally employed	*mean*	9.57	10.23	-.54***	9.53	10.42	-.89***
	sd	(3.83)	(3.75)	(.05)	(3.88)	(3.70)	(.03)
	N	16,208	16,677	32,885	23,136	25,664	48,800
Years of schooling | informally employed	*mean*	8.14	8.68	-.54***	8.12	8.71	-.59***
	sd	(3.71)	(3.72)	(.05)	(3.75)	(3.71)	(.04)
	N	13,888	10,923	24,811	20,896	14,891	35,787
Years of schooling | men, formally employed	*mean*	9.06	9.64	-0.58***	9.04	9.76	-0.72***
	sd	(3.67)	(3.65)	(0.05)	(3.72)	(3.61)	(0.04)
	N	10,425	11,018	21,443	14,766	16,895	31,661
Years of schooling | women, formally employed	*mean*	10.48	11.38	-0.90***	10.41	11.70	-1.29***
	sd	(3.94)	(3.68)	(0.07)	(4.00)	(3.53)	(0.06)
	N	5,783	5,659	11,442	8,370	8,769	17,139
Years of schooling | men, informally employed	*mean*	7.86	8.26	-0.40***	7.83	8.33	-0.50***
	sd	(3.78)	(3.75)	(0.06)	(3.78)	(3.72)	(0.05)
	N	7,509	6,218	13,727	11,201	8,809	20,010
Years of schooling | women, informally employed	*mean*	8.47	9.24	-0.77***	8.45	9.26	-0.81***
	sd	(3.60)	(3.61)	(0.07)	(3.69)	(3.62)	(0.06)
	N	6,379	4,705	11,084	9,695	6,082	15,777

Note: Datasets used are the Annual Poverty Indicators Survey 2008 and 2011. Standard deviations in parentheses. ***, **, and * indicate significance at the one, five, and ten percent levels, respectively.

5.1.2. Schooling of employed individuals

As part of our RDD, we run the first stage regression which shows the effect of the policies on the schooling of employed individuals only. The estimates show that beneficiaries of the policies attain significantly higher years of schooling compared to non-beneficiaries (Table 3). Specifically, Panel A of Table 3 shows that among the employed, within the optimal bandwidth, exposure to the program leads to about 0.162 to 0.230 more years of schooling. The outcomes are statistically significant at the one and five percent significance level and are consistent with the earlier *t*-test. Graphically, the jump in years of schooling is evident at the 1974 cut-off year (Figure 1).

To explore the variation of the effect on schooling, we disaggregated our sample by sector and gender. Interestingly, the policies have no significant effect on the schooling of formally employed individuals (Panel B, Table 3) but have significant impact on the schooling of the informally employed sample (Panel C, Table 3).

To further break this down, we find statistically significant evidence that men who are currently employed in the formal sector have benefited more in the programs with 0.259 to 0.309 more years of education based on the optimal bandwidth (Panel D, Table 3). On the contrary, the policies appear to have exerted no significant effect on the schooling of formally employed women (Panel E, Table 3).

The results in the informal sector are quite different from those found in the formal sector. Panel F of Table 3 indicates that the policies did not exert significant impact on schooling of currently employed men in the informal sector. In contrast, Panel G of Table 3 reveals that the policies have exerted a statistically significant rise in schooling attainment of women workers in the informal sector. The increase is anywhere between 0.586 and 0.694 years of schooling based on the optimal range.

Based on these findings, different subgroups of women and men respond differently to changes in the price of education (i.e., different price elasticity of demand). We highlight that in the formal sector, employed men appear to have benefited more from the free and subsidized education than employed women, while the opposite is true in the informal sector.

TABLE 3. First stage estimates (IV 2SLS): Effect of free and subsidized secondary schooling policies on schooling, Philippines, 2008 to 2011

Dependent variable: Years of schooling	*Panel A Sample: Employed in the formal and informal sector*		*Panel B Sample: Employed in the formal sector*	
Z	0.230***	0.162**	0.18	0.073
	(0.056)	(0.065)	(0.131)	(0.11)
Optimal Bandwidth	13	9	5	6
With controls	No	Yes	No	Yes
R-squared	0.019	0.111	0.004	0.095
No. of observations	91,173	64,530	20,478	24,714
	Panel C Sample: Employed in the informal sector		*Panel D Sample: Employed men in the formal sector*	
Z	0.435***	0.352***	0.309**	0.259*
	(0.11)	(0.118)	(0.143)	(0.141)
Optimal Bandwidth	7	6	5	5
With controls	No	Yes	No	Yes
R-squared	0.005	0.12	0.003	0.062
No. of observations	21,724	18,834	13,402	13,402

TABLE 3. First stage estimates (IV 2SLS) (continued)

Dependent variable: Years of schooling	*Panel E Sample: Employed women in the formal sector*		*Panel F Sample: Employed men in the informal sector*	
Z	-0.149 (0.217)	-0.226 (0.199)	0.247 (0.16)	0.184 (0.165)
Optimal Bandwidth	5	5	7	6
With controls	No	Yes	No	Yes
R-squared	0.009	0.06	0.003	0.127
No. of observations	7,076	7,076	11,989	10,361
	Panel G Sample: Employed women in the informal sector			
Z	0.694*** (0.205)	0.586*** (0.192)		
Optimal Bandwidth	5	5		
With controls	No	Yes		
R-squared	0.01	0.097		
No. of observations	7,077	7,077		

Note: *Z* is a dummy variable that takes the value of 1 if birth year ≥ 1974 and 0 if birth year < 1974. Years of birth were normalized based on the cut-off (1974). Linear specification includes year of birth and *Z* × year of birth. Datasets used are the Annual Poverty Indicators Survey 2008 and 2011. Control variables include male and regional dummies. Standard errors in parentheses are clustered at the year of birth level. ***, **, and * indicate significance at the one, five, and ten percent levels, respectively.

5.2. Effect on income

We analyze the returns to schooling of employed individuals using fuzzy RDD. While returns to education has been widely studied since the late 1950s, most analyses focus on high-income countries and only few on developing economies [Peet, Fink, and Fawzi 2015]. The few earlier estimations argue that workers in developing countries receive higher returns to education than those in more developed countries (Card [2001]; Duflo [2001]). Also, previous studies mention that estimated returns using the IV approach are commonly higher than those using OLS (Card [1999]; Sakellariou [2006]). Here we provide additional empirical evidence on returns to schooling in a developing country.

Based on our optimal bandwidth, an additional year of schooling increases income by about 17.2 to 23.0 percent, with high level of statistical significance (Panel A, Table 4). Thus, in the Philippines, higher levels of education, brought forth by secondary schooling policies, yield significantly higher income. Consistent with previous research, it is still economically wise to obtain more years of education. The results also imply that the benefits of free and subsidized schooling can only be realized if the individual is employed because labor income is by far the most important source of individual income.

TABLE 4. Second stage estimates (IV 2SLS): Effect of schooling on income, Philippines, 2008 to 2011

Dependent variable: log of Income	*Panel A Sample: Employed in the formal and informal sector*		*Panel B Sample:Employed in the formal sector*	
Years of schooling	0.172*** (0.052)	0.230** (0.095)	0.572 (0.352)	0.858 (1.131)
Optimal Bandwidth	13	9	5	6
With controls	No	Yes	No	Yes
No. of observations	91,172	64,529	20,478	24,714
	Panel C Sample: Employed in the informal sector		*Panel D Sample: Employed men in the formal sector*	
Years of schooling	0.104** (0.053)	0.120* (0.071)	0.361** (0.145)	0.367** (0.177)
Optimal Bandwidth	7	6	5	5
With controls	No	Yes	No	Yes
No. of observations	21,724	18,834	13,402	13,402
Dependent variable: Years of schooling	*Panel E Sample: Employed women in the formal sector*		*Panel F Sample: Employed men in the informal sector*	
Years of schooling	-0.246 (0.708)	-0.091 (0.303)	0.04 (0.132)	0.014 (0.191)
Optimal Bandwidth	5	5	7	6
With controls	No	Yes	No	Yes
No. of observations	7,076	7,076	11,989	10,361
	Panel G Sample: Employed women in the informal sector			
Years of schooling	0.158** (0.064)	0.170** (0.073)		
Optimal Bandwidth	5	5		
With controls	No	Yes		
No. of observations	7,077	7,077		

Note: *Z* is a dummy variable that takes the value of 1 if birth year ≥ 1974 and 0 if birth year < 1974. Years of birth were normalized based on the cut-off (1974). Linear specification includes year of birth and *Z* × year of birth. Datasets used are the Annual Poverty Indicators Survey 2008 and 2011. Control variables include male and regional dummies. Standard errors in parentheses are clustered at the year of birth level. ***, **, and * indicate significance at the one, five, and ten percent levels, respectively.

5.2.1. Effect on income by sector

For an in-depth analysis, we explore where the change in income comes from by dividing our employed sample into formally and informally employed workers by gender.

An additional year of schooling has no significant effect on income of formal wage earners (Panel B, Table 4) but has significant effect on income of informal wage earners (Panel C, Table 4). In particular, an additional year of education increases informal income significantly by 10.4 to 12.0 percent based on the optimal bandwidth. This may indicate that the contraction of the formal sector and low labor demand between 2008 and 2011 forced individuals to venture into the informal sector, even those who are more educated. As data from the Asian Development Bank (ADB) and International Labor Organization (ILO) [2011] reveal, employment in the formal sector contracted while employment in the informal sector, particularly for women, grew during the crisis.

The differences in returns to schooling of individuals in the two sectors are consistent with previous literature which show that the benefits of schooling may be distributed unequally [Fasih 2008]. In the case of the Philippines, the contraction of the aggregate economy during the Asian economic crisis makes the informal job market buoyant, making returns to schooling disproportionately increase in the sector. In the next subsection, we explain the variation in our estimates by investigating the returns to schooling across genders in each sector.

5.2.2. Effect on income by sector and gender

Based on Table 2, informally employed men have the lowest average years of schooling both before and after policy implementation (i.e., 7.83 and 8.33 years for bandwidth 12). In contrast, formally employed women have the highest grades of schooling at 10.41 years before the reforms and 11.70 years after. The educational attainment of informally employed women are almost comparable to that of formally employed men. These may indicate that the formal labor market could be less accommodating to women, even to the more educated ones, partly because of the cost associated with maternal leave, which is most likely borne by formal enterprises. Women may choose to work in the informal sector because they prefer jobs that are flexible which allow them to perform their task in home production. Indeed, in terms of employment, based on the LFS (2007 to 2011), the proportion of men working in the formal sector is consistently way higher than the proportion of women working in the formal sector ("TABLE 3.10 - Employed Persons by Class of Worker and Sex, Philippines: 2007 – 2011" [n.d]). We apply the same RDD strategy in our succeeding analyses of the causal effect of schooling on income gained by men and women in formal and informal occupations.

5.2.2.1. Effect on income in the formal sector by gender

The second stage estimates reveal that an additional year of schooling causes a 36.1 to 36.7 percent increase in the income of men employed in the formal sector (Panel D, Table 4). Moreover, there is no significant relationship between women's schooling and income in this case (Panel E, Table 4). These results

suggest that men in the formal sector appear to have benefited more from the policy by gaining more years of schooling and receiving higher earnings. These may also be reflective of how women in the formal sector are at a disadvantage vis-à-vis men during this period. According to the ADB and ILO [2011], women in the Philippines suffered disproportionately during the global financial crisis for two reasons. First is that women have limited employment opportunities as gender disparities in employment and income have been observed even before the crisis began. Second, female-dominated industries, such as garments, electronics, and export processing zones, were hit the hardest by economic shocks. Most lay-offs occurred in these female-dominated industries. Regardless of schooling policies and educational attainment, if the formal labor market favors men over women, gender inequities in employment and income will continue to persist.

5.2.2.2. Effect on income in the informal sector by gender

The findings in the informal sector are quite the opposite of those found in the formal sector. Based on the optimal bandwidth in the second stage, there is no significant relationship between male schooling and income (Panel F, Table 4). Meanwhile, among women in informal occupations, an additional year of schooling significantly increases their income by about 15.8 to 17 percent (Panel G, Table 4).

These results may imply that the informal sector absorbed even the highly educated women who cannot be accommodated in the formal sector during aggregate economic contraction. This influx of women into informal work is consistent with the findings of ADB and ILO [2011] that when the crisis hit, women strongly felt the burden of meeting immediate family needs (i.e., food, water, and healthcare). Thus, they opted to engage in informal activities, either through self-employment, home-based work, small businesses, or other sidelines, to compensate for income loss and ensure family survival.

5.3. Gender segregation in employment

Wrapping up our discussion on the gender differences in income, we mention the common observation that women tend to settle for low-productivity, low-paying, or informal jobs and are not commonly promoted to higher positions in formal jobs even though Filipino women obtained more years of schooling than their male counterparts. According to the World Bank [2012], this phenomenon may be explained by two factors, namely care responsibilities and market failures.

First, women's productivity and earnings are affected by their household responsibilities and time allocation across activities. Gendered norms and traditions dictate that women should spend significantly more time in housework and care responsibilities than men. Thus, women are more likely to choose jobs with flexible working arrangements (i.e., part-time, informal, or casual work), which in turn offer lower wages. Men also generally spend more time in market

work than women. While the presence of small children in the family increases the amount of care by both men and women, women still clock in more hours than men. Thus, the high fixed costs of market work (i.e., fixed schedules and minimum required hours), particularly formal work, remain a burden for women, causing them to choose jobs that offer flexible schedules. In some cases, women may have to leave work completely.

In the Philippines, the expansion in employment opportunities, as a result of economic growth, has not been inclusive for women. Time-use patterns in domestic, care, and market work reveal gender-based work gaps. In domestic and care work, gendered norms lead women to spend more time in domestic and care work compared to men. Relatedly, in terms of market work, there is a low percentage of Filipino women in formal wage, non-agricultural employment. A higher percentage of women are engaged in vulnerable employment, which includes own account work and unpaid work in family businesses, relative to men [ADB 2013].

Second, market and institutional failures also affect women's choice of employment and employers' ability to assess women's skills and capacities. Market failures in labor market information, for instance, affect women's participation in formal sector jobs and employers' decision-making. Since women have low presence in certain job sectors, employers are not fully informed of their knowledge and skills. This means that employers are not aware of their potential work performance and will, thus, find it difficult to hire and promote more women.

Moreover, institutional failures in terms of infrastructure, especially transportation, lower women's access to economic opportunities due to longer travel time to work and decreased mobility. Poor women, who often reside in remote villages, settle for low-productivity and informal jobs due to the difficulty of traveling to cities or urban areas where better work opportunities are available. Similarly, if a woman is of reproductive age, she may find it difficult to apply for a formal sector job since the costs of maternal leaves may be borne as additional expenses by the company [World Bank 2012].

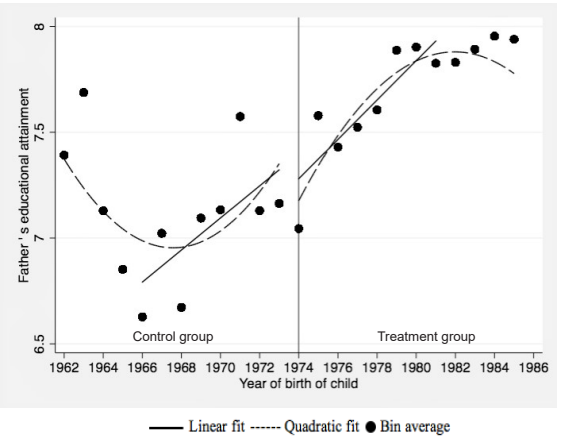
Based on data from the Philippines' LFS, the proportion of women in the informal sector rose from 39 percent in 2007 to 41 percent in 2011, while that of men in the same sector slid from 61 to 59 percent ["Table 3.10 - Employed Persons by Class of Worker and Sex, Philippines: 2007 – 2011" n.d.]. As mentioned earlier, these informal jobs are usually vulnerable and short-term. Workers do not receive social protection and are constantly at risk of being laid off as economic downturns occur. They likewise need to compete largely with new entrants who have been retrenched from the formal sector [ADB and ILO 2011]. Hence, our results also shed light on the need to protect workers in the informal economy, many of whom are women who strive to earn extra income for their families.

5.4. Smoothness assumption and evidence of discontinuity in other datasets

We validate our RDD by testing the smoothness assumption and finding similar discontinuity in other available datasets. For the smoothness assumption, we show that respondents' fathers' and mothers' education do not jump significantly across the cut-off (Figures 2 and 3). We similarly find no signs of discontinuity in individuals' urban/rural location (Figure 4). Since these variables vary smoothly across the cut-off, we verify that the policies only affect schooling and that schooling, in turn, primarily drives changes in our outcomes.

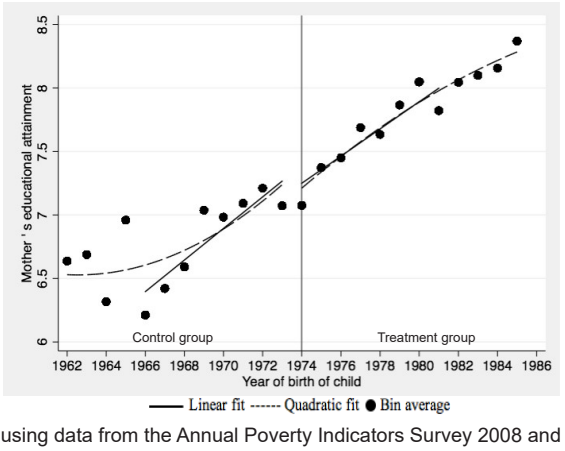
To provide supportive evidence of discontinuity in education, we use APIS 2017 and find that there is also a significant jump in schooling attainment at the cut-off (Figure 5). This means that the treatment group in this dataset also benefited from the policies.

FIGURE 2. Year of birth of child and father's education, Philippines, 2008 to 2011



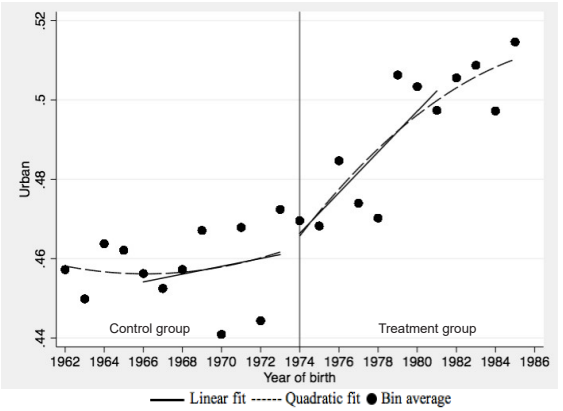
Note: Figure drawn using data from the Annual Poverty Indicators Survey 2008 and 2011.

FIGURE 3. Year of birth of child and mother's education, Philippines, 2008 to 2011



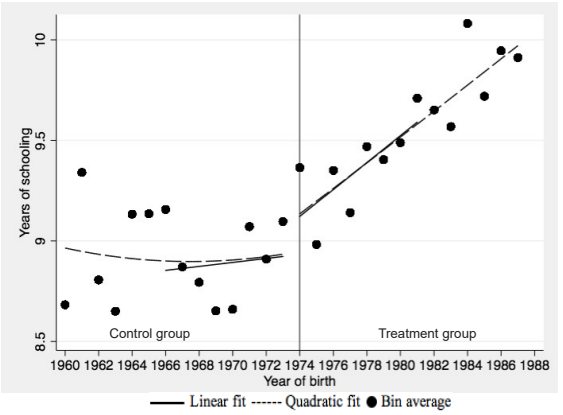
Note: Figure drawn using data from the Annual Poverty Indicators Survey 2008 and 2011.

FIGURE 4. Year of birth and urbanity, Philippines, 2008 to 2011



Note: Figure drawn using data from the Annual Poverty Indicators Survey 2011.

FIGURE 5. Fit of the first stage regression: Year of birth and education, Philippines, 2017



Note: Figure drawn using data from the Annual Poverty Indicators Survey 2017.

6. Conclusion

Schooling attainment remains low in developing countries and many programs were implemented to solve this problem. Free public and subsidized private secondary schooling has been implemented in the Philippines in 1988 and 1989. Through RA 6655, the government eliminated tuition and other school fees in public high schools. Similarly, through RA 6728, it provided tuition fee supplements and textbook funds to private high school students.

In this study, we conducted a rigorous assessment on the long-run impact of these policies on schooling attainment and income using an RDD. Briefly, this study found that the policies have significant positive impacts on schooling attainment and income.

First, beneficiaries of the policies attained significantly more years of schooling than non-beneficiaries. For instance, among members of the labor force, the treatment group gained 0.68 more years of schooling than the control group in bandwidth 8 (9.61 vs. 8.93 average years of schooling), indicating the effectiveness of the programs in enhancing schooling attainment. This rise in years of schooling after policy implementation is true for both women and men. In addition, the first stage estimates among employed individuals indicate an average increase of 0.162 to 0.230 years of education.

Second, in general, schooling significantly increases income. We noticed that an additional year of schooling increases income by about 17.2 to 23.0 percent among our sample of employed individuals after policy implementation. When we divided our sample of workers based on sector and gender, the results are quite different. We found that the policy had a significant impact on schooling attainment and returns to education of women in the informal sector and of men in the formal sector. Specifically, an additional year of schooling causally increases income of informally employed women and formally employed men by 15.8 to 17 percent and 36.1 to 36.7 percent, respectively. These results are observed although women employed in the informal sector attained a higher increase in schooling than men employed in the formal sector (based on the first stage estimates). This may imply that there are culture-driven gender roles and labor market imperfections that put women at a disadvantage when entering formal work.

The study points to the need for approaches that protect and support women workers (i.e., gender employment quotas in the formal sector, social protection provisions in the informal sector, flexible work schedule options, and provision of day care programs). It also emphasizes the importance of enhancing schooling reforms as they are deemed effective in making education more accessible for all.

To sum up, our results contribute to the limited literature on the long-term impact of basic education policies in developing countries. We conclude that the reforms encouraged school participation. Yet their downstream impact on earnings tend to vary across sectors and genders.

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Who benefits from Dual Training Systems? Evidence from the Philippines

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Rising youth unemployment rates have been increasingly recognized as a serious challenge in developing and advanced economies, suggesting a potential skills gap between the demand and supply of recent graduates. Effective dual education programs which utilize a combination of classroom instruction and practical skill training are usually presented as an approach to develop a skilled workforce and meet employers' demands. This paper analyzes data from a recent survey tracking graduates from the Philippines' Dual Training System (DTS), as well as from regular programs provided by technical vocational training institutes. The evidence suggests that the DTS has a significantly higher rate of returns on labor market earnings than regular, classroom-only vocational training programs, particularly among high school graduates who did not perform well academically during basic education. The magnitude of the impact of the DTS is also likely to increase in correlation with the intensity of the on-the-job component.

JEL classification: I21, J24, O15
Keywords: Philippines, skills, training systems, vocational education

1. Introduction

Rising youth unemployment rates have been increasingly recognized as a serious challenge in both developing and advanced economies, as the trend indicates a potential skills gap between workforce demands and recent graduates. Governments across the world have fostered and implemented a variety of policies to try to bridge this gap. Among them is the provision of subsidized workforce training.

While the provision of education contributes to the accumulation of general human capital, training in the workplace is designed to equip workers with

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specific job competencies (Becker [1962]; Mincer [1962]). When particularly skilled workers are not readily available from the labor market, companies must train current employees and source trainable new hires to develop their own human capital specific to their needs. Indeed, transitioning from school and vocational training to the workforce often requires developing appropriate hard and soft skills, which can take place through on-the-job training (OJT), apprenticeships, and other vocational programs. These transitional programs are typically implemented in companies where new employees can acquire critical skills, knowledge, and behaviors by working alongside experienced workers or trainees. Globally, studies demonstrate generally high returns to OJT in private firms (Bartel [1995]; Blundell et al. [1996]; Loewenstein and Spletzer [1999]; Booth et al. [2003]; Booth and Brian [2007]; Lynch [1992]; and Veum [1995]).

This paper evaluates the experience of a particular type of subsidized workforce training involving OJT, known as the dual training system (DTS) which originated in Germany. In the DTS, trainees build practical skills through OJT at companies while acquiring relevant theoretical knowledge at vocational training institutions. Since its initial application in Germany and other European countries, with time, many developing countries have shown an increasing interest in applying these types of programs for workforce training, with limited knowledge on their actual impact and applicability in these settings, as well as in its cost-benefit [Lee et al. 2016]. Indeed, while OJT or firm-level (or enterprise-based) training appears critical for industrial development in developed countries, identifying returns to such training is rare in developing country contexts (Schaffner [2001]; Yamauchi et al. [2009]; and Sekkat [2011]).

One of the developing countries that followed the DTS approach is the Philippines, and this paper analyzes the impact it has had on its graduates once they transition into the labor market. The Philippine case is interesting not only given the size of its youth labor market, but also because youth idleness, a term referring to young people who are neither employed, nor enrolled in education, nor in a training program, is among the highest in the world, applying to one in every four persons ages 15–24 in the Philippines [Rutkowski et al. 2016]. Similarly, there is manifested unsatisfaction from employers on the readiness of youngsters once they enter the labor market: the number of employers reporting difficulties hiring workers with relevant workforce skills has increased by 30 percent in the past six years, particularly among growing, innovative, and large-scale firms in the country [Acosta et al. 2017].

Originally adopted from the German model, the Philippine DTS was introduced in the 1980s through a joint project of the Southeast Asian Science Foundation and the Hans Seidel Foundation. After its debut in the Dualteach Training Center, the program's success led to a nationwide expansion in 1991. The Technical Education and Skills Development Authority (TESDA) is mandated to promote, coordinate, and administer the DTS as a form of enterprise-based technical and vocational education training (TVET).

Recent studies suggest significant premiums for enterprise-based training in the Philippines. The employment rate of enterprise-based training (including DTS) graduates has been consistently highest among all training modalities under TESDA (Di Gropello et al. [2010] and Orbeta and Esguerra [2016]). Moreover, a cost-benefit study found net benefits for firms offering the DTS programs relative to the direct costs incurred from program implementation [Mapa et al. 2016]. The same study also suggested differences in long-term productivity between the DTS-trained workers and non-DTS-trained workers, but did not estimate empirically such claim.

This study analyses the labor market returns to the DTS program in the Philippines by using tracking survey data provided by technical and vocational institutes (TVIs) in the country. The paper also analyses the differences in labor market outcomes between the DTS and regular program (RP) graduates from the same TVIs, without categoric implications of causal impacts considering randomized-control trial methods are not possible with the available data.

This paper is divided into six sections. The second section provides an overview of the Philippine DTS. The third section describes the analytical approach used to estimate the rate of private returns to the DTS. The fourth section details the tracking survey and samples. The fifth section examines the results of returns to the DTS, and the sixth section presents the conclusions of the paper.

2. Dual Training System in the Philippines

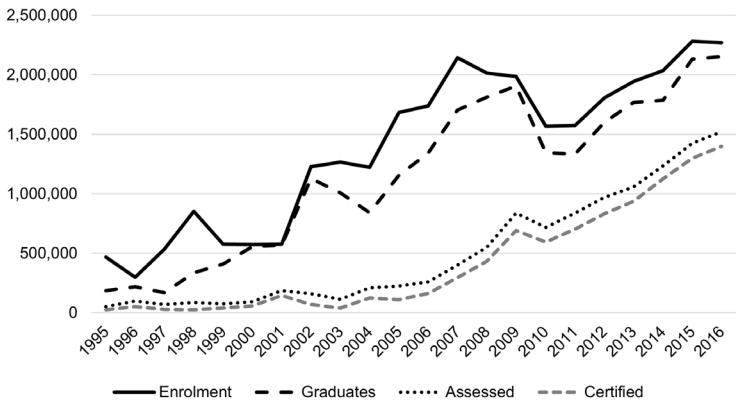
In the Philippines, TESDA was established in 1994 and mandated by law to formulate coordinated and fully-integrated technical education and skills development policies, plans, and programs.[1] TESDA administers competency assessments and certifications with the intent of professionalizing mid-skilled workers. It develops competency standards and qualifications, coupled with training standards and assessment instruments, which serve as a foundation for the registration, accreditation, and delivery of various programs. TESDA also provides equitable access and provision of programs to the growing number of TVET clients (Figure 1). It funds programs and projects for technical education and skills development and supports TVET institutions (TVIs) through trainer development programs, curriculum and materials development, career guidance and placement, and scholarship programs.

TESDA's vocational training programs are delivered in three modes of training, namely (a) institution-based (school-based and center-based), (b) enterprise-based, and (c) community-based. Among the three modes, the enterprise-based mode comprises the smallest share (Table 1). The composition of enrollment and graduation in 2016 demonstrates that institution-based training (delivered by

[1] Republic Act No. 7796, also known as the TESDA Act of 1994.

schools and TVIs) accounted for 51 percent and 49 percent of the total enrollment and graduates, respectively. Enrollment figures from 2010 to 2016 indicate an uptick in enrollees and graduates of the institution-based mode, which may be attributed to a 57 percent increase in the number of TVIs (TVIs totaled 4,733 in 2013, and a majority were private). The enterprise-based mode broadly maintained a relatively low share of approximately three percent.

FIGURE 1. Trend of TVET enrollment, graduates, assessed, and certified (1995–2016)



Source: Administrative data, many years, TESDA.

TABLE 1. TVET Enrollment and graduates by delivery mode (2010–2016)

Delivery Mode	2010		2013		2016	
	Number	Share	Number	Share	Number	Share
Enrollees	**1,568,617**	**100**	**1,572,131**	**100**	**2,269,665**	**100**
Institution-based	860,919	55	875,848	56	1,151,644	51
Enterprise-based	86,978	6	80,309	5	72,458	3
Community-based	620,720	40	615,974	39	1,045,563	46
Graduates	**1,344,371**	**100**	**1,332,751**	**100**	**2,151,236**	**100**
Institution-based	671,488	50	679,306	51	1,057,574	49
Enterprise-based	73,352	5	72,082	5	67,080	3
Community-based	599,531	45	581,363	44	1,026,582	48

Source: Administrative data, many years, TESDA.

There are three distinct program types within the enterprise-based mode: (a) apprenticeship, (b) learnership, and (c) the DTS. The DTS uniquely involves theoretical instruction and is jointly implemented by TVIs and companies, while apprenticeship and learnership programs predominantly provide skills training in TESDA-approved partner companies for a maximum of six or three months, respectively. In the DTS, schools and partner companies share the responsibility

of delivering well-coordinated learning experiences. Trainees spend about 40 percent of the total learning time in school and 60 percent in companies for hands-on training. The duration of the program varies depending on the complexity of the training content. On average, the DTS programs span a total of 1.5 to two years, consisting of about six months of in-school learning and ten months of in-company training. Trainees also receive an allowance of up to 75 percent of the minimum wage rate. Available statistics on the enterprise-based mode are limited, but the DTS accounts for about 40 percent of all enterprise-based programs regulated by TESDA, with apprenticeship and learnership programs accounting for 25 percent and 35 percent, respectively [Orbeta and Esguerra 2016].

The Philippine government offers tax incentives to encourage the participation of companies in the DTS. Per the Republic Act No. 7986,

> they shall be allowed to deduct from their taxable income the amount of fifty percent (50%) of the actual system expenses paid to the Accredited Dual Training System Educational Institution for the establishment's trainees, provided that such expenses shall not exceed five percent (5%) of their total direct labor expenses but in no case to exceed twenty-five million pesos (₱25 million) a year.

In 2015, 706 TESDA-accredited partner companies and 108 TVIs/schools were involved in delivering the DTS program [Mapa et al. 2016]. In addition to tax breaks, companies can reduce recruitment and training costs as well as maintenance costs. The rationale for the DTS is that skills gaps in training can be avoided as training investments respond directly to the needs of employers. Expected advantages for trainees include access to advanced technologies in industries as well as earnings during training.

Some TVIs assert that the DTS provides a smoother transition from training to employment. Absorption rates have ranged from 80 percent to 90 percent, with graduates often employed by the companies they received OJT.[2] This employment rate is exceedingly high compared to the overall employment of TVET graduates, which has remained around 65 percent with a trend of improvement in the last several years [Mapa et al. 2016].

3. Analytical approach

This study estimates and compares the labor market outcomes, such as wages and employment, of graduates from the DTS and other RPs. The analysis is based on a standard Mincerian model to estimate the labor market returns to the DTS as a function of salary and employment opportunities after graduation from these specific vocational training programs. Specifically, we analyze the

[2] Based on communications with TVIs such as MERALCO Foundation Institution (MFI), Dualtech, Don Bosco Tech, and Jacobo Z. Gonzales Memorial School of Arts and Trades.

associations between outcome variables, such as the natural log of labor earnings or employment probabilities, and explanatory variables, such as different modes of vocational programs and individual characteristics of graduates (such as years of schooling, work experience, final high school grades, and maternal education) using Mincerian-type regressions.

The survey analyzed in this study was conducted in the Philippines prior to the recent expansion of basic education to Grade 12, so TVI trainees are high school (HS) graduates who completed Grade 10 (or four years of junior HS). The analysis is performed on graduates from vocational programs. The study does not analyze the characteristics of those who did not graduate given data limitations; however, the dropout rate from these programs has remained low.

Associations between the natural log of labor earnings and characteristics, such as different modes of vocational programs and individual characteristics of graduates (such as years of schooling, work experience, final HS grades, and maternal education) are analyzed using Mincerian-type regressions. To account for variations across different training programs offered through the DTS or RPs, variables for the enrollment year and TVIs are controlled in the equation.

These calculations are estimated using ordinary least squares for wages or probit regressions for discrete labor market outcomes, such as employment incidence. The employment incidence is analyzed at two stages: (a) immediately after graduation from a vocational training program; and (b) at the time of tracking survey completion, which occurred several years after graduation from vocational training programs.

The specific equation applied is as follows:

$$Y_i = \alpha + \beta_1 DTS_i + \beta_2 X_i + \varepsilon_i \quad (1)$$

where Y_i is a labor market outcome (such as wage or employment), DTS_i is a controlled variable for enrolling in either the DTS (=1) or RPs (=0), and X_i is a set of other factors that may affect Y_i (for example, general average HS grade,[3] years of schooling, work experience, enrollment year, and a controlled variable for TVI).

In an alternative specification, the potential impact of general human capital on the DTS was also tested using a general average HS grade. The average HS grade is transformed into a standardized value[4] for analysis. This conditional hypothesis can be tested with an interaction term using the first equation and can be regarded as an adjustment to the slope coefficient on the HS grade for the DTS graduates.

$$Y_i = \alpha + \beta_1 DTS_i \times HSG_i + \beta_2 X_i + \varepsilon_i \quad (2)$$

[3] The average HS grade is a measure observable to all at the final stage of HS.

[4] The average HS grades (in raw score) take values of 0 to 100. By converting them into standardized *z*-scores, the observed values are expressed in terms of standard deviations from their means. They have a distribution with a mean of 0 and a standard deviation of 1. If the average HS scores are above the mean, the standardized value is positive. Scores below the mean result in negative standard scores.

Subsequently, the DTS graduate sample is analyzed in isolation to determine whether different aspects of the DTS program delivery are related to their labor market outcomes. The DTS programs are highly heterogeneous as a result of being offered in various industrial sectors to address occupation-specific skills. Since the TVIs partner with different companies, factors such as time allocation for in-school learning and in-company training (OJT), the intensity of OJT training, and the application of learning methods can vary.

A methodological challenge acknowledged by the study is the participants' selective enrollment in the DTS programs. Trainees who enter the DTS-specialized institutions are a select group that do not represent the population of vocational trainees in general. Only institutions that offer both the DTS and RPs are used in the survey sample so that comparison is feasible within an institution. Results should be taken with caution and interpreted as conditional associations rather than direct influences.

4. Data used for analysis and descriptive statistics

A tracking survey was conducted to collect information regarding the DTS and RP graduates and their labor market outcomes. The survey was conducted from January to March 2016 in Region III, Region IV-A, and the National Capital Region (NCR). Participants included 958 respondents who enrolled in the DTS or RPs in nine TVIs from the specified regions beginning from 2008. All participants subsequently completed the program.[5] Clustered random sampling was applied to randomly select former trainees from each of the chosen clusters or the TVIs.

The following four criteria are met by the selected TVIs: (a) both the DTS and RPs are in operation within the same institution, (b) trainees are assessed objectively when selected for the DTS, (c) records are maintained under good conditions for several years, and (d) they are located in Region III, Region IV-A, or the NCR.[6] The first condition is essential because the impact of the DTS relative to the RPs is estimated after controlling for institution-specific factors. Careful investigations identified nine TVIs that satisfy the four criteria (Table 2).[7]

Any trainees who did not graduate from their program were randomly replaced in the sample. The sampling randomly chose 20 trainees from the DTS and 20 trainees from the RPs within each TVI/enrollment cohort cell. Since the sample excluded those who did not complete their program for various reasons, the findings are conditional on having graduated from a program. As noted earlier, the

[5] Those who did not complete the programs in which they initially enrolled were randomly replaced in the sample.
[6] Historically the DTS was first adopted in Regions III and IV-A, which accounts for a relatively high number of TVIs that implement the DTS in those regions.
[7] The survey included the National College of Science and Technology (NCST) in Cavite, but the analysis dropped observations from the NCST because it was later found that the institution only has the DTS. Non-DTS courses were part of their college program, which are not comparable to the DTS.

graduation rate for TVET remained around 90 percent, with a relatively low drop-out rate in recent years. The completion rate was slightly higher for enterprise-based training programs compared to other programs.

TABLE 2. Sample TVIs, type, and sample size

Region	Name of TVI	Type	Size of TVI	Sampled former trainees	
				Original	After trimming
III	Gonzalo Puyat School of Arts and Trade	Private	Small	29	28
III	Jocson College	Private	Small	49	43
III	Provincial Training Center - Orion	Public	Large	160	150
III	Provincial Training Center - Tarlac	Public	Large	112	106
III	Regional Training Center - Mariveles	Public	Large	194	140
IV-A	Jacobo Z. Gonzales Memorial School	Public	Large	150	134
IV-A	Provincial Training Center Rosario	Public	Medium	85	80
IV-A	Quenas National Agricultural School	Public	Medium	18	10
NCR	MFI	Private	Large	145	142
Total				942	833

Source: DTS Tracking Survey Data 2015, World Bank.

The survey tracked individuals who graduated from vocational training programs several years prior and were already in the labor market. As a result, tracking activities involved a substantial amount of effort in contacting, locating, and interviewing the trainees in the sample.[8] Simultaneously, an institution survey was conducted to collect information from the sample TVIs on enrollment records, programs, and institutional costs.

The sample was screened and filtered based on the consistency between actual and reported programs in which trainees enrolled. The number of trainees from the Provincial Training Center in Mariveles, Bataan was substantially reduced from 194 to 140 due to survey implementation challenges and poorly maintained institutional records. The resulting effective sample size was 833, with 362 trainees from the DTS and 471 trainees from the RPs. A look at yearly enrollment numbers highlights a relatively stable balance between the DTS and RPs across the survey period (Table 3).

[8] The selected TVIs provided lists and contact information for the graduates who were randomly chosen for the survey sample.

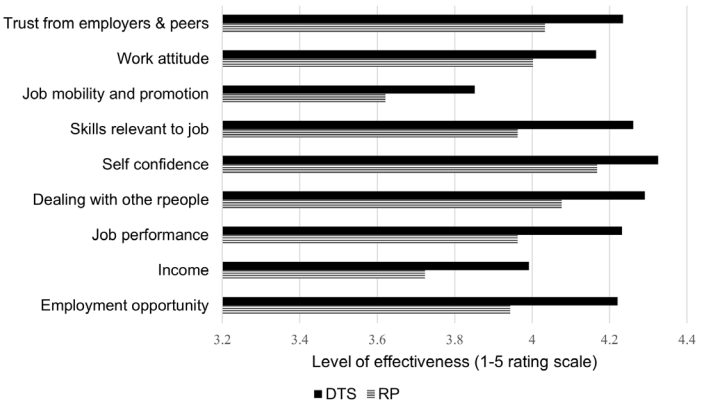
TABLE 3. Sample former trainees by enrollment year

Program type	Enrollment year									
	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
RP	1	12	28	30	50	113	131	97	9	471
DTS	2	18	30	37	53	79	93	47	3	362
Total	3	30	58	67	103	192	224	144	12	833

Source: DTS Tracking Survey Data 2015, World Bank.

The survey asked sampled graduates of both the DTS and RPs for their impression of various benefits related to the training they received from TESDA (Figure 2). Graduates of the DTS reported higher levels of employment opportunities and earnings on average compared to graduates of the RPs. The average scores of self-evaluation among DTS graduates on their acquired skills, confidence levels, attitudes relevant to work, and earned trust from their employers and colleagues were also consistently higher than those among RP graduates.

FIGURE 2. Self-evaluation about the impacts of training received from TESDA



Source: DTS Tracking Survey Data 2015, World Bank; World Bank calculations.
Note: These self-evaluated impacts were reported in a five scale of effectiveness and these differences between DTS and RP graduates are all statistically significant at five percent.

Table 4 provides summary statistics of the labor market outcomes among the survey sample. While both current salary and employment status figures appear higher for the DTS graduates, the differences are not statistically significant between the two groups. However, there are greater employment opportunities after training completion among the DTS graduates compared to the RPs graduates. The employment rate of the DTS graduates in the survey is high, which corresponds with the employment rate officially reported by TESDA.

TABLE 4. Comparing wages and employment incidence of former trainees by the DTS and RPs

Variables	All		RP		DTS		Difference (a) − (b)
	N	Mean	N	Mean (a)	N	Mean (b)	
Latest monthly salary	456	11,408	212	11,044	195	12,199	−1,155
Currently employed	833	68%	471	68%	362	69%	−0.8%
Currently employed as wage earner	833	59%	471	57%	362	62%	−5%
Employed right after TESDA training	833	74%	471	70%	362	82%	−11.8%***

Source: DTS Tracking Survey Data 2015, World Bank.
Note: *** Statistically significant at one percent level.

Table 5 provides summary statistics of the basic characteristics of the DTS and RP graduates in order to assess the potential impact of alternative factors (Table 5). The data demonstrate a higher average age and a greater number of males among the RPs graduates compared to the DTS graduates. Years of schooling (the total number of years spent in formal elementary and high schools), post-secondary vocational training, and tertiary education are nearly the same between graduates of both programs.

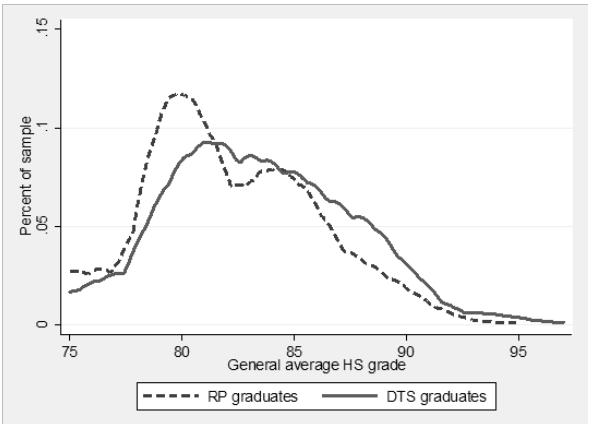
TABLE 5. Comparing basic characteristics of the DTS and RP graduates

Variables	All		RP		DTS		Difference (a) − (b)
	N	Mean	N	Mean (a)	N	Mean (b)	
Age	833	26.6	471	28.6	362	23.9	4.7***
Gender (% female)	833	34%	471	22%	362	50%	−28%***
Formal education (no. of years)	833	12.1	471	12.0	362	12.3	−0.2*
General average grade at HS graduation	833	82.6	471	82.1	362	83.3	−1.2***
TVET (no. of years)	833	0.7	471	0.3	362	1.4	−1.1***
College enrollment - before TVET (%)	833	17%	471	25%	362	8%	17%***
College completion - before TVET (%)	833	24%	471	35%	362	11%	24%***
College enrollment - after TVET (%)	833	9%	471	12%	362	5%	8%***
College completion - after TVET (%)	833	1%	471	1%	362	1%	0%
Work experience (no. of years)	833	9.4	471	11.6	362	6.6	5.0***
Years since graduating TVET	833	3.3	471	3.5	362	2.9	0.6***

Source: DTS Tracking Survey Data 2015, World Bank.
Note: *** Statistically significant at one percent level.

The general average grade at HS graduation (Grade 10) is also nearly the same between the DTS and RPs graduates. The distribution of the raw general average HS grades of the survey sample is comparable among the two groups (Figure 3). The general average grade, reported from 1 to 100-point scores, is computed by simply dividing the sum of all final grades by the number of learning areas. Students with final grades of at least 75 in all learning areas can earn high school certificates and be promoted to the next level. For example, a general average HS grade of close to the full point (100 points) is necessary to enter the most prestigious universities in the country.

FIGURE 3. Distribution of the RP and DTS trainees by general average HS grade



Source: DTS Tracking Survey Data 2015, World Bank; World Bank calculations.
Note: These self-evaluated impacts were reported in a five scale of effectiveness and these differences between DTS and RP graduates are all statistically significant at five percent.

Academic qualification prior to completing vocational training is generally higher among the RP trainees compared to the DTS trainees, and this difference is statistically significant. Among former trainees in the RPs, one out of four has enrolled in college but stopped, and one out of three graduated from college before starting their vocational training.

Finally, the manner in which the DTS programs are implemented in schools and companies was presented (Table 6). The data demonstrate that the total duration to complete TVI-based learning and in-company training is about 1.4 years, which is substantially longer than the average duration of the RPs training. About 70 percent of the DTS trainees were supervised during their in-company training and benefitted from support in mastering work processes, while a smaller proportion learned independently or from peer trainees. At graduation, about 70 percent of trainees had obtained the National Certificate (NC)[9] level 2 or above, while six percent earned the NC Level 1 or Certificate of Competency (COC)[10] distinction.

[9] The NC is issued when a candidate has demonstrated competence in all units of competency that comprise a qualification (TESDA).
[10] The COC is issued to individuals who have satisfactorily demonstrated competence on a single or cluster of units of competency (TESDA).

The higher-level NCs generally have certificate credentials in the labor market, while the other certificates have limited values by themselves. About one-third did not earn any certificate.

TABLE 6. Delivery aspect of the DTS programs

Implementation aspects	Description	Average among DTS trainees
DTS implementation scheme (%)	Block release (scheme=1)	91.0
	Day release (scheme=2)	9.0
How work processes were learned during OJT (%)	Adequate guidance from supervisors	23.0
	Learned from peers	5.0
	Learned by doing it yourself	6.0
	All above	48.0
Certification upon graduation (%)	Higher level (NC2–NC5)	71.0
	Lower level (NC1 or COC)	6.0
	No certificate	27.0
Actual length for in-TVI training and in-plant training	Total number of weeks spent in school/TVIs	26.7
	Total number of weeks spent in company/plant	40.7
	Weekly total number of hours spent for OJT	45.2

Source: DTS Tracking Survey Data 2015, World Bank.
Notes:
a. Block release refers to a schedule where students/trainees complete 40 percent of their training full-time in a TVI, then complete the remaining 60 percent of their training full-time in a plant. (TESDA Circular No. 31 s.2012)
b. Day release refers to a schedule where trainees spend two days per week in a school and the remaining work days in a plant. (TESDA Circular No. 31 s.2012)

5. Estimation results on labor market outcomes of DTS

Labor market outcomes of the DTS compared to the RPs were estimated using the survey data. Tables 7-11 present estimated coefficients in the labor wage or employment equations with selected independent variables of interest (see the previous section for the detailed analytical approach).

A simple linear regression model was adopted by changing key control variables such as enrollment year, the TVIs, or both, and supposing substantial effects on the outcomes. This reflects the programs' possible heterogeneity. The same regression was estimated by including the interaction term to assess the relationship between the standardized general average HS scores in the DTS versus other RPs. Additional characteristics such as gender, work experience, and years of schooling are also included in the specification.

TABLE 7. Wage premium (%) for the DTS, general average HS grade - OLS estimate on latest salary

Variables	(1)	(2)	(3)	(4)	(5)
	RP and DTS	RP and DTS	RP and DTS	RP and DTS	RP and DTS
DTS dummy (=1, RP=0)		0.118**	0.081	0.047	0.039
		(1.996)	(1.260)	(0.715)	(0.711)
Standardized HS grade	0.032	0.027	0.027	−0.029	0.011
	(1.081)	(0.856)	(0.846)	(-0.923)	(0.249)
DTS* std. HS grade					-0.082***
					(-3.698)
Years of schooling	0.072***	0.082***	0.072***	0.051**	0.047*
	(3.708)	(3.813)	(3.175)	(2.178)	(2.046)
Work experience	0.008	0.011	0.009	0.017	0.016
	(0.827)	(1.047)	(0.842)	(1.613)	(1.155)
Work experience (squared)	−0.000	−0.000	−0.000	−0.000**	-0.000
	(−1.227)	(−1.482)	(−1.239)	(−2.118)	(-1.500)
Female	0.011	0.019	0.044	0.032	0.036
	(0.206)	(0.320)	(0.737)	(0.504)	(0.661)
Mother's education level	0.001	0.001	0.001	0.001a	0.001*
	(1.104)	(1.357)	(1.369)	(1.752)	(2.005)
Constant	8.215***	8.024***	8.120***	8.689***	8.669***
	(31.719)	(27.156)	(24.868)	(19.895)	(24.815)
Observations	399	356	354	356	354
R-squared	0.051	0.068	0.087	0.145	0.157
Enrollment year controlled	NO	NO	YES	NO	YES
TVI controlled	NO	NO	NO	YES	YES

Source: DTS Tracking Survey 2015, World Bank. World Bank calculations.
Note: Robust *t*-statistics in parentheses. *p<0.1; **p<0.05; ***p<0.01

The heterogeneity of TVIs and programs affects the estimation results of returns to the DTS. Estimates on labor earnings were assessed by calculating the log of graduates' latest monthly salary (Table 7). The results highlight that the coefficient on the DTS programs is positive and significant in the simplest specification, in which neither the controlled TVI variable nor enrollment year is included (see Column 2). The result becomes insignificant when the controlled TVI variable and enrollment year are included in the specification, taking different school-specific characteristics into account (see Columns 3 and 4). Different schools work with different employers, resulting in distinctly different OJT programs across the years, and this variation seems to have an impact on the estimation results.

The findings suggest that the DTS programs have a stronger positive relationship to labor earning among trainees with lower general average HS grades as compared to trainees with higher grades. The coefficient of the interaction

term between the average general HS grade and the DTS shows significant and negative effects, while neither of the parameters of the DTS and average HS grade is statistically significant (see Column 5). A standardized HS grade score of −1 will yield an interaction term coefficient of 0.082, which means an 8.2 percent increase in salaries (relative to the RPs) can be expected if trainees were among the lower academic end of basic education and could graduate from the DTS programs. For comparison, the average rate of returns to an additional year of schooling is five percent per year.

Therefore, practical skills training through OJT appears effective in developing human capital, particularly among those who did not perform well academically during basic education. Holding other variables constant, this translates to a difference in labor earnings of at least ₱955 per month, or approximately US$240 per year, between the DTS trainees in the bottom or top 16 percent of post-secondary trainees overall. By the same standards, if lower HS academic achievers choose the DTS instead of the RPs, they can gain an additional ₱497 per month or an equivalent of US$120 per year. Such increases are not insignificant in the context of today's labor market conditions in the Philippines.

TABLE 8. Employment probability for the DTS, general average HS grade - probit estimate on current employment (marginal effects reported)

Variables	(1)	(2)	(3)	(4)	(5)
	Total	Total	Total	Total	Total
DTS dummy (=1, RP=0)		0.082**	0.062	0.042	0.039
		(2.053)	(1.539)	(1.014)	(0.934)
Standardized HS grade	0.039**	0.038**	0.042**	0.035*	0.121
	(2.165)	(2.043)	(2.225)	(1.792)	(1.255)
DTS* std. HS grade					−0.047
					(−1.183)
Years of schooling	0.003	0.002	0.002	−0.003	0.002
	(0.255)	(0.203)	(0.205)	(−0.236)	(0.137)
Work experience	0.000	0.002	0.001	0.005	0.006
	(0.071)	(0.503)	(0.291)	(1.191)	(1.240)
Work experience (squared)	−0.000	−0.000	−0.000	−0.000	−0.000
	(−0.183)	(−0.500)	(−0.343)	(−1.231)	(−1.231)
Female	−0.118***	−0.140***	−0.124***	−0.106**	−0.105**
	(−3.381)	(−3.599)	(−3.163)	(−2.465)	(−2.437)
Mother's education level	−0.002	−0.002*	−0.002**	−0.002**	−0.003**
	(−1.530)	(−1.836)	(−2.195)	(−1.994)	(−2.409)
Observations	840	745	742	745	742
Enrollment year dummy	NO	NO	YES	NO	YES
TVI dummy	NO	NO	NO	YES	YES

Source: DTS Tracking Survey 2015, World Bank. World Bank calculations.
Note: *z*-statistics in parentheses. *p<0.1; **p<0.05; *** p<0.01

The relationship between the DTS and graduates' employment opportunities was also compared with that of RPs and their graduates (Tables 8 and 9). The DTS graduates were more likely to be employed, especially right after completing the program, compared to graduates of the RPs (Table 9). The employment incidence immediately after completing training was consistently seven percentage points higher among the DTS trainees. This positive impact on employment probability diminishes over time. When accounting for variations across the TVIs and enrollment years, the employment probability among DTS graduates does not significantly differ from vocational programs several years after graduation.

The general average HS grade is also strongly associated with employment. However, the coefficient of the interaction term between the DTS and general average HS grade is not statistically significant for employment probability.

Returns to training or employment probabilities are surely different across heterogeneous program characteristics in DTS implementation. As previously noted, the DTS programs are broadly defined by TESDA, and each program design differs depending on the participating TVIs and companies. Therefore, the sample of DTS graduates was analyzed in order to estimate returns to different aspects of the program.

TABLE 9. Employment probability for the DTS, general average HS grade - probit estimate on employment right after TVET (marginal effects reported)

Variables	(1)	(2)	(3)	(4)	(5)
	Total	Total	Total	Total	Total
DTS dummy (=1, RP=0)		0.073**	0.062*	0.078**	0.058
		(2.079)	(1.845)	(2.086)	(1.597)
Standardized HS grade	0.008	0.008	0.010	0.007	0.119
	(0.481)	(0.485)	(0.641)	(0.386)	(1.402)
DTS * std. HS grade					−0.030
					(−0.864)
Years of schooling	−0.005	−0.004	−0.021**	−0.007	−0.014
	(−0.521)	(−0.404)	(−2.251)	(−0.628)	(−1.340)
Work experience	−0.016***	−0.015***	−0.014***	−0.014***	−0.016***
	(−4.908)	(−4.269)	(−4.168)	(−3.785)	(−4.156)
Work experience (squared)	0.000***	0.000***	0.000***	0.000***	0.000***
	(3.069)	(2.840)	(2.758)	(2.598)	(2.655)
Female	−0.010	−0.047	−0.050	−0.059	−0.042
	(−0.308)	(−1.344)	(−1.558)	(−1.541)	(−1.131)
Mother's education level	−0.001	−0.001	−0.001	−0.001	−0.001
	(−1.257)	(−1.301)	(−1.407)	(−1.391)	(−1.233)
Observations	840	745	830	745	742
Enrollment year dummy	NO	NO	YES	NO	YES
TVI dummy	NO	NO	NO	YES	YES

Source: DTS Tracking Survey 2015, World Bank. World Bank calculations.
Note: *z*-statistics in parentheses. *p<0.1; **p<0.05; *** p<0.01

The analysis suggests higher intensity in-school training during the DTS is positively related to earnings (Table 10) by an additional three-four percentage points per additional week. In-company training intensity is not related to additional wages, but it is positively related to employment incidence (Table 11). While an increase in the overall duration of in-company training projects are negligible monetary benefits, an additional hour of in-company training per week can increase the employment rate by two-three percentage points. Monitoring visits by instructional trainers from TVIs were also found to potentially increase employment probability. Other aspects of program design and delivery did not show significant association with earning and employment outcomes.

TABLE 10. Wage premium (%) for the DTS, general average HS grade - OLS estimate on latest salary

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	DTS	DTS	DTS	DTS	DTS	DTS
Years of schooling	0.062**	0.045	0.052	0.057	0.049	0.049
	(2.331)	(0.799)	(1.164)	(1.173)	(0.872)	(1.106)
Standardized HS grade	0.029	0.027	−0.013	0.027	0.029	−0.006
	(0.667)	(0.542)	(−0.291)	(0.663)	(0.616)	(−0.120)
Work experience	0.007	0.008	0.018	0.011	0.012	0.022**
	(0.604)	(0.702)	(1.679)	(1.064)	(1.199)	(2.699)
Work experience (squared)	−0.000	−0.000	−0.000*	−0.000	−0.000	−0.000**
	(−0.960)	(−0.782)	(−1.933)	(−1.235)	(−1.288)	(−3.254)
Female	0.022	−0.113	0.008	−0.114	−0.124	−0.022
	(0.223)	(−1.281)	(0.076)	(−1.281)	(−1.817)	(−0.223)
Mother's educational level	0.001	0.001	0.001	0.001	0.001	0.001
	(1.030)	(1.547)	(1.268)	(1.849)	(1.532)	(1.257)
DTS implementation scheme dummy (1=Block release)		0.104				0.060
		(1.734)				(1.566)
Given training plan from TVI (1=yes)		0.019				0.049
		(0.257)				(0.803)
Weeks spent for in-school learning			0.003**			0.004**
			(3.391)			(3.119)
Weeks spent for in-company training			−0.002			−0.002
			(−1.235)			(−1.440)
Number of hours per week for in-company training			−0.011			−0.005
			(−0.447)			(−0.232)
Number of hours per week for in-company training (squared)			0.000			0.000
			(0.234)			(0.021)
How to learn work process - from supervisors				0.127		0.092
				(1.168)		(0.900)
How to learn work process - from peers				−0.013		−0.078
				(−0.128)		(−0.853)
How to learn work process - by yourself				−0.200		−0.193
				(−1.833)		(−1.728)

TABLE 10. Wage premium (%) for the DTS, general average HS grade - OLS estimate on latest salary (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	DTS	DTS	DTS	DTS	DTS	DTS
How to learn work process - from all				0.042		0.001
				(0.462)		(0.014)
Reported to TVI during in-company training (1=yes)					0.009	−0.035
					(0.181)	(−0.846)
Times visited TVI teacher during in-company training (1=yes)					−0.004	−0.003
					(−1.463)	(−1.655)
Constant	8.226***	8.612***	8.899***	8.277***	8.634***	8.696***
	(23.766)	(12.073)	(18.858)	(13.949)	(13.266)	(15.532)
Observations	397	192	192	206	189	189
R-squared	0.070	0.096	0.171	0.113	0.100	0.198
Enrollment year dummy	YES	YES	YES	YES	YES	YES
School dummy	YES	YES	YES	YES	YES	YES

Source: DTS Tracking Survey 2015, World Bank. World Bank calculations.
Note: Robust *t*-statistics in parentheses. *p<0.1; **p<0.05; *** p<0.01

TABLE 11. Employment probability for the DTS, general average HS grade - probit estimate on current employment status (marginal effects reported)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	DTS	DTS	DTS	DTS	DTS	DTS
Years of schooling	0.001	−0.028	−0.037**	−0.022	−0.025	−0.046***
	(0.019)	(0.018)	(0.018)	(0.016)	(0.016)	(0.015)
Standardized HS grade	0.040***	0.024	0.017	0.028	0.017	0.017
	(0.014)	(0.032)	(0.036)	(0.029)	(0.035)	(0.035)
Work experience	−0.000	−0.004	−0.005	−0.003	−0.005	−0.005
	(0.003)	(0.006)	(0.007)	(0.003)	(0.004)	(0.007)
Work experience (squared)	−0.000	0.000**	0.000*	0.000***	0.000***	0.000*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Female	−0.114***	−0.154***	−0.142**	−0.156***	−0.148***	−0.113
	(0.023)	(0.029)	(0.059)	(0.041)	(0.038)	(0.074)
Mother's educational level	−0.002*	−0.002**	−0.002**	−0.001*	−0.003**	−0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
DTS implementation scheme dummy (1=Block release)		0.071				0.055
		(0.138)				(0.150)
Given training plan from TVI (1=yes)		−0.034				−0.019
		(0.067)				(0.060)
Weeks spent for in-school learning			0.001			0.001
			(0.003)			(0.002)
Weeks spent for in-company training			0.003***			0.002***
			(0.001)			(0.001)
Number of hours per week for in-company training			0.032***			0.029***
			(0.011)			(0.011)

TABLE 11. Employment probability for the DTS, general average HS grade - probit estimate on current employment status (continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	DTS	DTS	DTS	DTS	DTS	DTS
Number of hours per week for in-company training (squared)			−0.000*** (0.000)			−0.000*** (0.000)
How to learn work process - from supervisors				0.086 (0.093)		−0.040 (0.112)
How to learn work process - from peers				−0.137 (0.125)		−0.204 (0.144)
How to learn work process - by yourself				0.009 (0.158)		−0.010 (0.118)
How to learn work process - from all				0.073 (0.088)		−0.018 (0.077)
Reported to TVI during in-company training (1=yes)					0.021 (0.039)	0.022 (0.039)
Times visited TVI teacher during in-company training (1=yes)					0.006** (0.003)	0.002 (0.002)
Observations	837	374	374	407	365	418

Source: DTS Tracking Survey 2015, World Bank. World Bank calculations.
Note: Standard errors in parentheses. *p<0.1; **p<0.05; *** p<0.01

6. Conclusion

This paper focused on the DTS experience in the Philippines as one of the various vocational training programs which offer plenty of opportunities for on-the-job training and work experience. The paper finds that DTS has favorable labor market returns compared to other types of training modalities and greater impacts in terms of the labor market and skills enhancement compared to other school-based vocational training programs.

Although the overall impact of completing training in the DTS was not confirmed after controlling for heterogeneity across TVIs or programs, the results show that high monetary rewards are strongly associated with the DTS trainees who had weaker academic performance in basic education. Those students without a strong academic performance in high school can still expect better earnings prospects by pursuing a path to build practical skills through vocational training programs such as the DTS. This relationship was not confirmed among the sampled graduates of the RPs, who consistently showed a positive link between grade and labor market returns after vocational training. While graduates with weaker academic performance fare better compared to others in DTS, it is important to acknowledge that the effect is minimal, and the results are conditional on graduation.

The intensity of in-company training, as opposed to the length of in-company training, was another critical factor that supported higher returns to the DTS graduates. Monitoring visits by TVI instructors during in-company training also suggest important outcomes in the labor market, even when controlling for different TVIs and programs. These results suggest that in order to promote program quality, increasing the intensity of in-company training experiences and implementing frequent supervision could be effective strategies for companies participating in the DTS and TVIs.

While the conclusions of the study are drawn through reasonable data analysis, due to methodological limitations, the results are conditional on graduation from vocational programs. The rate of return for the program can also vary over the working lifecycle or by cohort, something that cannot be looked at with the available data. The study also did not analyze the characteristics of those who drop out of vocational programs. Further investigation may be necessary in order to confirm the efficiency of practical training opportunities.

Further research would also involve estimating the full cost-benefit estimates of the program. This is particularly important for policymakers who must decide on vocational training spending and prioritization of vocational training programs. Decisions on vocational training spending and prioritization of vocational training programs should rely on social rates of return beyond the private returns estimated in this report (e.g., higher salaries for DTS graduates in relation with RPs) and be dependent on fully accounting for the differential costs of programs.

Finally, an analysis with more recent data may be warranted. The advance of technological developments, along with the economic cycle (including deep recessions as the one faced by the country in 2020-2021 due to the COVID-19 pandemic), can raise different conclusions that may affect current training investment decisions.

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The impact of Philippine monetary policy on domestic prices and output: evaluating the country's transmission channels

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This paper examines the price and output effects of Philippine monetary policy through its transmission channels from 1996 to 2019 using Structural Vector Autoregression (SVAR) models. Recursive and non-recursive identification strategies are implemented to build a model that represents the small open economy of the Philippines, which is affected by exogenous shocks in oil prices and US interest rates. Impulse response functions are then compared between recursive and non-recursive models to select results that demonstrate consistency with macroeconomic theory and overall statistical significance. The Local Projections method is then applied as a means of verifying the accuracy of the preferred model's results. Findings show that a contractionary shock to Philippine monetary policy has weak short-term effects on domestic output and prices. These results contribute to the literature by characterizing the strength of transmission channels 17 years after inflation targeting was adopted as a primary component of Philippine monetary policy.

JEL classification: C01, E52
Keywords: Philippine monetary policy, structural vector autoregression, Local Projections method

1. Introduction

In 2002, the Philippine Central Bank or Bangko Sentral ng Pilipinas (BSP) adopted inflation targeting (IT) as the principal mechanism of its monetary policy. The adoption of IT allowed the central bank to set and publicly announce explicit inflation rate targets for the medium-term. Guinigundo [2016] states the IT approach fosters a well-anchored expectations channel to help the central bank achieve price stability while reducing the volatilities of output and interest rates. The public announcement of inflation targets generally ensures a stable price level of goods and services which protects the purchasing power of economic agents and indirectly encourages economic growth in the country. IT has placed the BSP in a better position to focus on price stability as its primary objective which has facilitated roughly 20 years of sustained economic growth

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in the country. However, it has its limitations and it does not completely shield economies from inflationary periods that are caused by supply-side constraints or exogenous shocks. The Philippines most recently, in 2018, experienced such an episode partly due to the rising international fuel costs, as inflation rates soared to a ten-year high, or roughly two percentage points above the announced target.

Both the national government and the central bank deemed the inflationary episode as transitory. The Department of Finance (DOF) attributed inflation rise to external transitory pressures from the United States (US) increasing its interest rates, rising international oil prices, and the adjustment period from the implementation of the Tax Reform for Acceleration and Inclusion [Department of Finance 2018]. Alternatively, in response to these rising prices, the BSP raised interest rates by a cumulative 175 basis points from 3.00 percent in January 2018 to 4.75 percent in December 2018.[1]

During these instances, the appropriate responses to supply shock inflationary pressures are not changes in policy rates, but rather non-monetary policy programs such as targeted in-kind or cash-transfers.[2] The exception is when it becomes apparent that there are lingering demand effects from persistent supply-side inflation. The central bank may then decide to revise interest rates to alter the inflation expectations of consumers and producers.

In the last two decades, the Department of Economic Research – Bangko Sentral ng Pilipinas [2019] noted that most of the inflationary episodes were caused by supply-side constraints such as oil shocks, or structural impediments affecting food importation, and typhoons impacting the domestic agriculture. Bernanke and Mishkin [1997] allude that these short-run deviations from inflation targets are to be expected and even occasionally accommodated by the central bank. However, it is worth noting that these increased price volatilities negatively impact economic growth and delay monetary policy transmission. Therefore, viable transmission channels are essential to minimize the (demand driven) price fluctuations in the short run and reduce the tradeoff between inflation and output.

In the case of supply shocks, similar to those encountered by the Philippines, Arestis, Caporale, and Cipollini [2002] implied that mistimed policy rate adjustments contribute to a destabilization in the output gap because monetary policy is now inducing an opposite variation on output and demand. Guinigundo [2016] states that inflation volatility has been on a clear downward trend since 2002 due to IT's well-anchored inflation expectations in the country, but this approach does not prevent persistent inflationary episodes because the Philippines is still susceptible to oil price shocks or agricultural impediments.

It is to this end that this paper investigates the impact of monetary policy on the Philippine economy. Its primary objective is to characterize price and output effects of interest rate adjustments in the country through its monetary

[1] Monetary policy decisions were taken from Bangko Sentral ng Pilipinas [2018].
[2] An example of non-monetary policy programs is the Pantawid Pasada Program.

policy transmission channels. The methodology of this study involves building a Structural Vector Autoregression (SVAR) model of a small open economy like the Philippines to analyze the effect of BSP's monetary policy, in the form of its policy rates, on consumer prices and output (through industrial production). Such a framework allows this study to achieve its objectives by answering two research questions: (1) the impact of monetary policy on domestic commodity prices and output, and (2) the strength of monetary policy transmission channels and their pass-through effects on the Philippine economy.

Existing literature on the impact of Philippines monetary policy on output and prices is limited. There are only a handful of studies, but none of these specifically highlight the impact of policy rates on the production output or real gross domestic product (GDP) and prices. Therefore, this paper seeks to contribute to the literature in two ways: first, by providing fresh analysis that reflects monetary policy decisions after the adoption of inflation targeting; and second, by using SVAR models, which, if properly identified, tend to provide more realistic estimates and simulations of shocks to policy variables.

The outline of the succeeding sections of this paper are as follows. Section 2 provides a literature review of theoretical and empirical studies associated with this topic. Section 3 presents the data and preparatory tests needed for time-series analysis. Section 4 then covers the methodology, while Section 5 provides a discussion of primary results and robustness tests. Finally, Section 6 presents a summary of findings, limitations of the paper, and future areas for research.

2. Literature review

There exists a clear heterogeneity in the effects of monetary policy on macroeconomic indicators like prices, output, and employment. Additionally, Mishra, Montiel, and Spilimbergo [2012], and Mishra and Montiel [2013] outlines the differences, and their reasons, in monetary policy effects between low-income and high-income economies. There are changes in government laws, the development of banking and financial systems, and the presence of imperfect competition levels that ultimately affect the strength of transmission channels. These factors make it important to regularly update the empirical literature to see if the impact of interest rates on output and prices still conform with conventional economic theory, holding all else constant, over multiple time periods.

In the case of the Philippines, the issue of heterogeneity is especially essential because empirical studies on the price and output effects of monetary policy are limited. There are only a few readily available papers like Guinigundo [2008], Tuano-Amador, Glindro and Claveria [2009], and Glindro et al. [2016] that extensively discuss the impact of monetary policy for the period following the adoption of inflation targeting.

2.1. Philippine monetary policy transmission channels and their effects on domestic prices and output

Guinigundo's [2008] research is one of the few papers that characterizes interest rate, credit, exchange rate, asset price, and expectation channels in the Philippines under an inflation targeting framework. While the analysis is empirical, it also provides (1) a clear description of monetary policy transmission channels' responses and the (2) implementation lag before pass-through effects on the country's interest, exchange rate, and credit channels become evident. Guinigundo's analysis may be summarized into four points.

First, the BSP's monetary board makes changes to the Philippine policy interest rate (channel) through the bank's overnight policy rate (PR) rate. Empirically, these adjustments are said to directly affect Treasury Bill rates within three months. Second, the dominance of banking in the financial system through both in-person and digital mediums have created a strong interdependence between the credit and asset price channels. This structure forced the central bank to adopt more macroprudential policies geared towards monitoring risky transactions, which have potentially weakened the pass-through effects of both channels over time. Third, as part of its inflation targeting framework, the BSP commits to a flexible exchange rate regime by allowing market forces to influence the exchange rate even if this has a direct, but not severe, impact on actual inflation and inflation expectations. There is an estimated exchange rate pass-through of about a year before effects are fully realized. Finally, the Philippines is characterized to regularly experience supply-side shocks in the form of rising oil and food prices. These volatile price movements, along with a significant expectations channel, have required the BSP to conduct regular public announcements on its policy decisions for consumers and firms so that it remains a credible source of information for stable inflation expectations.

Apart from adjustments in the PR rate, Glindro et al. [2016] lists the BSP's primary instruments for open market operations (OMO) as the reserve requirement, the rediscount rate on short-term loans extended to financial institutions against collateral from banking clients, the purchase or sale of the central bank's government securities, and the acceptance of special deposit accounts. Chie [2013] further classifies these measures into direct and indirect instruments. Direct instruments allow the BSP to control the percentage of bank deposits and deposit substitute liabilities that banks keep on premises while indirect instruments generally entail adjustments in short-term policy interest rates or the buying and selling of government securities from these financial institutions.

In the context of this study, two conclusions can be made from the characterization of Philippine monetary policy transmission channels. First, despite more financial alternatives (electronic accounts and e-wallets) and macroprudential policies, the credit channel likely remains the most potent channel of Philippine monetary policy. Guinigundo's [2008] analysis holds true

in the status quo as the Philippine economy is heavily reliant on credit: because banks comprise 80 percent of the country's total assets, which also creates some interconnectedness between both credit and asset channels.

In terms of pass-through effects from the credit channel on prices and output, these should be relatively noticeable in the short-term. While more alternatives to bank loans have emerged, majority of Filipinos still make use of banks. As of 2019, the BSP [2019] reported that bank accounts still have a marginally higher penetration rate of 12.2 percent versus microfinancing at 12.1 percent and e-money accounts at 8.0 percent. Moreover, historically low bank rates and high credit claims have also provided the liquidity needed for domestic consumption and investments decisions (i.e., small-scale entrepreneurial decisions and lending capacity) in the economy. Much of the literature such as Glindro et al. [2016], Bayangos [2010], and Tuano-Amador, Glindro and Claveria, [2009] supports this claim as they found significant but relatively weak pass-through effects on the credit channel. As described by Anzuini, Lombardi and Pagano [2012] and Frankel [2006], lower banking rates, for example, decrease the opportunity cost for firms who hold unsold commodities and unpaid loans. They especially incentivize borrowing and spending decisions in consumption-driven economies like the Philippines.

Second, the impact of BSP policy rate adjustments on the country's flexible exchange-rate regime is expected to impact prices in the short- and medium-term. Tuano-Amador, Glindro and Claveria [2009] state that due to well-anchored inflation expectations from the IT regime and a cyclical inflow of foreign exchange, the pass-through effects of the Philippine exchange rate channel have decreased noticeably after 2002. Their analysis suggests that the pass-through effects of the exchange rate channel is more consistent with economic theory or the Uncovered Interest Rate Parity Condition (following adjustments in monetary policy). Intuitively, this condition means a hike in Philippine policy rates likely makes domestic assets more attractive relative to foreign assets. Higher policy rates then encourage an inflow of foreign exchange which leads to an appreciation of the peso relative to foreign currencies. Ultimately, an appreciating peso makes the country's exports more expensive which will likely decrease an economy's output.

2.2. Empirical Philippine monetary policy studies

2.2.1. Price and output effects of Philippine monetary policy

This section covers the various empirical methodologies used to analyze Philippine monetary policy transmission mechanisms. While there is a relatively large variation of models tackled in this discussion, the result of each study provides a baseline expectation of monetary policy transmission channels in the Philippines.

Literature dedicated specifically to the domestic price and output effects of Philippine monetary policy is limited, and most papers have not used data that

is recent as of this writing. Most of the studies that are readily available from independent and central bank researchers use Autoregressive Distributed Lag (ARDL) models, VAR models, Structural Equations Modeling (SEM), and input-output (I-O) methodologies, but only a few utilize SVAR models with extensive identification strategies. Moreover, the current empirical literature does not directly address the effects of monetary policy adjustments on (1) prices and output or (2) the relative strength of transmission channels following policy rate adjustments.

The consensus in the literature is that the Philippines's interest and credit channels are relatively stronger in comparison to other channels.

Vargas' [2021] VAR analysis uses quarterly data from 1985 to 2007 and supports the relative strength of the country's credit channel. The results show that this channel had the strongest effect on real GDP in comparison to the real exchange rate and lending rate channels. However, forecast error variance decomposition (FEVD) found that each of the channels were still relatively weak sources of the variance changes for real GDP and consumer prices. In terms of the study's output effects, the model found expansionary monetary policy strongly increased output after two quarters while having a weaker long-run effect on domestic prices in the country.

Research from the BSP is generally consistent with work highlighting the relative strength of the country's credit channel, but monetary policy's price and output effects are less clear. Tuano-Amador, Glindro and Claveria [2009] implemented a SEM to support the claim that the BSP's policy rate changes affect the credit of the private sector through its OMO, but their paper did not enumerate the impact of BSP policy changes on the country's output and prices.

Guinigundo [2008] from the BSP also supports the relative strength of the country's credit channel but considers its possible weakening over time. Decreased penetration from bank lending channels due to increased financial market liberalization in the early 1990s, a stricter prudential regulatory framework, and more efficient risk-based and punitive measures against erring banks are few reasons for a potentially weaker credit channel in the Philippines. However, empirically, his analysis only makes use of a simple ARDL model, which fails to account for identification problems or seasonality and stationarity in the data.

Other studies describe the strength of interest and exchange rate channels. Dakila Jr. and Paraso [2005] used a Vector Error Correction Model (VECM) to examine the short- and long-run effects of Philippine monetary policy, primarily through the interest rate channel, on GDP and capital formation. Instead of BSP's policy rates, the paper uses 91-day Treasury Bill rates from quarterly data in 1987 to 2003, since these two variables are closely correlated. Their findings present the same conventional relationship between interest rates, GDP, and capital formation, but deviate slightly from the Philippine literature when they argue that contractionary monetary policy is felt only six quarters following the shock.

Glindro et al. [2016] implemented a Bayesian VAR model to analyze the country's monetary policy transmission channels from 1999 to mid-2015. This

approach was complemented with an ARDL model to examine the inflation persistence and pass-through of PHP/USD exchange rates. In comparison to exchange rates, policy rate shocks have stronger effects on the one-day Treasury Bill rate and the average bank lending rate because they are fully absorbed after a one percentage point increase over the course of a year. These findings are consistent with those of Guinigundo [2015] who used a two-step Engle Granger Error Correction Model to conclude that policy rate changes have a significant, but a relatively weaker impact on bank credit when price changes and economic growth are considered in the equations due to well-anchored inflation expectations. Alternatively, Guinigundo's [2008] I-O analysis indicates that impact of policy rate hikes on the exchange rate is felt immediately after the first month with a gradual increase up to a year after the shock.

2.3. Cross country studies on the impact of monetary policy on prices and output

Research that measures the price and output effects of monetary policy and its transmission channels have been conducted for Asia-Pacific economies like Vietnam, Singapore, Malaysia, Thailand, and Australia. The literature presents two points of contention when discussing the effects of monetary policy in a small open economy. First, many empirical papers consider the trade-offs between utilizing a VAR or SVAR model. Second, the type of identification strategy implemented contributes heavily to the accuracy of the results.

VARs are used for modelling small open economies because they impose relatively few theoretical assumptions on the statistical analysis. Phan [2014] argues that VAR models are empirically convenient for monetary policy studies because they are less dependent on economic theory and treat all macroeconomic variables as endogenous variables in a matrix of reduced form equations. However, Cooley and LeRoy [1985], Evans and Kuttner [1998], Bagliano and Favero [1998], were further cited in Phan's [2014] study to claim that (1) this flexibility makes VAR's IRF mere linear combinations of structural shocks that produce misleading results which are disconnected from economic theory, and (2) VARs have poor forecast performance, particularly in long samples due to parameter instability. The benefit of a SVAR model is that it allows the consideration of the structural dynamics that are specific to the Philippine economy through an identification scheme that imposes various restrictions.

2.3.1. SVAR studies on monetary policy

The contributions from Bernanke [1986] and Sims [1980] present the importance of the theory-based approach in SVAR models of the monetary policy of small open economies. They argue that discounting macroeconomic theory leads to (1) potential correlations that exist between variables like money and

output as well as (2) missing the true underlying structural shocks present in system of the model.

There are several identification strategies used in the SVAR monetary policy literature. This review mainly covers studies that made use of recursive and non-recursive identification methods. Along with this, studies also impose a combination of short-run and long-run restrictions on endogenous variables that were developed by Shapiro and Watson [1988], King and Watson [1992], and Blanchard and Quah [1988].

Much of the empirical literature of monetary policy effects is based on the SVAR model developed by Kim and Roubini [2000] on non-US G-7 countries. Their model utilizes a non-recursive identification strategy and imposes contemporaneous restrictions. Variables are also segregated into either domestic or foreign blocs in their paper. This classification aids researchers in selecting appropriate variables that potentially avoid economic puzzles. The former bloc consists of monetary transmission channels like interest, exchange, credit, and asset price channels along with an economy's money supply. Domestic output is captured either through industrial output or GDP. Policy variables are those considered to be the central bank's main component of implementing monetary policy or adjusting interest rates.

Two variables then account for the influence of the international market which in turn helps ensure the accuracy of IRFs. Oil prices and the US Federal Funds Rate represent exogenous changes to monetary policy because these two factors often contribute to unexpected domestic policy rate adjustments. Grilli and Roubini [1995] argue that the inclusion of the Federal Funds Rate is necessary because this controls the reaction of a small open economy's domestic monetary policy to US monetary policy changes. Generally, models may classify US Federal Reserve rates, and oil prices as two exogenous variables in the 'foreign bloc' of the SVAR model that do not respond contemporaneously to domestic monetary policy channels from small open economies.[3]

In Kim and Roubini's [2000] paper, results from a contractionary shock to monetary policy are consistent with conventional macroeconomic theory for a majority of the industrialized countries in their SVAR model: (1) an initial increase in interest or policy rates in the short-run along with a fall in money supply, (2) a decrease in price level and output, and (3) an appreciation of the exchange rate followed by its depreciation or mean-reversion.

Modifications of Kim and Roubini's model have been applied to much of the succeeding literature. Raghavan, Silvapulle, and Athanasopoulos [2012] apply a similar strategy in the post Asian financial crisis period for Malaysia, a slightly similar Southeast Asian economy to the Philippines. They apply both recursive and non-recursive identification schemes to an initial seven-by-seven

[3] In the SVAR monetary policy literature, domestic variables are referred to as a 'domestic bloc' while foreign variables are referred to as 'foreign bloc'.

model. Their results are plagued by economic puzzles, or what Sims [1992] and Obstfeld and Rogoff [2000] refer to as movements in IRFs from macroeconomic variables (like prices, exchange rates, interest rates) that are counterintuitive to conventional economic theory. The recursive model of Raghavan, Silvapulle, and Athanasopoulos [2012] showed an output puzzle because industrial output increased from a contractionary shock to monetary policies. The same type of counterintuitive response was found for exchange rates and money supply under this specification. Alternatively, the non-recursive model in their study had no price puzzle, but IRFs did show the same puzzles for Malaysian output, money supply, and exchange rates.

The non-recursive identification strategy of Abouwafia and Chambers [2015] on Middle Eastern countries provides a clear contrast to Kim and Roubini's [2000] SVAR framework. The primary difference in Abouwafia and Chambers' work is that it emphasizes the role of stock prices through the asset channel of monetary policy transmission mechanisms and dismisses the long-run impact of monetary policy on exchange rates.

Overall, the literature is generally undecided about which identification strategy is superior in modelling the economic effects of monetary policy for small open economies. Arwatchanakarn [2017] used a non-recursive identification strategy to model Thailand's economy to find evidence of an exchange rate puzzle. Nguyen [2014] applied the same strategy to examine short-run monetary policy effects in Vietnam and found the same conclusion, but with the addition of transitory price and liquidity puzzles. Brischetto and Voss [1999] applied a non-recursive strategy on Australian monetary policy effects, but surprisingly found no evidence of economic puzzles.

Based on the literature, the identification strategy (recursive or non-recursive) is clearly an essential step to ensuring that the SVAR framework accurately represents the macroeconomic dynamics of a small open economy while the inclusion of certain macroeconomic variables plays a role in keeping models robust and avoiding economic puzzles.

2.4. Expectations of macroeconomic variables following a monetary policy shock

The analysis of this paper is heavily dependent on the response of credit, output, price, and exchange rates to a (contractionary) monetary policy shock. Expectations similar to that of Kim and Roubini [2000] are applied in this study. They use available macroeconomic theories to characterize the time path of domestic credit, output, prices, and the exchange rate following the increase of domestic policy rates. There is a straightforward decline in domestic credit following this shock because money supply is expected to decrease. In the case of output, there is minimal to no expectation of a decrease in output following a contractionary monetary policy shock.

This is largely because real variables are fixed, and any movements in output should only be considered transitory or short term. The price level is then expected to immediately decline following the shock, but the time period in which the decrease occurs is dependent on whether prices are sticky or flexible in that economy, as argued by Christiano and Eichenbaum [1992, as cited in Kim and Roubini 2000: 572]. Finally, in the case of domestic exchange rates, an initial appreciation is expected, but this is followed by periods of depreciation.[4]

3. Data

This paper makes use of Philippines quarterly data from 1996 Q1 to 2019 Q4. The 23-year period covers several developments in the Philippine economy including financial crises, the formal adoption of inflation targeting by the BSP in 2002, and several supply- and demand-side shocks.

3.1. Descriptive statistics

Table 1 presents the list of variables used in the SVAR framework in their original form. Given that Philippine data on domestic credit to private is only available annually, all variables were adjusted to quarter frequency. *DC* was interpolated from an annual frequency to a quarter frequency to match the remaining variables. Variables were then computed as individual growth rates. Adjustments for seasonality and structural breaks were then implemented to ensure the accuracy of results.

TABLE 1. Variables, data frequency, and sources

Variable name	Abbreviation	Unit	Frequency	Source (notes)
		Endogenous variables		
		(*Domestic bloc*)		
Industrial Production Index	IPI	Index	Monthly	Philippine Statistics Authority
				(Notes: 2010 =100, Volume or constant price value index)
Consumer Price Index	CPI	Index	Monthly	Philippine Statistics Authority
Exchange rate (PHP/USD)	ER	Philippine Peso	Monthly	Bangko Sentral ng Pilipinas
Policy rate	PR	Percent	Monthly	Bangko Sentral ng Pilipinas
Domestic credit to private sector (Percent of GPD)	DC	Percent	Annual	World Bank - DataBank

[4] The following studies cited by Kim and Roubini [2000] outline the expected and responses of domestic exchange rate to contractionary monetary policy and are relevant to analysis of this paper: Dornbusch [1976], Eichenbaum and Evans [1992], and Grilli and Roubini [1995].

TABLE 1. Variables, data frequency, and sources (continued)

Variable name	Abbreviation	Unit	Frequency	Source (notes)
Exogenous variables (*Foreign bloc*)				
Dubai crude prices	Oil	Dollar per barrel	Monthly	World Bank – Commodity Markets
US Federal Funds Rate	IR	Percent	Monthly	United States Federal Reserve

Based on the Jarque-Bera Test statistics from Table 2, all variables do not possess a normal distribution. Along with a large standard deviation for most variables, this lack of normality is likely associated with the regular volatility and seasonal patterns of each indicator like the *CPI*, *Oil*, and *IPI*.

TABLE 2. Descriptive statistics in level form

	IPI	DC	ER	CPI	PR_PHP	Oil	IR_US
Mean	115.03	36.69	45.95	85.97	6.59	54.42	2.37
Median	108.53	35.44	46.48	87.79	5.88	52.47	1.74
Maximum	187.34	55.84	56.37	125.12	15	116.67	6.52
Minimum	73.16	27.5	25.76	46.67	3	11.07	0.07
Std. Dev.	22.29	7.93	7.29	23.05	3.28	31.77	2.19
Skewness	1.06	0.59	-1.08	-0.03	0.98	0.45	0.47
Kurtosis	3.86	2.19	4.14	1.7	2.99	2.01	1.62
Jarque-Bera	21.09	8.12	23.81	6.73	15.45	7.14	11.11
Probability	0	0.02	0	0.03	0	0.03	0
Sum Sq. Dev.	47,214	5,981	5,049	50,472	1,023	95,888	455

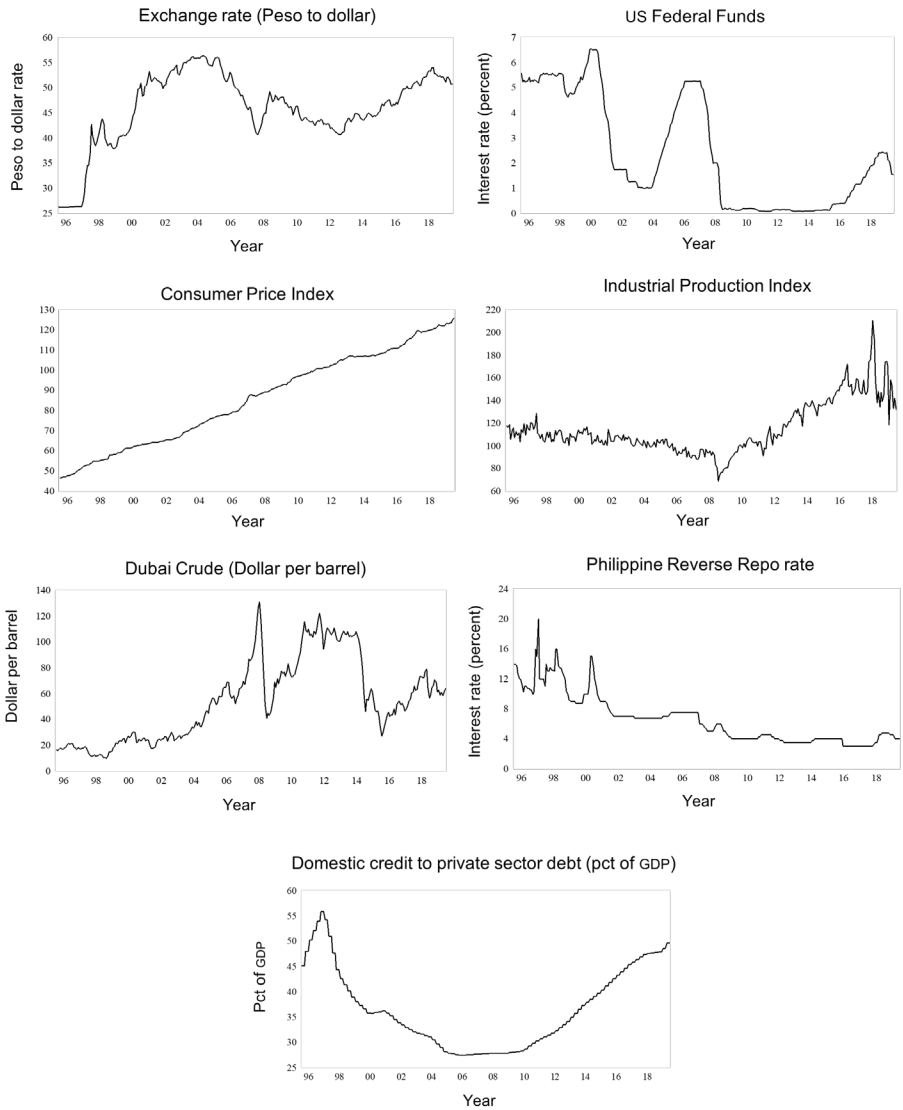
Based on Figure 1, all variables except interest rates for both the Philippines and the US are trending upwards. The figure demonstrates clear non-mean reverting characteristics and seasonal trends in variables like the *CPI*.

3.2. Data preparation for time-series analysis

3.2.1. Corrections for seasonality and structural breaks

Most macroeconomic indicators require the implementation of seasonal adjustment techniques. Otherwise, the econometric models may produce imprecise estimates that are unable to distinguish cyclical effects from other factors [Granger 1978]. There are various methods to correct for seasonality in time-series data, but this paper corrected for seasonal trends using ARIMA-X12 on EViews, as it is conventionally used to accommodate the stochastic processes found in aggregated macroeconomic data.

FIGURE 1. Non-adjusted data (1996–2019)



Another concern with long time-series is the presence of structural breaks. Failing to account for these breaks also leads to the imprecise estimates in the SVAR models. Therefore, two types of tests were implemented to account for known and unknown breaks.

Chow's [1960] Breakpoint Test is conducted to determine known structural breaks by fitting subsamples of linear regression models while allowing for structural breaks in each time period. After, using an F-test, there is a comparison of unrestricted and restricted sum of squared residuals.

A similar process can be applied to the unrestricted and restricted log likelihood function and a Wald Statistic. Two potential structural breaks were identified: the Asian financial crisis (May 1997[5] to January 2001) and the Global financial crisis (August 2008 to April 2013).

To look for unknown structural breaks, a Quandt-Andrews breakpoint test is performed. This test is essentially a single Chow Breakpoint Test that is performed at every observation between two dates and then summarized through the Maximum Statistic, the Exp Statistic, and the Ave Statistic as discussed by Andrews and Ploberger [1994] and Andrews [1993]. These statistics are provided through likelihood, *F*, and Wald tests.

Since these tests are not applicable to SVAR, the autoregressive coefficients of these VAR models can be estimated separately through the ordinary least squares (OLS) method without loss of estimation efficiency. Both tests use the same specification as the VAR model in the main analysis, but through five separate equations for endogenous variables—*IPI*, *DC*, *ER*, *DC*, *PR*.

3.2.2. Testing for stationarity and optimal lag order selection

The Augmented Dickey-Fuller [1979] test is used to look for the presence of a unit root (or stochastic trend) in the data. Non-stationary data requires first-differencing for SVAR models to ensure the time-series models produce credible estimates that are free of any deterministic trends. Standard notation from Hamilton [1994] specifies an ADF test using the least squares estimator is given by

$$\Delta X_t = \alpha_0 + \beta X_{t\text{-}1} + \delta T + \sum_{i=1}^{P} \alpha_i \Delta X_{t\text{-}i} + \varepsilon_t \quad (1)$$

where the first difference (ΔX_t) of the series at time t is regressed on the level at time t-1, augmented with lag terms (until order P) of the dependent variable. The time trend is $\sum_{i=1}^{P} \alpha_i \Delta X_{t\text{-}i}$ and ε_t is the error term. A hypothesis test is performed on $\beta = 0$ which is equivalent to determining that X_t has a unit root process. Mean-reversion or stationarity is then checked against the significance of the level term, $X_{t\text{-}1}$.

Results from Table 3 required first-differencing (and log transformations) in the SVAR model to be applied to all variables since their level form showed evidence of non-stationarity.

The Schwarz Information Criterion (SIC) identified the optimal number of lags at 2. This criterion was selected over alternatives to preserve degrees of freedom. The sample is also above 60 which would not give Akaike's Information Criterion (AIC) or Final Prediction Error (FPE) computational power over the SIC as argued by Liew [2004].[6]

[5] There were not enough observations to test the start of the Asian financial crisis or the time prior to 1997, but tests for other periods were conducted successfully.

[6] Models with other lag orders were also tested. Particularly, the 3-lag (suggested by HQ criteria) and 8-lags models (suggested by AIC) are tested. The best model among those tested is the one with 2 lags.

TABLE 3. Augmented-Dickey Fuller Test for variables in level and first-difference

	Level		First difference	
	***t*-Statistic**	**Prob.***	***t*-Statistic**	**Prob.***
Industrial Production Index	-0.2121	0.9321	-12.838	0.0001
Domestic credit to private sector (Percent of GPD)	-1.767	0.3946	-4.1512	0.0013
Nominal exchange rate (Philippine peso to US Dollar)	-2.8319	0.0577	-6.2304	0
Consumer Price Index	-0.1627	0.9383	-5.8096	0
Policy Rate	-2.2252	0.1989	-9.8344	0
Dubai Crude price (Dollar per barrel)	-1.6038	0.4766	-8.0249	0
US Federal Funds Rate	-2.1812	0.2145	-4.0988	0.0016
H1: Presence of unit root in the model.				
H0: Stationarity in the model.				

*MacKinnon (1996) one-sided *p*-values.

3.3. SVAR variable selection and choice of policy and target variables

The SVAR models of this paper utilize seven variables. Industrial Production Index growth, Consumer Price Index, Peso-Dollar Exchange Rate growth rate, changes in Policy Rate (PR), and changes in domestic credit to private sector as a percent of GDP are endogenous variables that are meant to control for the domestic economy and the BSP's monetary policy. Alternatively, Dubai Crude prices and the Federal Funds Rate are exogenous variables that control for international conditions such as oil prices and international trade.

Industrial Production Index – represents the output of the Philippine economy. According to International Monetary Fund (IMF) [2021], this index incorporates the real output of a country's manufacturing sector. As a target variable, output is directly influenced by a country's decision to adjust interest rates, because this influences individuals' spending power and firms' production capacity.

Consumer Price Index – represents prices of goods, the basket for which includes food items, electricity, and transportation costs in the Philippines. It directly absorbs inflationary pressures brought from demand- or supply-side inflation that the economy experiences throughout the business cycle.

Exchange Rate – influences an economy's macro-price ratios like those between imports and exports along with those between tradable and non-tradable goods. The exchange rate potentially minimizes inflationary effect on prices if this targeted by the central bank as argued by Frenkel and Taylor [2006]. The Philippines allows a flexible exchange rate even if its frequent weakening potentially contributes to inflation.

Policy Rate (PR) – the primary means of the BSP conducting OMO and signaling the prevailing interest rate of their monetary policy. According to the Bangko Sentral ng Pilipinas [2020], this policy variable, which is also referred to as the Reverse Repurchase Rate, is the rate used by its overnight facility when lending to banks to accommodate their liquidity requirements.

Domestic credit to private sector (*percent of GDP*) – represents the reaction to adjustments in the RRP because this is the amount of credit circulating around the economy's private sector. This variable may be used as a proxy for the economy's money supply.

Dubai Crude prices per barrel – The Philippines is a net importer of oil. In early 2019, Dubai crude imports from the Middle East accounted for 55 percent of imports [Domingo, 2019]. Along with a weakening currency, this dependence on fuel imports has made the economy vulnerable to supply-side shocks caused by the international market and changes in the Organization of Petroleum Exporting Countries' production.

US Federal Funds Rate – As an emerging economy that is heavily dependent on the US market, the Philippine economy is vulnerable to shocks from the Fed's policy, as also argued by the Department of Finance [2018].

4. Methodology

The methodology is presented in two sections. The first section briefly explains the theoretical framework of a SVAR model and why a simple VAR approach is not adequate for (1) demonstrating the price and output effects of Philippine monetary policy and (2) the strength of monetary policy transmission channels. The next section then discusses the two types of identification strategies used in this paper—recursive and non-recursive. There is a discussion of why each identification scheme is an adequate way to characterize monetary policy in the Philippines.

4.1. Empirical Approach

4.1.1. SVAR methodology

A SVAR model is the primary modelling approach taken in this paper, but before providing its representation of the Philippine macroeconomy, it is essential to briefly discuss why a reduced form VAR model is not applicable.

Since its introduction by Sims [1980], much of the literature on monetary policy effects like Bernanke [1990] and Christiano, Eichenbaum, and Evans [1999] implement VAR models to illustrate the effects of monetary policy on domestic output, prices, and even employment through monetary transmission channels.

As defined by Stock and Watson [2001], a reduced form VAR is a system of equations, where each of the dependent variables is a linear function of its own lagged or past values, previous values of other variables, and a serially

uncorrelated error term. A reduced form VAR model can be presented with the following specification:

$$\boldsymbol{Y}_t = \boldsymbol{\alpha} + \boldsymbol{\Phi}_1 \boldsymbol{Y}_{t-1} + \cdots + \boldsymbol{\Phi}_p \boldsymbol{Y}_{t-p} + \boldsymbol{\beta X_t} + \boldsymbol{\varepsilon}_t \tag{2}$$

$$\text{with } \boldsymbol{\varepsilon}_t \sim WN(\mathbf{0},\boldsymbol{\Omega})$$

where $\boldsymbol{Y}_t$ is a $(k \times 1)$ vector of endogenous variables that contains industrial production index growth at time t (*IPI*), change in credit to GDP ratio (*DC*), growth rate of exchange rate (*ER*), CPI-inflation rate (*CPI*) and changes in Policy rate (*PR*).[7]

$\boldsymbol{\alpha}$ is an n-length intercept vector, $\boldsymbol{\Phi}_p$ is a $(k \times k)$ vector of estimated coefficients at lag order p, and X_t is a $(q \times 1)$ vector of exogenous variables which contains Dubai Crude price growth (*Oil*) and the US Federal Funds Rate (*IR*), with the corresponding parameter vector $\boldsymbol{\beta}$. Finally, $\boldsymbol{\varepsilon}_t$ is a vector of error terms, which follow a white noise process with mean 0 and variance-covariance matrix $\boldsymbol{\Omega}$.

The presence of exogenous variables extends this VAR(p) model to a VARX (p, s). In the remaining sections of the methodology, notation referring to exogenous variables is removed for simplicity.

While reduced form VAR models are used to test generically formulated theories in macroeconomics, Cooley and LeRoy [1985] and Canova [1995] argue that their atheoretical nature, missing identification conditions, and correlation among shocks prevent IRFs from depicting accurate responses to shocks and capturing the true dynamic nature of macroeconomic variables. Thus, reduced form VARs are informative but say little about the structural parameters without important identification conditions.

To implement impulse response analyses and capture the dynamic causal effect due to its identification of a macroeconomy, a SVAR model is applied. Using slightly modified notation from Raghavan, Silvapulle and Athanasopoulos [2012], an IRF from this model may be defined as,

$$\frac{\partial Y_{t+s}}{\partial u_{i,t}} = \theta_{i,s} \tag{3}$$

where $s = 1, 2, 3,\ldots$, and $u_{i,t}$ is an unexpected structural shock to variable the ith variable over s period.

Consider the VAR(p) model from equation (2) without exogenous variables using modified standard notation from Hamilton [1994]:

$$\boldsymbol{Y}_t = \boldsymbol{\Phi}_1 \boldsymbol{Y}_{t-1} + \cdots + \boldsymbol{\Phi}_p \boldsymbol{Y}_{t-p} + \boldsymbol{\varepsilon}_t \quad \leftrightarrow \quad \boldsymbol{\Phi}(L)\boldsymbol{Y}_t = \boldsymbol{\varepsilon}_t \tag{4}$$

where $(L^p)\boldsymbol{Y}_t$ represents the lag operator.

[7] Standard growth rates were utilized for the empirical analysis. For simplicity, in the succeeding sections, variables will just be referred to using their abbreviations.

It is from reduced form VAR estimates that the coefficient of $\boldsymbol{\Phi}_1 \cdots \boldsymbol{\Phi}_p$ may be obtained. If $\boldsymbol{\varepsilon}_t$ were the structural shocks, then the IRFs may be taken from the MA representation of the VAR, $\boldsymbol{Y}_t = \boldsymbol{\Psi}(L)\boldsymbol{\varepsilon}_t$, by taking the first derivative.

Since ε_t may be affected by multiple shocks, the structural form of the model using standard notation is:

$$\boldsymbol{B}_0\boldsymbol{Y}_t = \boldsymbol{B}_1\,\boldsymbol{Y}_{t\text{-}1} + \cdots + \boldsymbol{B}_p\,\boldsymbol{Y}_{t\text{-}p} + \boldsymbol{u}_t \;\leftrightarrow\; \boldsymbol{B}(L)\boldsymbol{Y}_t = \boldsymbol{u}_t \tag{5}$$

where $\boldsymbol{E}(\boldsymbol{u}_t\,\boldsymbol{u}_{s'}) = \begin{cases} \boldsymbol{D} \text{ or } \boldsymbol{I} & \text{for } t = s \\ \boldsymbol{0} & \text{for } t \neq s \end{cases}$

Two identification strategies are utilized to capture different representations of the Philippine macroeconomy while the SVAR model of each strategy depicts the response of interest, credit, and exchange rate channels to a shock in monetary policy.

The recursive approach utilizes the foundations provided by Sims [1980; 1992] on imposing restrictions and mimics the small open economy used by Raghavan, Silvapulle, and Athanasopoulos [2012] in Malaysia, but with some modifications to accurately convey dynamics of the Philippine economy. Alternatively, the non-recursive approach heavily draws from the work of Abouwafia and Chambers [2015], but again, with some modifications to the model's identification and ordering.

IRFs are compared between both approaches to determine the more plausible and statistically relevant model. This, along with the FEVD of the superior model is then presented and discussed.

4.1.2. Recursive identification strategy

This study utilizes the order of variables and theoretical expectations set by Kim and Roubini [2000]. Their structural framework has been modified and applied to numerous recursive studies like that of Raghavan, Silvapulle, and Athanasopoulos [2012] on Malaysia. The same is applied in this paper, but with some modifications for the Philippine economy.[8]

The five variable recursive model, y_t = (*IPI*, *CPI*, *DC*, *PR*, *ER*), includes Industrial Production Index growth, Consumer Price Index, growth rate of Exchange Rate, and Policy Rate (or Reverse Repurchase Rate) as endogenous variables, whereas Dubai Crude (*Oil*) and US Federal Funds Rate (IR) are exogeneous variables.

Using a Cholesky decomposition, the model is just-identified when the contempraneous matrix B_0 has $\frac{m(m-1)}{2} = \frac{5(5-1)}{2} = 10$ restrictions for (exact) identification, where five is the number of parameters or variables used in the model.

[8] It is worth noting that there are various representations of the Philippine macroeconomy. Alternative orderings and sample modifications are applied in the sensitivity analysis of the robustness tests section. Other tests included are the Local Projections method to check the model's identification and a VECM to validate the long-run expectations of Philippine monetary policy.

The contemporaneous matrix, B_0, may be restricted to be a lower triangular matrix:

$$\begin{bmatrix} \varepsilon_{IPI,t} \\ \varepsilon_{CPI,t} \\ \varepsilon_{DC,t} \\ \varepsilon_{PR,t} \\ \varepsilon_{ER,t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ b_{21} & 1 & 0 & 0 & 0 \\ b_{31} & b_{32} & 1 & 0 & 0 \\ b_{41} & b_{42} & b_{43} & 1 & 1 \\ b_{51} & b_{52} & b_{53} & b_{54} & 1 \end{bmatrix} \times \begin{bmatrix} e_{IPI,t} \\ e_{CPI,t} \\ e_{DC,t} \\ e_{PR,t} \\ e_{ER,t} \end{bmatrix} \tag{6}$$

where $\varepsilon_{i,t}$, refers to shocks and $e_{i,t}$ corresponds to reduced-form forecast errors of the ith variable in the same order of variables as of the recursive model, y_t.

In terms of ordering, the first two variables, *IPI* and *CPI*, are considered to be what Bernanke and Blinder [1990] refer to as non-policy or target variables because it is anticipated that these variables respond to monetary policy rate adjustments. Christiano, Eichenbaum, and Evans [2005] present the nominal rigidity theory to justify the order of these two variables, which states that inertia present in *CPI* and output remains relatively persistent in the face of policy rate shocks. Friedman [1968] states the effect from monetary policy adjustments may occur only two to three quarters depending on timing and extent of the adjustment. This theory and order have been cited in Nguyen, Papyrakis, and Van Bergeijk [2019], while Kim and Roubini [2000] and Raghavan, Silvapulle, and Athanasopoulos [2012] have also used the same ordering of these two variables to show that *CPI* is influenced by *IPI* due to the lag in firms' decision to adjust production or their prices.

The next two variables, *DC* and *PR*, make up what Canova and Pérez Forero [2014] refer to as the monetary policy equation. *PR* (Policy Rate) is the primary policy instrument of the BSP to adjust interest rates, which affects money supply or the proxy variable known as available credit, *DC*. Finally, *ER* is affected by all previous variables because of the BSP's free-flowing exchange rate policy, as argued by Guinigundo [2008], would allow market forces to affect the Philippine exchange rate unless there are extreme volatilities or the rate severely threatens the country's inflation target. As also stated in the literature, (inflation) pass-through effects by the *ER* are not instantenous and likely to occur over time due to its dependence on other macroeconomic variables. Overall, this specification is in majority of the literature that mimic Kim and Roubini's [2000] framework.

4.1.3. Non-recursive identification strategy

The non-recursive ordering and identification in the second component is similar to the ordering and theory specified by Abouwafia and Chambers's [2015] analysis on the Middle East. In a non-recursive fashion, (short- and) long-run restricitions are applied to allow a specification (7) relating structural shocks (ε_t) and endogenous variables.

Essentially, a total of eight restrictions are imposed on B_0 to achieve over-identification conditions that are given by:

$$\underset{y_t}{\begin{bmatrix} IPI_t \\ CPI_t \\ ER_t \\ DC_t \\ PR_t \end{bmatrix}} = C(L) \underset{B^{-1}}{\begin{bmatrix} b_{11} & 0 & 0 & 0 & 0 \\ b_{21} & b_{22} & 0 & 0 & 0 \\ b_{31} & b_{32} & b_{33} & 0 & b_{35} \\ b_{41} & b_{42} & b_{43} & b_{44} & b_{45} \\ b_{51} & b_{52} & b_{53} & b_{54} & b_{55} \end{bmatrix}} \times \underset{\varepsilon_t}{\begin{bmatrix} \varepsilon_{IPI,t} \\ \varepsilon_{CPI,t} \\ \varepsilon_{ER,t} \\ \varepsilon_{DC,t} \\ \varepsilon_{PR,t} \end{bmatrix}} \tag{7}$$

where $C(L)B^{-1}$ refers to long-run restrictions.

The primary difference between (7) and Abouwafia and Chambers's [2015] model is the inclusion of *DC* instead of the asset price channel (or stock prices) in the fourth equation. The characterization of Philippine monetary policy indicates that credit and asset price channels are strongly intertwined which makes *DC* an acceptable substitution in this case.

In terms of ordering, the first two variables, *IPI* and *CPI*, are target variables or they denote the goods market equilibrium. They once again follow Christiano, Eichenbaum, and Evans's [2005] explanation on the nominal rigidity theory, or what may be referred to as the monetary neutrality. This theory indicates that nominal variables have no impact on real economic indicators in the long run. Moreover, it is anticipated there will be some persistence in the short run. Partly due to the lag from firms to adjust to (monetary) policy decisions.

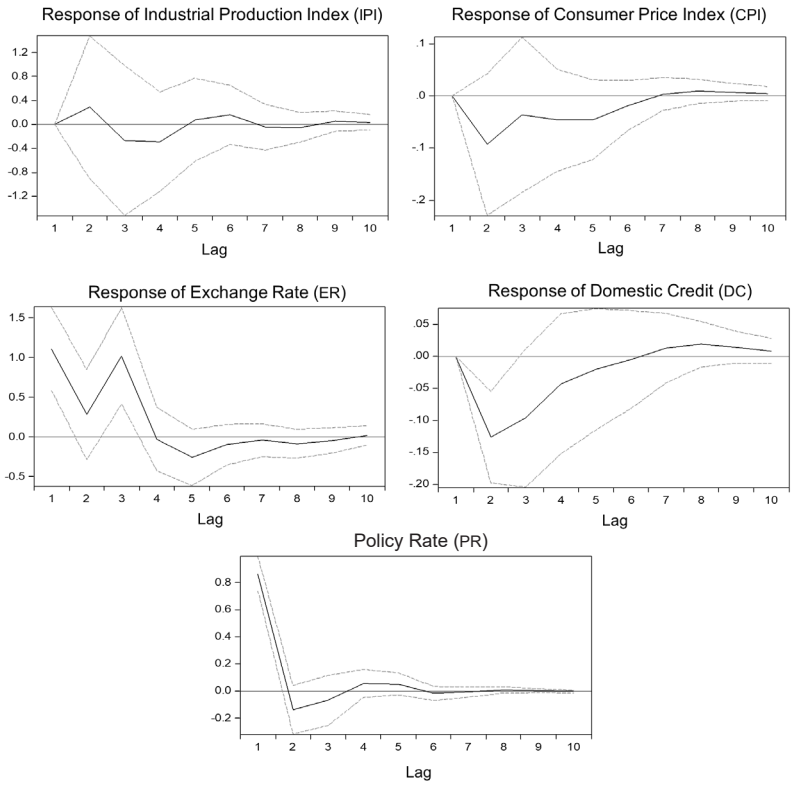
In this identification strategy, there is a clear difference in the response of *ER* because a lag is designated in its reaction. This specification considers Guinigundo's [2008] claim that there are instances in which the domestic exchange rate is completely unfazed by monetary policy adjustments. The remaining two variables, *DC* and *PR*, are monetary policy variables. The specification of *PR* is again based on Guinigundo [2008] characterization of the BSP's behavior which is to make policy decisions based on all available information from other macroeconomic indicators.

5. Empirical results and discussion

5.1. Comparison of results between both identification strategies

Figures 2A and 2B present similar results on the price and output effects of Philippine monetary policy through its transmission channels. It is not unexpected for output to show some persistence in the short run. IRFs show relatively weak credit and exchange rate transmission channels in the country. The predictions of IRFs also show hardly any statistical significance for both methods. However, there are still two notable differences between both models.

FIGURE 2A. IFRs of a contractionary to a domestic monetary shock (SVAR, recursive)

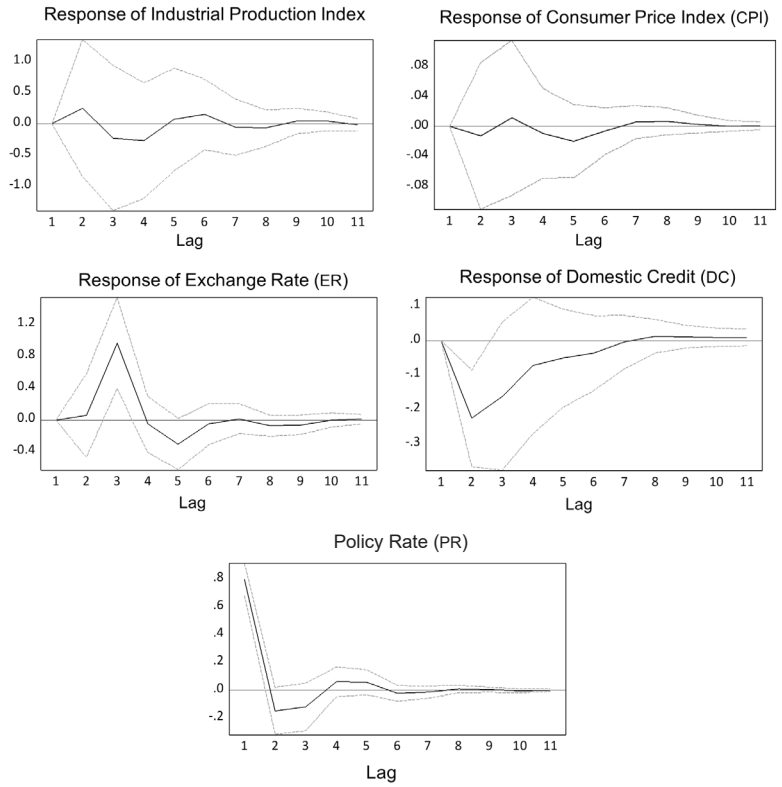


Note: Dashed lines represent 95 percent confidence bands.

In the case of the recursive method, there is evidence of an exchange rate puzzle that directly contradicts Dornbusch [1976]. Conventional theory states that, following a contractionary domestic monetary policy shock, there is a short-run appreciation of domestic currency before steadily declining over time. In most cases, this occurs when there is a floating exchange rate, much like the one applied by the BSP.

Price and output effects from higher interest rates are more pronounced for the recursively identified model while the impact on credit is almost twice as a large for the non-recursive model. Along with its statistical significance, the results presented by the non-recursive method are more consistent with the literature which makes it the preferred model for this paper.

FIGURE 2B. IFRs of a contractionary to a domestic monetary shock (SVAR, non-recursive)



Note: Dashed lines represent 95 percent confidence bands.

5.2. Discussion of non-recursive (preferred model) results and macroeconomic implications

Figure 2A presents IRFs depicting a one-standard-deviation contractionary shock in Philippine monetary policy. All variables demonstrate their response through ten quarters. Dashed lines plotted in each graph represent one-standard-error bands while the blue line depicts the time path of each variable's response. Scales vary among graphs to magnify the time path per variable relative to their respective means, which is represented by the straight black line.

First, the response of *IPI* to the shocks of the policy rate is not significant, but it does conform to the view that monetary policy may potentially only impact output in the short run before it reverts to a fixed level in the long run. While there is persistence, the deviation is not large. After the tightening of Philippine policy rates, there is an initial increase (0.33 percentage point) in the second period, but this is followed by a decline until the fourth period (0.35 percentage point), before rebounding to its pre-shock level, or mean-reverting value, in the

succeeding periods. This result suggests that the initial tightening of monetary policy potentially had an impact on output but after a lag of two periods due to persistence. While the overall time path of this model is consistent with the work of Vargas [2021] and Dakila Jr. and Paraso [2005], results from the preferred model suggests that there is a more noticeable lag of one to two quarters before the impact of higher interest rates is felt on output.

Second, the response of *CPI* is not significant, but it is consistent with conventional macroeconomic theory. An increase in policy rates decreases the price level because it disincentivizes borrowing, investment, and spending. Results show a decrease (0.01 percentage point) in the *CPI* by the second period before showing some minor deviations for the next four periods. Afterwards, there is clear evidence of mean reversion in the seventh period. The time path is consistent with Glindro et al. [2016], but this paper's model shows a much weaker impact on the price level.

Third, the response of the *ER* is only significant for the third quarter, but it does show a time path that is somewhat consistent with delayed overshooting, argued by Kim and Roubini [2000], in which there is an initial appreciation followed by depreciation of the Philippine (domestic) currency in later quarters. The impact appreciation only lasts from the second quarter until the fourth quarter. There is also a strong appreciation of the exchange rate in the third quarter (0.88 percentage point). This is followed by a sharp depreciation of the *ER* two quarters later (0.20 percentage point) before slowly reverting to a value close to zero in the seventh quarter.

Fourth, the response of *DC* is statistically significant for the first two quarters following the shock. The results are closely tied to *CPI*, as there is an immediate decline (0.22 percentage points) after the shock. This time path shows the amount of domestic credit from private firms decreasing shortly after the tightening of policy rates before steadily rising by the eighth quarter. The magnitude of these estimates are less than but still consistent with that of Guinigundo [2008], Glindro et al. [2016], and Tuano-Amador, Glindro, and Claveria [2009] who argue that, in comparison to the alternatives, the credit channel is the strongest monetary policy transmission mechanism due to the prevalence of the banking sector.

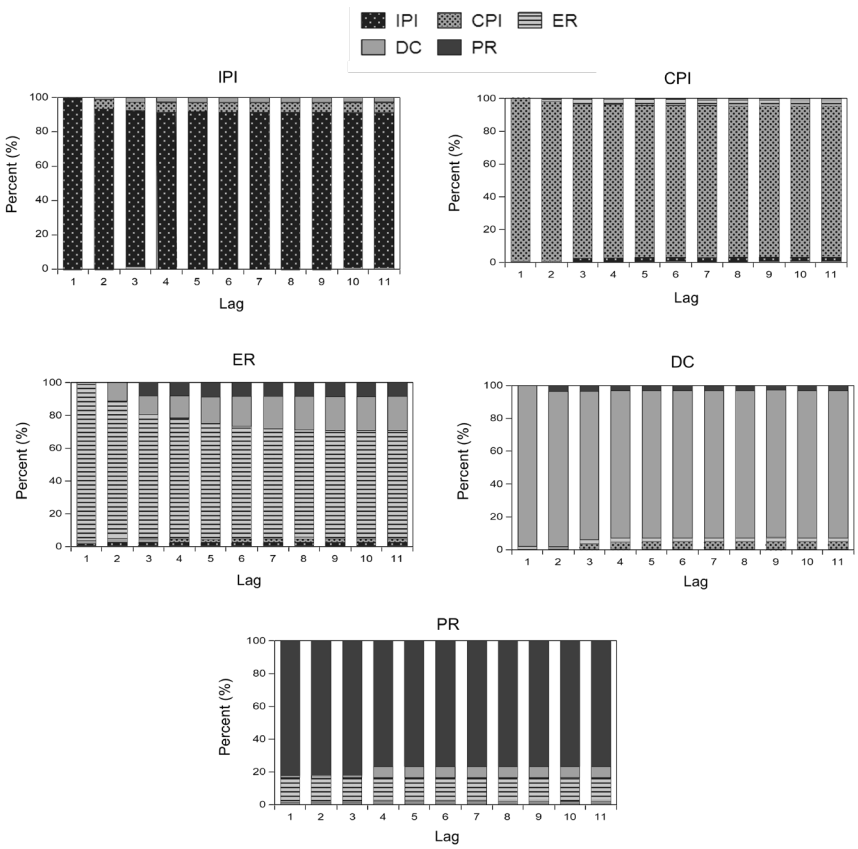
IRFs from *IPI* and *CPI* contain no periods in which the deviation is statistically significant. The impact of contractionary monetary policy also has considerable lags on *IPI* and there is a relatively weak impact on the reducing the price level (in the short run). However, the lag still is within the expectations of conventional macroeconomics of roughly two to eight quarters before the impact of monetary policy adjustments are felt. Credit channels may display the strongest pass-through effects in comparison to the alternatives, but the overall response functions of these channels still suggest a relatively weak pass-through of Philippine monetary policy transmission mechanisms.

5.3. Discussion of VD SVAR results and their depiction of Philippine macroeconomic variables

VD results from the SVAR model in Figure 3 explain the variability of shocks in respective variables over the course of eleven quarters. Results indicate that, except for *ER* and *PR*, 92.30 percent of the forecast variance of *IPI*, *DC*, and *CPI*, on average, is explained by their own shocks.

In the case of *ER*, its own shock accounts for an average of 76.23 percent of the variation of the fluctuation over eleven quarters. *DC* accounts for 12.38 percent in *ER* over this period, but this only rises after the first quarter. This is followed by *PR*, which accounts for 5.93 percent that substantially increases after the second quarter. *IPI* then provides a marginal average contribution of 4.23 percent. Lastly, *CPI* comprises only 1.44 percent of the variation in *ER*. The relatively large sources of variation brought about by other domestic variables are consistent with the BSP's free-floating exchange rate policy.

FIGURE 3. VD of SVAR variables (non-recursive, stacked table)



PR is another variable that contains relatively large amounts of variation driven by other domestic variables. Its own shock contributes to an average of 76.66 percent variation over eleven quarters while 15.18 percent of the variation is attributed to *ER*. The averages of *CPI* and *DC* are 0.80 and 6.12 percent in variation fluctuations, respectively. The contribution of *CPI* rises substantially after the first quarter. *IPI* then accounts for a modest 1.24 percent in variation fluctuations of the BSP's *PR*. This breakdown is generally consistent with the reasoning provided by the country's monetary authorities—that volatilities from *CPI* and potentially *ER* are motivators behind their decision to adjust *PRs*.

5.4. Tests for robustness

Robustness tests are implemented to ensure the absence of economic puzzles,[9] proper model ordering and identification, and the validity of monetary policy transmission in both short- and long-run horizons. These tests include (1) a sensitivity analysis, (2) the Local Projections method, and (3) a VECM.

The rationale behind these three robustness tests are as follows: first, a sensitivity analysis that includes modifications to the sample, ordering, and sign restrictions are simple ways of ensuring credible estimates and time paths of IRFs. Second, Jordà's [2005] Local Projections (LP) method is relatively absent from the Philippine monetary policy literature. This robustness test allows for an alternative computation of IRFs without identification of the underlying multivariate dynamic system. Barnichon and Brownlees [2019] and Ronayne [2011] argue that the LP method is less computationally intensive because it allows for more flexible forecasts of impulse-response estimation along with their nonlinear standard errors. Third, IRFs from SVAR models are less accurate in the long run. Moreover, short-run deviations (like inflationary episodes) may cast doubt on the preferred model's depiction of monetary policy transmission in the short term. In this study, a VECM identifies long-run cointegrating relationships between the policy and target macroeconomic variables which validates the depiction of results from the preferred SVAR model and also provides some characterization of the expectations channel in the Philippines.

5.4.1. Sensitivity analysis (Sample modifications, alternative orderings, and sign imposition)

First, since this paper uses interpolated data for the representation of quarterly domestic credit, there is a minor concern of data precision and distribution. As mitigation, monthly data from the BSP's Depository Corporations Survey (2002 to 2019) on 'domestic claims on private sector' was used in place of *DC*.[10] The

[9] Economic puzzles are often depicted through IRF results which are contradictory to conventional macroeconomic theory and evidence of model misspecification as argued by Sims [1992].

[10] Domestic claims from the Depository Corporations Survey would have been an ideal choice for domestic credit in this study. However, available data from the BSP shows a shorter series by four years which would fail to capture any period before IT was implemented by the BSP.

time paths of IRFs are generally consistent with non-recursive results though the decline on output is more immediate while the there is a one quarter delay before prices decrease. Moreover, unlike the IRFs form the non-recursive model, *DC* and *ER* no longer have any statistically significant periods which could indicate weaker transmission mechanisms.[11]

Second, the ordering from the non-recursive methods is only one way of representing monetary policy transmission in the Philippines. The current conjecture implies target variables (*IPI*,*CPI*) ← policy variables (*DC*,*ER*,*PR*). Changes in the order of firms' response (*IPI*) to changes in the prices (*CPI*) have no impact on monetary transmission in this system. Alternate orderings of policy variables also do not change general results except for a transitory puzzle when *ER* is ordered last in the system. Though there is initial currency depreciation, this is followed by appreciation before gradually reverting to the expected trend. Based on these results, alternate orderings for *IPI*,*CPI*,*DC*, and *PR* from the non-recursive SVAR model appear to be robust. Along with alternative orderings, sign restrictions were also imposed using various orderings, but macroeconomic movements (from IRFs) remained generally consistent with the preferred (non-recursive) model.

5.4.2. Local Projections method

Results from the LP method are generally consistent with the overall trend and statistical significance depicted by the ordering of the non-recursive SVAR model.[12] From this outcome, it is likely that the non-recursive SVAR model is robust in the sense that it is properly identified. However, there are some differences in the time paths and magnitudes of the IRFs from the LP method worth indicating.

First, the impact of a contractionary monetary policy from the LP method shows a clearer decline for *IPI* before gradually rising after the second quarter while there is more persistence from *CPI*. The IRFs from the LP and SVAR methods are similar by showing that the effect of the shock tapers off by roughly the fifth and sixth quarters of the horizon. Second, the impact on *ER* in the LP method is more consistent with Kim and Roubini's [2000] analysis because the (impact) appreciation of the domestic currency following the shock is more pronounced and declines gradually over a longer period before rebounding after the sixth quarter. Third, the impact on *DC* starts at a similar magnitude in second quarter as in the SVAR model, but at a slower pace. In the LP method, *DC* reaches its pre-shock level two quarters later earlier than the SVAR IRF reaches at the seventh quarter.

While an argument can be made for the validity of both sets of IRFs, results from the non-recursive SVAR and LP method do suggest that monetary policy transmission channels are relatively weak at pass-through effects on output and prices in the country.

[11] IRF results using DC from the Depository Corporations Survey may be found in Appendix 2.
[12] IRFs from the LP method results may be found in Appendix 2.

5.4.3. Vector Error Correction results

The Johansen Cointegration Test is performed to determine if there are cointegrating relationships among non-stationary data which are integrated of the same order. Based on the results, such long-run (cointegrating) relationships are present among the variables in this study. The coefficient on the error-correction equation is statistically significant and indicates a correction of the previous period's deviation at an adjustment speed of 0.34 percentage points. Long-run relationships between *PR* and *IPI* are statistically significant and consistent with the primary non-recursive analysis.

Moreover, the IRFs from the VECM depict time paths that are consistent with the non-recursive SVAR results for the short term.[13] Overall, it is likely that Philippine monetary policy can anchor (inflation) expectations and impact domestic output and prices, but there is a potential lag before its effects are fully realized for transmission channels in the short term.

6. Concluding remarks

This paper investigated the price and output effects of Philippine monetary policy. Using adjusted quarterly macroeconomic data from 1996 to 2019, a five-variable SVAR model was identified using two identification strategies (recursive and non-recursive) to estimate how monetary transmission channels like domestic credit, exchange rates, and interest rates exhibit pass-through effects onto Philippine consumer prices and output.

The research addressed two open questions: (1) the (short-run) price and output effects of domestic monetary policy and (2) the relative strength of monetary policy transmission channels in the country. In terms of the first question, though not statistically significant, the tightening of monetary policy is associated with a transitory decrease in output and prices in the short run. The decline in output is significantly less noticeable than the decline of the price level in the second quarter succeeding the shock based on the preferred model. This outcome shows that the movement of the Philippine economy generally adheres to the classical dichotomy, which is beneficial for the BSP. It provides some evidence that the tightening of monetary policy by the government does not disrupt output in the long term. Conversely, the non-existent (or potentially modest) impact of the shock on lowering the price level relative to the literature [Dakila Jr. and Paraso 2005; Glindro et al. 2016] indicates that domestic monetary policy might fail to counteract all of the effects of price shocks from the commodity market.

The characterization of price and output effects on the Philippine economy provide the foundation for the second research question of this paper. In comparison to the literature, the non-recursive model showed relatively weaker

[13] VECM results may be obtained from the author upon request.

pass-through effects on domestic credit which is supposedly the strongest transmission mechanism of monetary policy in the country. Though, with only some statistical significance in the short term, the results confirm that the credit channel is a noticeable (but relatively weak) transmission mechanism of Philippine monetary policy. In the case of the domestic exchange rate, though not statistically significant, there is an immediate impact of interest rate tightening which shows that the BSP may have some ability to counteract effects of US interest adjustments or even oil price shocks. These imperfect monetary transmission mechanisms are not uncommon for developing countries and they are a clear point of contrast to monetary policy studies on developed countries.

The results in this study were verified with several robustness tests but they are not without limitation. The SVAR model used in this study may not completely address the issue of endogeneity, as argued by Phan [2014]. Constant estimates and variances provided over a specific period by the model might also fail to incorporate underlying structural changes. The Philippines adopted inflation targeting, six years into the dataset, which could be a big enough structural impact that alters the model's variances or parameters relating the structural shocks. While dummies were incorporated into the SVAR model prior to 2002 to capture any structural breaks, determining whether these structural changes alter a model's variances and parameters may be best done though a Time-Varying Parameter VAR model. Further research may also be conducted to analyze the reasons behind the strength of monetary transmission channels and provide more controls for asset prices and even inflation expectations.

Overall, the current IT regime has allowed the BSP to anchor inflation expectations and reduce inflation volatility in the country, but persistent supply-side shocks are still expected to occur more frequently in the future. Repeated efforts to boost communications with consumers and businesses in the short run may minimize any delays of monetary policy transmission. Alternatively, the continuation of non-monetary policy measures such as targeted cash transfers or subsidies may also limit the effects of persistent (supply-slide) inflation.

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The BSP's Forecasting and Policy Analysis System

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The Bangko Sentral ng Pilipinas (BSP) subscribes to the Forecasting and Policy Analysis System (FPAS) as the framework for macroeconomic forecasting and analysis in support of monetary policy formulation. FPAS is a standard framework, adopted by many inflation-targeting central banks, that organizes the generation, consolidation, and analysis of economic information relavant to monetary policy formulation. This paper aims to describe how macroeconomic forecasts and policy simulations are generated to support monetary policy analysis and formulation at the BSP. To this end, this article summarizes the main features of the process involved in generating the baseline forecasts, alternative scenarios, and policy simulations. We highlight the complementary roles played by the BSP's suite of models and the expert judgement from the sector specialists as well as the importance of forecast communication in the transmission of monetary policy. Finally, we present a systematic evaluation of the forecasting performance of the BSP from 2010 to 2020 together with some of the lessons in forecasting during the COVID-19 pandemic and the recent efforts to improve the BSP's FPAS.

JEL classification: C5, E5
Keywords: monetary policy, macroeconomic modelling, forecasting, inflation targeting

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1. Introduction

Since the adoption of inflation targeting (IT) as the framework for monetary policy in 2002, forecasting inflation with reasonable precision had become a key priority for the Bangko Sentral ng Pilipinas (BSP) due to the forward-looking nature of monetary policy formulation. IT central banks, including the BSP, formulate policies generally based on a reasonable picture of the macroeconomy and risks surrounding it over the policy horizon.

The use of models establishes a structure for policy analysis by providing a theoretical framework to understand and summarize key economic relationships. Models are also natural storytelling devices that facilitate external communications.

The BSP uses a variety of methodologies ranging from purely time series techniques to semi-structural and theoretical models. These are used for generating forecasts of inflation and other key macroeconomic variables to guide the economic surveillance activities of the BSP in aid of monetary policy decision making as well as policy evaluation.

BSP modelling efforts subscribe to a "thick" modelling philosophy by maintaining a suite of models for forecasting and policy simulation. According to Pagan [2003], it is desirable to maintain a diverse set of models since no single model can address all policy issues. In addition, the selection of appropriate model requires a careful balance of the trade-off between theoretical and empirical coherence. The "thick" modelling approach recognizes the natural limitations of models to (i) forecast accurately the exact path of the variables over the forecast horizon; and (ii) adequately address or cover all policy issues in the economy. In other words, this modelling approach addresses the inherent trade-off between model tractability and model size and depth that allow for richer structural features. In recognizing these limitations, the suite-of-models approach offers flexibility to address different policy issues and forecasting requirements of monetary policy analysis.

The use of macroeconometric models for forecasting and policy analysis is common in IT central banks which combine fully-structural and semi-structural types of models to generate their baseline projections. Thus, the BSP's pluralistic approach to modelling is consistent with the practice among central banks of maintaining various models (i.e., economy-wide or specific to some sectors such as oil and housing market, among others) for forecasting as well as for scenario analysis and risk assessment (Table 1). The pluralistic approach to macroeconomic modelling is similarly employed by the International Monetary Fund (IMF) to address a broad range of policy issues globally and in individual countries [Isard 2000]. Such policy questions include the spillover effects of policy changes, implications of rise in global oil prices, and sustainability of a country's pension system, among others. The utilization of nowcasting models along with the judgment of sector specialists is also a common practice among central banks as part of their forecasting process.

TABLE 1. Economic models for forecasting and policy analysis at various central banks

Name of central bank	Economic models for forecasting and policy analysis
Bank of Canada	• Terms-of-Trade Economic Model (TOTEM), a large-scale multi-sector dynamic stochastic general equilibrium (DSGE) model • International Model for Projecting Activity (IMPACT), a global semi-structural model • Global Projection Model (BOC-GPM) • Large Empirical and Semi-structural model (LENS) • Model for the US Economy (MUSE), a macroeconometric model
Bank of Thailand	• Bank of Thailand Macroeconometric Model (BOTMM) • Small semi-structural model • DSGE model • Other economic models (corporate sector model, household model, vector autoregressive models or VARs)
Czech National Bank	• Core quarterly projection model • Monitoring and near-term forecasting models (e.g., ARIMAX) • Signal extraction models • Dynamic optimizing multi-sector model with stock-flow relationships • Satellite models
European Central Bank	• New Area-Wide Model (NAWM), a DSGE model • New Multi-Country Model (ECB-MC), a multi-country semi-structural model • Satellite models (e.g., Bayesian VAR)
Monetary Authority of Singapore	• Monetary Model of Singapore (MMS), a macro computable general equilibrium model • Satellite Model of Singapore (SMS), a macroeconometric model
Reserve Bank of Australia	• Full-system economic models (VAR; Factor Augmented VAR; Stuctural VAR; Vector Error Correction Model or VECM; Macroeconomic Relationships for Targeting Inflation or MARTIN; DSGE) • Single-equation economic models (exports ECM; Okun's law model, Australian dollar ECM; Phillips curve; Inflation mark-up model; Asset pricing model)
Reserve Bank of New Zealand	• New Zealand Structural Inflation Model (NZSIM), a combination of core DSGE model and auxillary equations • Statistical models (Factor models, Bi-variate indicator models, VAR, and Bayesian VAR)
South African Reserve Bank	• Core econometric model, a structural ECM • Quarterly projection model • DSGE model

Note: The above list is not exhaustive and is subject to change.
Source: Official central bank websites.

It should be emphasized that the BSP does not employ models as black boxes. Significant inputs and judgment from sector experts and management are incorporated in the forecasting and modelling exercises to form a coherent narrative. At the same, there is recognition of the inherent uncertainty in the forecasting process, due in part to the complexity of the operating environment along with model/parameter uncertainty. This is mitigated by considering

alternative scenarios for the assumptions used and subjecting the baseline forecasts to various shocks. A key output of the forecasting process is an assessment of risks over the policy horizon as well as confidence intervals for key variables, typically shown as fan charts.

The increased role of judgment and risk assessment in the forecasting process warrants further improvements. Recent research has shown that the combination of model-based and judgment-based forecasts have performed relatively well in terms of out-of-sample forecasting. The role of subjective judgement in forecasting is particularly useful during unusual events (e.g., oil crisis, currency crisis, terrorist attack, etc.) in which estimation of the impact could require more information to complement historical statistics [Sims 2002]. Thus, a more formal framework on how to combine various model forecasts and expert judgment of the staff and policymakers could lead to improvements in the central bank's analytical capacities [Adolfson et al. 2007].[1]

This paper summarizes the main features of the process involved in generating the baseline forecasts, alternative scenarios, and policy simulations in the BSP. We highlight the complementary roles played by the BSP's suite of models and the expert judgement from both the sector specialists and top officials as well as the importance of sufficiently communicating the inflation outlook and risks in improving the transmission of monetary policy. We also present a systematic evaluation of the forecasting performance of the BSP from 2010 to 2020 together with some of the lessons in forecasting during the COVID-19 pandemic and the recent efforts to improve the BSP's suite of macroeconomic models.

2. Forecasting and Policy Analysis System (FPAS)

The FPAS is the standard framework adopted by many IT central banks to systematically organize monetary policy decision-making [Clinton et al. 2017]. IT central banks in the 1990s pioneered the systematic use of tools and processes in setting their interest rates. The framework covers the efficient provision and generation of all economic information, including forecasts for and policy simulations on macroeconomic variables, relevant to monetary policy formulation. It also provides guidance on the organizational structure of the forecasting team, sources of external assumptions, schedule of deadlines and meetings for each forecast exercise, database management, and information technology requirements.

[1] Adolfson et al. [2007] illustrated specific episodes when expert judgment complemented model-based forecasts at the Sveriges Riksbank (the central bank of Sweden). For instance, in Q2 2002, the official forecasts of Riksbank incorporated the sector experts' view that the food price increases due to the mad cow and foot and mouth diseases represent a persistent shock to price level but small effects in annual inflation. In contrast, the purely model-generated forecasts from DSGE overestimated the impact of food price shock to inflation in 2001 and 2002.

Laxton et al. [2009] identified the benefits of establishing an FPAS. This includes improved internal communications between the staff, management, and policy decision-makers, ease in identifying and communicating policy issues, enhanced ability to systematically review the previous forecast and policy decisions, development of technical skills of bank personnel involved in surveillance, forecasting, and policy analysis, improvements in institutional knowledge, and greater transparency behind the monetary policy decisions.

The framework involves the following major components (Adrian et al. [2018]; Mæhle et al. [2021]):

1. Establish a forecasting team responsible for model development, near-term forecasting (current and one-quarter ahead), and medium-term forecasting.
2. Develop a reporting system based on a key set of macroeconomic variables so that everyone involved in the process will be informed about how new information affects the near-term inflation forecast and the implications if any for the longer-term outlook.
3. Develop a projection model of the economy that embodies policymakers view about the monetary policy transmission mechanism in the standard set of shocks that affect the economy.
4. Develop a consistent model-based macroeconomic forecast. This includes assessing the risks to the previous official baseline forecast and using that to propose changes to the official baseline forecast.
5. Develop measures of uncertainty in the forecast such as model-based confidence intervals. These measures should be used to communicate the extent of this uncertainty both internally and to the public.
6. Study specific risks in the baseline forecast in developing contingency plans for reacting to new information.

2.1. Features of the BSP FPAS

Figure 1 illustrates the informal FPAS of the BSP. This covers the overall process for economic surveillance, generation of near-term and medium-term macroeconomic forecasts, and risk assessment in support of monetary policy analysis and formulation at the BSP.

2.2. Monetary policy analysis at the BSP[2]

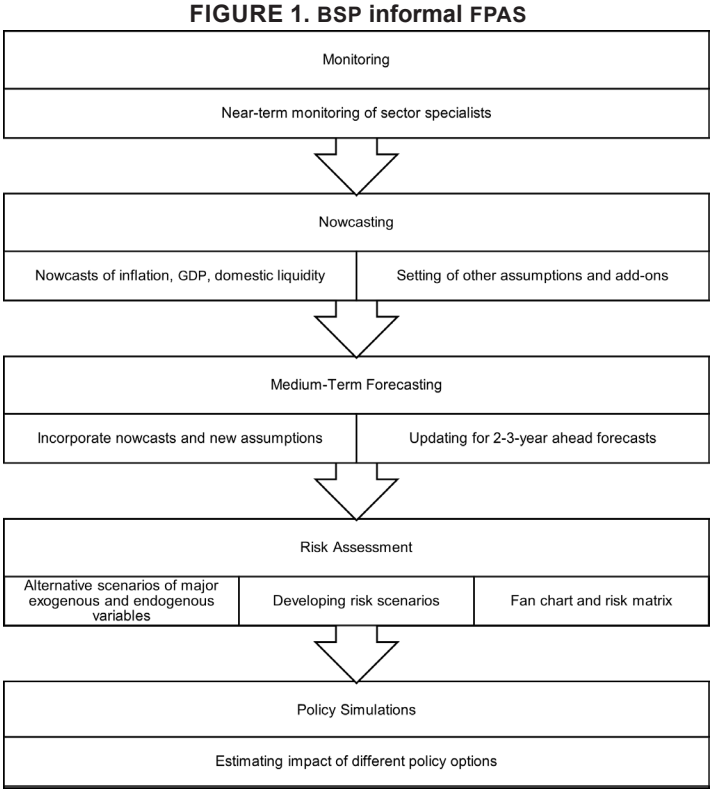
Monetary policy analysis at the BSP is non-linear and iterative with the end goal of generating a comprehensive and coherent narrative on factors underpinning the policy decision. The forecasting process starts about a month before the Monetary Board (MB) monetary policy meeting. The Technical Staff

[2] Please refer to the FAQ on Inflation Targeting for a more detailed description of the inflation targeting framework of the BSP available online ["The BSP and Price Stability" 2020].

(TS) of the BSP's Advisory Committee (AC)[3] comprising of sector experts, meets to discuss recent developments and possible risks in the key economic sectors that influence the outlook for inflation and growth in the country. Information from these discussions is incorporated by the DER forecasting team in the baseline projection and risk assessment. The inflation outlook and alternative scenarios are finalized when the TS reconvenes about two weeks after.

During the second technical level meeting, the DER forecasting team may be asked to revise its baseline estimates to incorporate the consensus view of the TS on the inflation outlook. The risks collectively identified by the TS will then be simulated using the BSP economic models to quantify their likely impact on the baseline projections. Table 2 shows a typical timeline of meetings on monetary policy analysis at the BSP.

FIGURE 1. BSP informal FPAS



Source: Authors.

[3] The AC was formed as part of the institutional setting for inflation targeting. It is tasked to deliberate, discuss and make recommendations on monetary policy to the MB. The AC is composed of seven members and chaired by the BSP Governor. The other members include the Deputy Governors of the Monetary and Economics Sector, Corporate Services Sector, Financial Supervision Sector, and the Senior Assistant Governors of the Monetary Policy Sub-Sector, Financial Markets, and Office of Systematic Risk Management.

TABLE 2. Timeline of meetings

Week	Meeting	Discussions
1-2		Topics arising from the last AC/MB meeting
3	TS Meeting: recent developments and issues	Domestic and global economic conditions Research on key issues of concern
4-5	TS Meeting: forecasts	Discuss preliminary forecasts, risks, and policy recommendations to AC
5-6	AC Meeting MB Policy meeting	Discuss forecasts and risks Policy recommendation to the MB Announce policy decision, forecasts, and balance of risks

Source: Authors.

The assessment of the TS on current macroeconomic conditions, baseline forecasts of key macroeconomic variables and risks surrounding the outlook as well as its policy recommendation are then presented to the AC during its scheduled policy review meeting. During the said meeting, the members of the AC will deliberate on the TS submissions and decide on their monetary policy recommendation to the MB. Members of the AC can suggest refinements to the forecasts or request additional scenario-building exercises or policy simulations to fully incorporate its view on the direction of the macroeconomy over the policy horizon. The policy recommendation of the AC is then submitted for discussion during the MB's monetary policy meeting. Once approved by the MB during its monetary policy meeting, the staff forecasts are then considered as the BSP's official forecasts, released to the public at the BSP's press conference on monetary policy decision.

TABLE 3. BSP's suite of models

Purpose	Model
Nowcasting	Inflation: SARIMAX, Regional, State Space GDP: ARIMA, Bridge Equations, Bayesian VAR, Composite Leading Indicators M3: ARIMA, VAR, LFS Current Account: ARIMA, MIDAS, Bridge Equations
Medium-term forecasting Scenario-building Policy simulations	Multi-Equation Model (MEM) Single Equation Model (SEM) Policy Analysis Model for the Philippines (PAMPH) Global Projection Model (GPM)
Add-ons and other policy simulations	Input-Output Table Global Integrated Monetary and Fiscal Model (GIMF)
Other models	Output Gap and Potential Output Models Early Warning System for Currency Crisis and Debt Sustainability Philippine Composite Index of Financial Stress

Source: Authors.

The BSP maintains a suite of models for forecasting and policy simulations with a view that no single and superior model could accurately forecast the exact path of economic variables or address all policy issues. This approach also recognizes the inherent trade-off between model tractability and model size and depth that allow for richer structural features. In recognizing these limitations, the suite-of-models approach offers flexibility to address different policy issues and forecasting requirements of monetary policy analysis. The BSP suite of models includes models used for near-term forecasting or nowcasting, medium-term forecasting, scenario building and policy simulations (Table 3).

2.3. Nowcasting models

Nowcasting models were developed to supplement the BSP's medium-term forecasting models. The forecasts from nowcasting models are considered as initial conditions when generating the forecasts from the medium-term forecasting models. By providing a clearer picture of the state of the current quarter or current month than what is officially available due to lags in data releases, the use of nowcasts as initial conditions lead to improvements in medium-term forecast performance. The following describes the various nowcasting models that are currently in operation at the BSP.

2.3.1. Inflation

The Disaggregated Seasonal Autoregressive, Integrated, Moving Average (SARIMA) model with exogenous variables generates 1- to 3-month ahead forecasts for 30 select sub-components of the CPI. The sub-component forecasts are then combined to produce estimates for headline, core, and other inflation measures. Using a Seasonal Autoregressive Integrated Moving Average process with exogenous variables (SARIMAX), forecasts are derived from the univariate analyses of historical movements along with occasional structural features and seasonal factors. Some equations are supplemented by higher-frequency data on the actual domestic prices of agricultural commodities, petroleum products and electricity. Estimates from the model provide a more detailed and components-based approach to analyzing inflation outcomes [Allon 2015].

The Regional Inflation Model forecasts headline inflation at the regional level to gain a more granular perspective on the price dynamics across the 17 regions in the country. The model uses the univariate and multivariate support vector regression (SVR) algorithm, which is a machine learning model that is capable of both linear and non-linear regressions. Unlike the standard ordinary least squares approach, SVR offers more flexibility by directly specifying an acceptable tolerance level for the error term in the estimation. Meanwhile, the multivariate SVR extends the analysis by including a dummy variable for a supply shock as assessed through news analysis and expert judgement [Gabriel et al. 2020].

The state-space model provides nowcasts for headline and core inflation via time-varying regressions written in state-space form. The selected explanatory variables for headline inflation are weekly price variables that represent potential shocks to major components of the CPI. Meanwhile, regressors for core inflation are demand-based indicators that reflect long-term trends in economic fundamentals rather than transitory price fluctuations. The state-space specification then captures non-linearities in the relationships (i.e., coefficients) of the inflation measures and their high-frequency explanatory variables through the use of the Kalman filter as well as the simultaneous estimation of observed and unobserved variables (Allon et al. [forthcoming]).

2.3.2. GDP growth

The quarterly GDP growth nowcast that feeds into the forecasting models of BSP is a consolidated forecast derived from different nowcasting methods. The methods considered for projecting the quarter-ahead GDP growth include: autoregressive models at the major industry and expenditure level; ordinary least square regression using frequently (i.e., monthly) released contemporaneous and leading indicators of GDP. Indicators used in the models are total and industrial electricity sales, manufacturing volume of production index, national government revenue and expenditure, and passenger car sales from Chamber of Automotive Manufacturers of the Philippines, Inc. (CAMPI). The models also consider a dummy variable for elections in industries positively influenced by election-related activities.

Forecasts from each model are aggregated using the inverse of the mean square error derived from the forecasted and actual values. The results from these models along with staff judgment based on recent trends in high-frequency indicators are used as the one quarter-ahead projection. These models undergo regular updating and refinement. A more sectoral GDP nowcasting using industry-related indicators is preferred to provide a detailed analysis of the factors driving the GDP forecasts. For example, data on overseas Filipino (OF) remittances, foreign trade statistics imports of consumer goods, and total number of employed persons are used as indicators to nowcast household final consumption expenditure.

2.3.3. Domestic liquidity

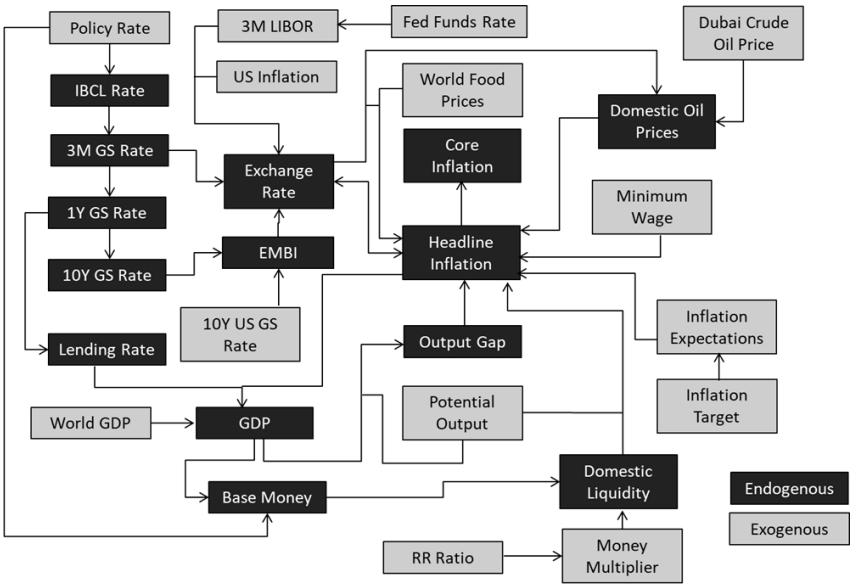
Various nowcasting models are also used to enhance the short-term forecasting performance of M3 growth. These time series models are based on high-frequency indicators, such as placements in the BSP's liquidity facilities, government deposits in the BSP, and other financial market variables. Alternative estimates of the money multiplier are also used to generate alternative forecasts of M3 in different states. The average of these nowcasts is used as initial conditions for the M3 growth forecasts over the policy horizon.

2.4. Workhorse models

The Multi-Equation Model (MEM) and Single Equation Model (SEM) are the BSP's workhorse models for macroeconomic forecasting and policy simulations. These were developed together with Dr. Roberto S. Mariano of the University of Pennsylvania in 1997 and 2013, and have been reviewed and refined by the staff thereafter. Details on the earlier version of MEM and SEM along with an evaluation of their forecast accuracy were explained in Guinigundo [2005].

The MEM is a system of equations aimed at providing a comprehensive view of the macroeconomic outlook over the policy horizon by capturing the main aspects of monetary transmission in the country. The MEM consists of simultaneous equations, estimated largely using the error-correction mechanism (ECM), and other identities. The key relationships in the model are described in Figure 2. The equation for monthly year-on-year (Y-O-Y) inflation is the primary equation in the MEM. Under this structure, the long-run price level follows the quantity theory of money, augmented by supply-side variables, such as nominal wages, oil prices, and non-oil prices. Meanwhile, the short-run dynamics is determined by both supply-side and demand-side variables as well as inflation expectations. Other important equations in the MEM relate to GDP growth, domestic liquidity, exchange rate, and market interest rates.

FIGURE 2. Schematic diagram of the MEM



Source: Authors.

External variables, like world GDP growth, foreign interest rates, international food prices, and Dubai crude oil prices are treated exogenously in the MEM. World GDP growth follows the trade-weighted average of the country's major trading partners. The growth assumptions for each trading partner as well as the path of international food prices are based on the projections from the IMF's World Economic Outlook (WEO) and Global Projection Model Network (GPMN). In addition, foreign interest rates and Dubai crude oil prices are assumed to follow the futures market. Shocks in the external sector affect inflation directly and indirectly. Higher international oil and food prices directly lead to higher inflation. Higher world GDP growth leads to higher domestic GDP growth, which boosts aggregate demand and leads to higher inflation. Higher foreign interest rates impact the interest parity condition, which could lead to depreciation of the peso and higher inflation.

The SEM specifies the monthly Y-O-Y inflation as a cointegrating relationship with a short-run ECM. Because the SEM is equivalent to the inflation equation in the MEM, it can be considered as the reduced-form version of the MEM. This results in a more consistent modelling approach between the two models. The major equations and identities of the MEM are shown in Table 4.

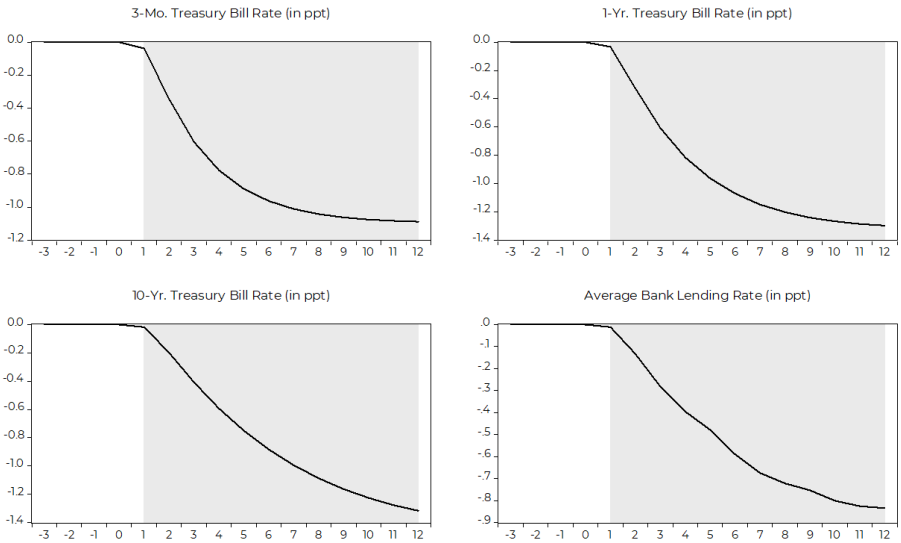
TABLE 4. Major equations and identities of the MEM

Variable	Long-run	Short-run
Inflation (π_t)	$\log cpi_t = \gamma_0 + \gamma_1 \log (m3_t/gdp_t) + \varepsilon_t$	$\pi_t = f\,(oil_t, nonoil_t, er_t, wages_t, gdp_t^{gap}, tbond_t^{10y} - tbill_t^{1y}, \pi_t^e - \pi_t^{target})$ $w/lags + \mu\varepsilon_{t-1}$
Interest rates	$tbill_t^{3m} = \gamma_0 + \gamma_1\, wmo_t + \epsilon_t$	$\Delta tbill_t^{3m} = \beta_1\, \Delta wmo_t + lags - \mu\varepsilon_{t-1}$
	$tbill_t^{6m} = \gamma_0 + \gamma_1\, tbill_t^{3m} + \varepsilon_t$	$\Delta tbill_t^{6m} = \beta_1\, \Delta tbill_t^{3m} + lags - \mu\varepsilon_{t-1}$
	$tbill_t^{1y} = \gamma_0 + \gamma_1\, tbill_t^{6m} + \varepsilon_t$	$\Delta tbill_t^{10y} = \beta_1\, \Delta tbill_t^{6m} + lags - \mu\varepsilon_{t-1}$
	$tbond_t^{10y} = \gamma_0 + \gamma_1\, tbond_t^{1y} + \varepsilon_t$	$\Delta tbond_t^{10y} = \beta_1\, \Delta\gamma_1\, tbond_t^{1y} + lags - \mu\varepsilon_{t-1}$
	$lending_t = \gamma_0 + \gamma_1\, wmo_t + \varepsilon_t$	$\Delta lending_t = \beta_1\, wmo_t + lags - \mu\varepsilon_{t-1}$
Base money (rbm_t)	$\log rbm_t = \gamma_0 + \gamma_1 \log (gdp_t) + \varepsilon_t$	$\Delta \log rbm_t = \beta_1 \Delta_{12} \log (gdp_t)$ $w/lags + \beta_2\, real\ wmo_t/lags + \mu\varepsilon_{t-1}$
Oil prices (oil_t)	$\log oil_t = \gamma_0 + \gamma_1 \log (dubai_t \times er_t) + \varepsilon_t$	$\Delta \log oil_t = \beta_1\, \Delta \log (dubai_t \times er_t)$ $w/lags + \mu\varepsilon_{t-1}$
Other equations and identities		
GDP growth	$\Delta_{12} \log gdp_t = \beta_1 + \beta\Delta_{12} \log gdp_t\ w/lags + \beta\Delta_{12} \log wgdp_t\ w/lags$ $+\ real\ interest\ rate\ lags + \epsilon_t$	
Output gap	$gdpgap_t = \log gdp_t - \log gdp_t^{potential}$ Potential output estimated via one-sided Hodrick-Prescott filter	
Exchange rate	$\Delta \log er_t = -(i_t - \pi_t) + (i_t^{US} - \pi_t^{us}) + \Delta \text{riskpremia}_t$	
Domestic liquidity	$m3_t = mm_t \times bm_t$	

Source: Authors.

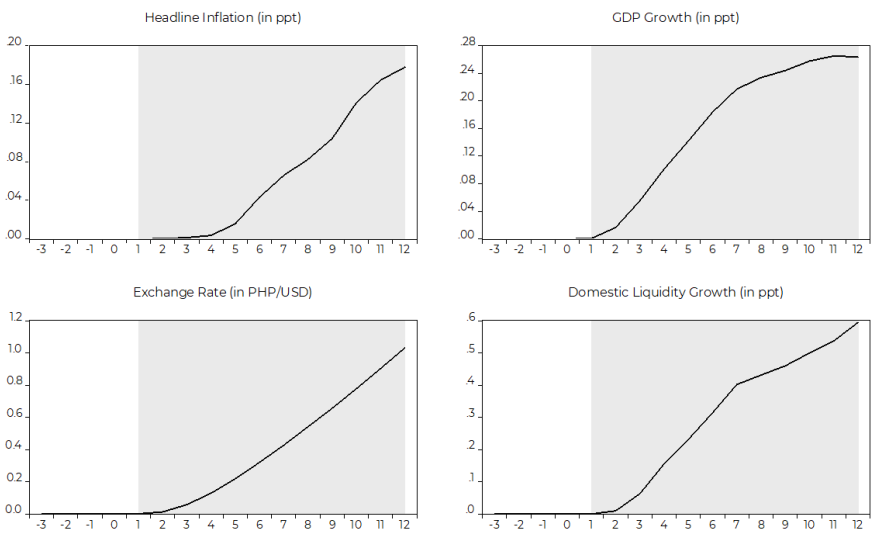
In the MEM, changes in the policy rate affect the economy through the standard transmission channels of monetary policy, i.e., interest rate, credit, exchange rate, and expectations. An easing of the policy rate is projected to result in lower market interest rates (Figure 3), faster domestic liquidity growth, a depreciation in the exchange rate, and higher GDP growth and inflation (Figure 4). However, over the forecast horizon, the BSP policy rate is assumed to remain at its current level.

FIGURE 3. Impact of a 100-bp policy rate easing on market interest rates



Source: BSP estimates.

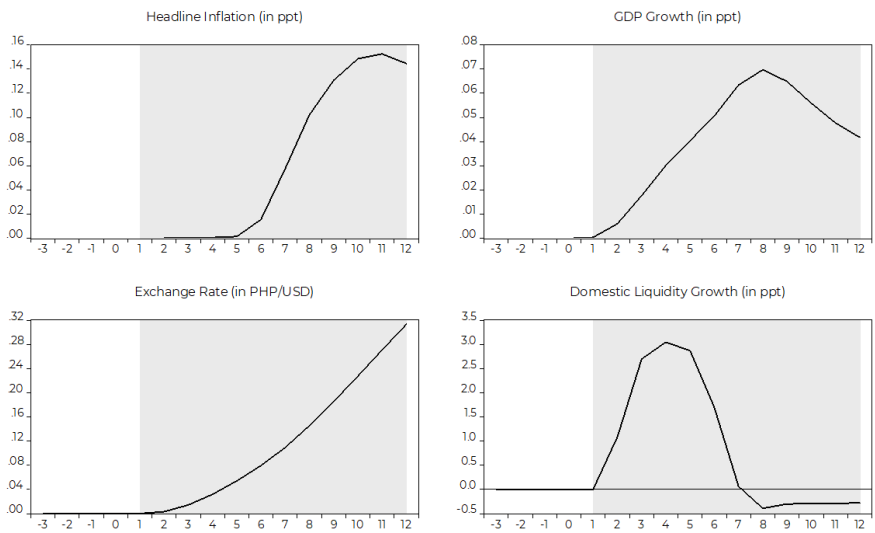
FIGURE 4. Impact of 100-bp policy rate easing on macroeconomic variables



Source: BSP estimates.

Meanwhile, a reduction in the reserve requirement ratio (RRR) leads to a corresponding increase in the money multiplier which raises domestic liquidity and inflation via the standard quantity theory of money identity. RRR adjustments affect the major macroeconomic variables with a lag, wherein the peak impact occurs after about four to six quarters (Figure 5).

FIGURE 5. Impact of a 100-bp RRR reduction on macroeconomic variables



Source: BSP estimates.

2.5. Expert judgement

The models are not mechanically employed to produce the macroeconomic forecasts. Instead, the generation of the inflation outlook benefits from the careful surveillance and monitoring activities of DER sector specialists. Key developments that could influence the outlook for inflation and growth are incorporated as either add-ons to the baseline forecast or as inflation risks, depending on the probability assigned by the AC TS. Meanwhile, the expected impact of highly probable events that were not captured by the models (e.g., implementation of tax reforms), due to the inherent limitations of econometric models, are incorporated as add-ons in the baseline forecasts.

Consistent with the practice of flexible inflation targeting, the DER endeavors to provide a comprehensive assessment of the price environment in the baseline forecast and risk assessment. DER surveillance activities cover various sectors in both supply and demand side of inflation. On the supply side, developments in the agriculture and oil market, among others, are closely monitored given their large weights in the Philippine CPI basket and their considerable impact on inflation

expectations [Español and Santillan 2018]. On the demand side, domestic economic activity and external demand, along with liquidity conditions, are given a lot of focus. The DER is also watchful of possible early signs of second-round effects to check whether inflation pressures are becoming entrenched in the price dynamics.

At the same time, the DER leverages its representation in key committees and assessment of multilateral institutions.

- The TS regularly engages with counterparts from government agencies with direct involvement in sectors of importance to the price dynamics. This includes the Department of Agriculture (DA), Department of Energy (DOE), Department of Trade and Industry (DTI), Department of Labor and Employment (DOLE), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), and Land Transportation Franchising and Regulatory Board (LTFRB) among others.
- The sector experts also interact with industry and consumer groups through inter-agency meetings such as the National Price Coordinating Council and the National Wages and Productivity Commission. Insights from discussions with the National Food Authority (NFA) Council, Committee on Tariff and Related Matters (CTRM), and Export Development Council (EDC) are incorporated in the assessment as needed.
- On the analysis of the global oil market, which influences heavily trends in domestic energy prices, the TS relies heavily on the assessment of the International Energy Agency (IEA), US Energy Information Agency (EIA), Organization of the Petroleum Exporting Countries (OPEC), and IMF along with market reports from Capital Economics, and Oxford Economics.
- The TS also attends the regular meetings of the GPMN to track the latest developments in global economic conditions and global economic prospects, supplemented with analysis from the IMF.

More importantly, the AC and MB are part of the assessment process with the narrative on the inflation outlook and risks representing the consensus view. Details on all the assumptions used to generate the baseline forecasts as well as risks to the inflation outlook are carefully presented to the AC and MB during the regular review of the BSP monetary policy. Comments and clarifications on these assumptions are addressed and taken into consideration in the subsequent review/ update of the inflation forecasts to ensure that the inflation forecasts and risks announced to the public represent the views and assessment of BSP policymakers.

2.6. Risk assessment

The forecasting team, together with the TS, evaluates the sensitivity of the baseline forecasts to various paths of the major exogenous variables, such as crude oil prices and world GDP growth. The baseline estimate is also subjected to shocks, implied by historical data, to determine the range of variability underpinned by the forecasts.

In addition, the TS considers different scenarios that pertain to upside and downside risks to the inflation outlook, which is summarized in a risk matrix (Table 5). The various scenarios are then assigned probability values based on the discussion at the technical level meeting involving the forecasting team and sector specialists. The outlook of other multilateral institutions as well as information gathered during inter-agency meetings are considered in determining the probabilities. Scenarios that have more than 75 percent probability of taking place over the forecast horizon are incorporated in the baseline. The estimated impact of each scenario is then multiplied by the assigned probabilities. The sum of the weighted impact for each year will indicate whether the risks to the outlook are balanced, on the upside, or on the downside.

TABLE 5. Risk matrix

Risks	Probability	Weighted impact
Upside Downside	Low (25%) Medium (50%) High (75%)	Probability-weighted impact of risks

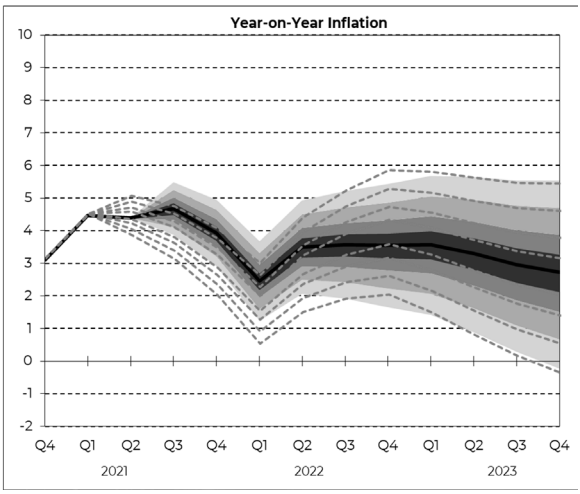
Source: Authors.

The balance of risks to the outlook are graphically presented using a fan chart (Figure 6).[4] The fan chart shows the probability of various outcomes for inflation over the forecast horizon. The darkest band depicts the central projection, which corresponds to the BSP's baseline inflation forecast. It covers 25 percent of the probability distribution. Each successive pair of bands is drawn to cover a further 25 percent probability until 75 percent of the probability distribution is covered. Lastly, the lightest band covers the lower and upper 90 percent of the probability distribution. The bands widen (i.e., "fan out") as the time frame is extended, indicating increasing uncertainty about outcomes. The band in wire mesh depicts the inflation profile in the previous report.

The shaded area measures the range of uncertainty which is based on the deviation of forecasts from actual outcomes in the past years. The relative magnitude of the probability areas lying above and below the central projection captures the level of skewness based on the downside and upside shocks that affect the inflationary process over the next two years.

[4] Central banks, such as the Bank of England (BOE) and the Czech National Bank (CNB), publish fan charts in their reports. CNB [2008] provides a detailed explanation on the methodology for construction of fan charts.

FIGURE 6. Fan chart



Source: BSP estimates.

3. Forecast evaluation

In the following sections, we provide the results of the systematic evaluation of the BSP's inflation forecasting performance. This exercise evaluates the month-ahead inflation projection from 2010 to 2020 published on the last working day of the month in the BSP's website and social media accounts as well as the annual inflation forecasts presented in the monetary policy meetings in 2019 and 2020 (Section 3.1). Moreover, statistical tests are performed on the 1-, 3-, 6-, and 12-month ahead inflation forecasts of the BSP for the period 2010 to 2020. In benchmarking the 6-month ahead forecasts, the BSP's full-year inflation forecast during the June monetary meetings of each year are compared against the private sector's full-year inflation forecast every June survey and the IMF's full-year inflation forecast during the release of the WEO every April (Section 3.2).[5]

Results of formal statistical tests show no bias or consistent pattern in the forecast errors of the BSP's inflation models. The BSP SEM/MEM does not consistently overpredict or underpredict inflation. The BSP's inflation forecasts are unbiased for 2016 to 2020 at forecast horizons ranging from 1-, 3-, 6-, and 12-months ahead.

Results also indicate that the inflation forecasts produced by the BSP are generally accurate, and efficient over the relevant forecast horizons. In addition, improvements in the performance were noted from 2016 to 2020 relative to the

[5] Meanwhile, the 1-year [2-year] ahead annual inflation forecast comparison refers to the following: (i) BSP's full-year inflation forecast during the December MB meetings of the previous year [two years] (i.e., the annual forecast for 2010 [2011] was the forecast presented in the December 2009 MB meeting); (ii) private sector's full-year inflation forecast every December survey of the previous year [two years] (i.e., the annual forecast for 2010 [2011] was the forecast in the December 2009 private sector economists survey); IMF's full-year inflation forecast during the release of the WEO every October of the previous year [two years] (i.e., the annual forecast for 2010 [2011] was the forecast in the October 2009 WEO).

full sample. Finally, the BSP's inflation forecasts have generated lower forecast errors relative to the private sector and IMF for the 6-month to 2-year ahead horizons, which are the relevant forecast horizon for monetary policymaking.

The model-fitted forecasts with add-ons were also closer to actual inflation outturns relative to projections presented during the preceding December monetary policy meetings for the periods 2018 to 2020. This indicates that the model is able to reasonably capture the inflation dynamics as the forecast errors decline after accounting for the actual values of the add-ons along with other explanatory variables. There are inherent residual forecast errors that reflect parameter uncertainty, especially for example with the significant structural break caused by the pandemic, as well as gaps in a parsimonious model specification.

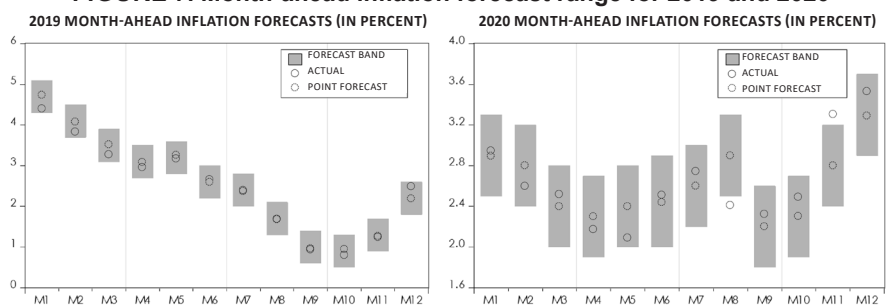
Lastly, the practice of supplementing the pure model results with estimated add-ons based on market surveillance improves the performance of the final forecasts. The generation of the inflation outlook benefits from the careful surveillance and monitoring activities of DER sector specialists.

3.1. Forecasting performance for 2010-2020

3.1.1. Month-ahead inflation forecasts

For the period 2010 to 2020, actual inflation has settled within the month-ahead inflation forecast band 122 times out of 132 months (92.4 percent). In 2019, actual inflation fell within the forecast band in all 12 months of the year. Meanwhile, monthly inflation in 2020 settled within the forecast range ten out of 12 months (Figure 7).

FIGURE 7. Month-ahead inflation forecast range for 2019 and 2020

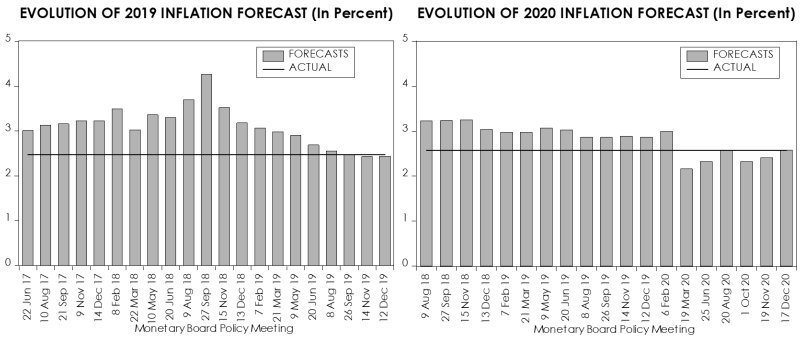


Source: BSP estimates.

3.1.2. Annual inflation forecasts for the Monetary Board policy meetings

Average inflation settled at 2.5 percent in 2019. The annual inflation forecasts for 2019 presented during the monetary policy meetings of the MB ranged from 2.4 to 4.3 percent with an average of 3.1 percent (Figure 8). These forecasts were generally higher compared to the actual outturn but improved notably over the forecast horizon as more information became available.

FIGURE 8. Annual inflation forecasts for 2019 and 2020

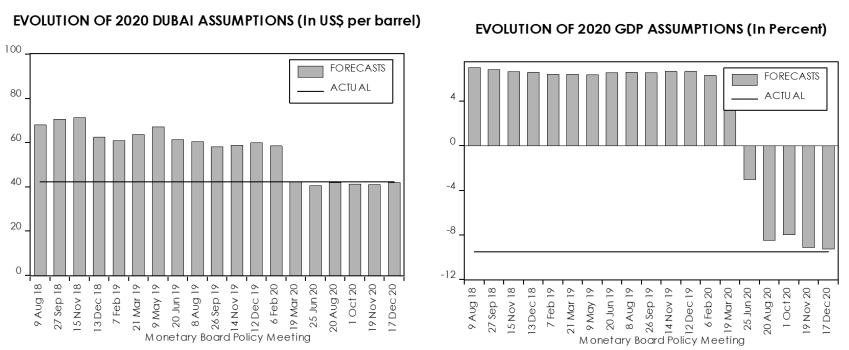


Source: BSP estimates.

The forecasts during the policy meetings from June 2017 to February 2019 were higher due mainly to how the impact of the Rice Tariffication Law (RTL) was reflected. Initially, the impact of the RTL was only factored in as a downside risk in the risk matrix. The RTL was then incorporated in the baseline forecasts after the passage of the law in March 2019. Consequently, the inflation forecasts in the succeeding policy meetings trended downwards to approach actual inflation.

Average inflation for 2020 remained broadly stable at 2.6 percent. The annual forecasts for 2020 presented during the policy meetings ranged from 2.2 to 3.3 percent with an average of 2.8 percent. The initial forecasts presented during the August 2018 to February 2020 policy meetings were relatively higher than actual inflation since the forecasts were made before the COVID-19 pandemic (Figure 8). The resulting contraction in both global and domestic economic activity along with lower global crude oil prices resulted in the significant downward adjustment in the inflation forecasts for 2020 by March 2020 (Figure 9). Despite the uncertainty caused by the pandemic, the full-year inflation forecasts from March to December 2020 remained relatively close to actual inflation with the annual forecasts ranging from 2.2 to 2.6 percent.

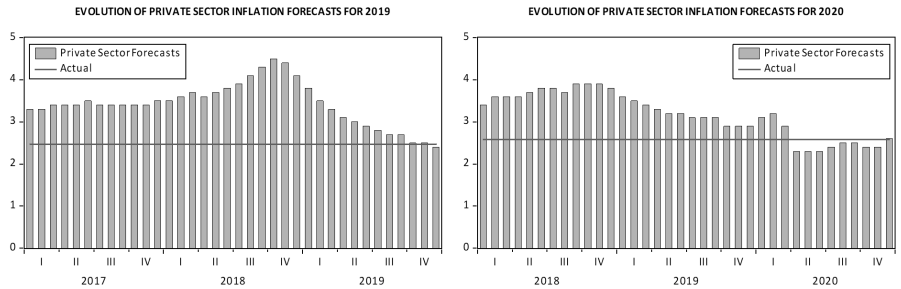
FIGURE 9. Main sources of forecast errors



Source: BSP estimates.

Meanwhile, the inflation forecasts for 2019 of private sector economists surveyed by the BSP were consistently higher compared to the actual inflation outturn throughout the monthly survey rounds. The 2019 inflation forecasts from the private sector ranged from 2.4 percent to 4.5 percent with an average of 3.4 percent. Similarly, the private sector inflation forecasts for 2020 that were made prior to the pandemic were significantly above the actual outturn. During the January 2017 to February 2020 survey periods, the private sector forecasts ranged from 2.9 percent to 3.9 percent with an average of 3.4 percent. Their forecasts were revised downwards from March to December 2019 ranging from 2.3 to 2.9 percent with an average of 2.5 percent (Figure 10).

FIGURE 10. Private sector inflation forecasts for 2019 and 2020



Source: BSP estimates.

3.2. Statistical tests of forecasting performance

The evaluation of the BSP's inflation forecasting performance across different forecasting horizons was assessed in terms of the following criteria: (1) accuracy, (2) unbiasedness, (3) efficiency, and (4) benchmarking. Bank of England [2015] indicates that while the aforementioned statistical tests are not independent from each other (i.e., more efficient use of available information could improve forecast accuracy), evaluating the forecast performance in various perspectives could prove useful in the refinement of the forecasting process.

3.2.1. Accuracy

How close are the inflation forecasts from their actual outturns? What is the forecasting horizon where inflation forecasts can be made with an acceptable level of precision?

BSP forecasts are generally accurate. The forecast errors, as measured by the mean absolute error (MAE) and root mean squared error (RMSE), tend to increase with longer forecast horizons. Nevertheless, the forecasts generated from the BSP's models perform better compared to a benchmark random walk model.[6]

[6] The accuracy of the BSP's inflation forecasts was compared to a naïve model, which was specified as a weighted average of the current and three previous observations of inflation [Duncan and Martinez-Garcia 2018].

The BSP macro models outperform a random walk model of inflation across forecast horizons of one month to 12 months ahead in terms of both MAE and RMSE. Moreover, the errors from the BSP's forecasts have trended downwards in the past five years (Table 6).

TABLE 6. Forecast accuracy comparison

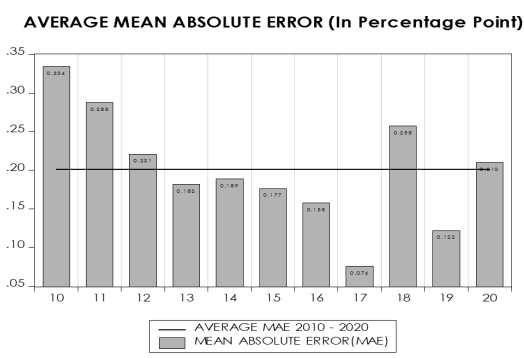
Months ahead	Sample: 2010-2020				Sample: 2016-2020			
	MAE		RMSE		MAE		RMSE	
	BSP	Random walk model	BSP	Random walk model	BSP	Random walk model	BSP	Random walk model
1	0.20	0.32	0.26	0.41	0.16	0.33	0.21	0.43
3	0.60	0.72	0.77	0.90	0.49	0.80	0.65	0.99
6	0.81	1.06	1.02	1.31	0.72	1.13	0.92	1.42
12	0.94	1.57	1.21	1.94	0.95	1.73	1.25	2.12

Source: BSP estimates.

In addition, the BSP's inflation forecasts are found to have a statistically adequate level of precision for up to 12 months ahead as captured by the forecast memory. The forecast memory measures the longest horizon wherein the inflation forecasts can be considered acceptable [Andersson et al. 2007]. More formally, the forecast memory is defined as the longest horizon where the RMSE is lower than the standard deviation of the series. The BSP's inflation forecasts up to 12 months ahead have an adequate level of precision since the standard deviation of inflation from 2010 to 2020 is 1.42 percent.

The BSP's forecasting performance has also generally improved. The MAE of BSP 1-month ahead inflation forecasts has consistently declined since 2010, although a slight uptick was observed in 2018 driven by the impact of the TRAIN Act along with higher-than-assumed global crude oil prices, the unanticipated increase in rice prices, higher-than-projected peso depreciation; and in 2020 due mainly to economic shock owing to the global pandemic (Figure 11).

FIGURE 11. MAE of inflation forecasts from 2010 to 2020



Source: BSP estimates.

3.2.2. Unbiasedness

Do the inflation forecasts consistently overestimate or underestimate actual outturns, i.e., are the forecast errors systematically positive or negative?

The unbiasedness of the inflation forecasts could be tested by regressing the forecast errors against a constant term (Equation 1).

$$\pi_t - \pi^f_{t,h} = error_{t,h} = \beta_0 + \varepsilon_t \quad (1)$$

where h = 1,3,6,12-month ahead forecasts.

- If $\beta_0 = 0$, then the forecasts are unbiased.
- If $\beta_0 < 0$, then the forecasts are systematically higher than actual inflation.
- If $\beta_0 > 0$, then the forecasts are systematically lower than actual inflation.

The results of the test indicate that there is no consistent pattern in the forecast errors of the BSP's inflation forecasts. It does not consistently overpredict or underpredict inflation, which could lead to a certain bias or direction in terms of policy recommendation. In fact, the unbiasedness of BSP's inflation forecasts has improved in more recent periods.

Using a sample from 2010 to 2020, there is evidence that the BSP's 3-month and 6-month ahead forecasts were higher than actual outturns. This could be attributed to the previous practice of including add-ons to the baseline forecast over the near term of risks that have not yet materialized. This was done for example for possible transport fare and electricity rate adjustments, which resulted in overestimated forecasts.

However, performing the same test for the period 2016 to 2020 suggests that the upward bias has dissipated across the 1-month, 3-month, 6-month, and 12-month ahead horizons. During this period, the BSP staff only incorporates the add-ons on the impact of factors that are not captured by the model when the price adjustments are already certain.[7] Near-term risks that are not reflected in the baseline forecasts are then included in the risk matrix, with the attached probability level determined by the AC Technical Staff (Table 7).

TABLE 7. Test for unbiasedness

Months ahead	2010-2020				
	β_0 Coefficient	p-value		β_0 Coefficient	p-value
1	-0.02	0.39		0.01	0.64
3	-0.25	0.00	***	0.02	0.86
6	-0.28	0.00	***	0.01	0.94
12	-0.21	0.06		-0.06	0.71

*** Significant at the 1 percent level.
Source: BSP estimates.

[7] For instance, the impact of the RTL on inflation was not incorporated directly in the baseline forecast while the bill was still being deliberated. Its impact was only reflected once the law was officially approved to avoid any downward bias in the baseline forecast emanating from the uncertainty of the timing and magnitude of the lower rice prices.

3.2.3. Efficiency

Do the inflation forecasts reflect all available information during the time the forecasts were made, i.e. can the forecasts be scaled up or down to be closer to the actual outturns?

The efficiency of the forecasts can be tested using the Mincer-Zarnowitz [1969] approach by regressing actual inflation outturns with the forecast (Equation 2):

$$y_t = \beta_0 + \beta_1 y_t^{t-h} + \varepsilon_t \quad (2)$$

where h = 1,3,6,12-month ahead forecasts.

If $\beta_0 = 0$ and $\beta_1 = 1$, then it means that the forecasts are not statistically different from actual inflation. However, if $\beta_0 = 0$ and $\beta_1 \neq 1$, then the forecasts errors could have been improved by scaling the forecasts up or down.

Similar to the test for unbiasedness, the efficiency of BSP's inflation forecasts has improved in recent years. The tests indicate that the forecasts are efficient across relevant forecast periods, using sample data for the period 2016 to 2020. This marks an improvement compared to the test results for the longer sample starting 2010 (Table 8).

TABLE 8. Test for efficiency

Months ahead	2010-2020				
	β_1 Coefficient	p-value		β_1 Coefficient	p-value
1	0.97	0.21		1.00	0.88
3	0.86	0.00	***	1.00	0.98
6	0.76	0.00	***	1.09	0.77
12	1.09	0.15		1.82	0.13

*** Significant at the 1 percent level.
Source: BSP estimates.

3.2.4. Benchmarking

How does the BSP's inflation forecasts compare with the performance of forecasts from a simple time series model, the private sector, and other organizations?

Table 9 indicates that the BSP's forecast errors of annual inflation from 6-month, 1-year, and 2-years ahead for the period 2010-2020 are comparatively lower compared to forecasts from the private sector and the IMF.

While private sector forecasts are generated independently, empirical studies showed that the BSP's inflation forecasts influence the formation of the private sector's inflation expectations. Español and Santillan [2018], following the inflation expectations model by Cerisola and Gelos [2005], found that the forward-looking indicators for inflation (i.e., BSP's one-year ahead inflation forecasts along with the government inflation target) and lagged inflation affect private-sector inflation expectations in the Philippines. Similarly, Español [2018] showed that the private sector considers the BSP's recent inflation forecasts in updating its own forecasts.

In 2019, the 6-month, 1-year, and 2-years ahead forecasts of the BSP, the private sector, and the IMF were all higher than the actual inflation outturn. However, the deviation of the forecasts from actual inflation was comparatively lower using the BSP's forecasts compared to the private sector and the IMF across the different forecast horizons.

In 2020, the 1-year and 2-year ahead forecasts of the BSP, private sector, and the IMF were also higher than the actual inflation outturn on account of the impact of the COVID-19 pandemic. Nonetheless, the forecast errors from the BSP are lower at -0.25 percentage point (ppt) for the 6-month ahead forecast, 0.29 ppt for the 1-year ahead forecast, and 0.46 ppt for the 2-year ahead forecast.

TABLE 9. Benchmarking with private sector and IMF

Year	Actual inflation	Deviation of forecasts from actual								
		6-month ahead			1-year ahead			2-year ahead		
		BSP	Private sector survey	IMF	BSP	Private sector survey	IMF	BSP	Private sector survey	IMF
2010	3.79	0.91	0.71	1.16	0.21	1.01	0.24	0.71	1.01	-0.29
2011	4.65	0.41	0.05	0.26	-1.03	-0.55	-0.65	-1.34	0.05	-0.15
2012	3.17	-0.07	-0.07	0.20	0.34	1.03	0.98	-0.15	0.93	0.83
2013	3.00	0.05	0.10	0.07	0.07	0.60	1.50	0.12	1.10	1.00
2014	4.10	0.07	0.20	0.33	0.38	-0.20	-0.56	-1.18	-0.20	-0.10
2015	1.43	0.65	0.90	0.63	1.57	2.17	2.44	1.81	2.17	2.14
2016	1.77	0.00	0.03	0.23	0.64	0.73	1.61	0.81	1.93	1.73
2017	3.20	-0.01	0.10	0.41	0.13	-0.20	0.25	0.04	-0.50	0.26
2018	5.20	-0.69	-0.70	-1.03	-1.80	-1.60	-2.19	-2.19	-2.10	-1.73
2019	2.47	0.22	0.43	1.36	0.71	1.63	1.52	0.75	1.03	0.53
2020	2.58	-0.25	-0.28	-0.86	0.29	0.32	-0.33	0.46	1.22	0.77
Average		**0.30**	**0.32**	**0.59**	**0.65**	**0.91**	**1.11**	**0.80**	**1.02**	**0.87**

Source: BSP estimates.
Note: Inflation data from 2010 to 2017 are derived from 2006-based CPI while the data from 2018 onwards are derived from 2012-based CPI.

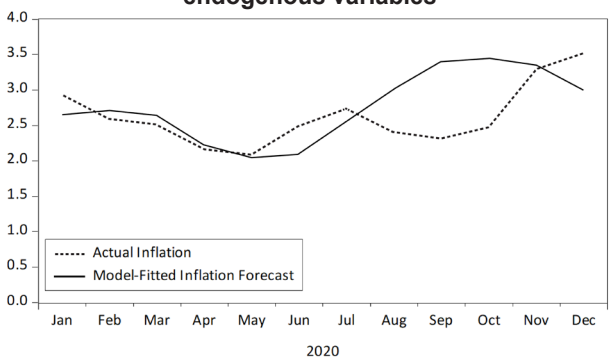
3.3. Counterfactuals for the COVID-19 episode

We find that the forecast errors computed after reflecting the actual values for all explanatory variables, such as GDP growth and oil prices, can be largely attributed to commodity prices that are not directly captured by the core models. The incorporation of add-ons for rice, other food items, electricity, and sin taxes to the purely model-generated forecasts lead to more accurate forecasts.[8]

[8] Given the limitations of macroeconomic models, "add-ons" are introduced to the baseline forecasts to reflect the expected impact of events that are not captured by the models. For example, the expected impact to inflation of tax reforms, such as the new sin taxes on alcohol and tobacco, are estimated outside the workhorse models based on the approved increases as well as timeline of implementation. The add-ons are also included as part of the forecast presentation to the TS, AC, and MB.

In the SEM/MEM, inflation is determined by oil prices, global non-oil prices, exchange rate, minimum wage, output gap, inflation persistence, and an error-correction term based on the quantity theory of money relationship. Factors estimated outside the model, which are added to the model-generated baseline forecasts, include adjustments for electricity rates, transportation fares, and prices of key food items such as rice, meat, fish, fruits, and vegetables.

FIGURE 12. Model-generated forecast using actual values of exogenous and endogenous variables



Source: BSP estimates.

Figure 12 shows the model-generated inflation forecasts using actual values for all exogenous and endogenous variables in the MEM from January to December 2020. After incorporating the actual values for all explanatory variables of inflation, the model-fitted forecasts for 2020 had a MAE of 0.4 ppt. The model-generated inflation forecasts were relatively close to the actual inflation outturns in H1 2020. However, significant deviations were noted in June, August to October, and December 2020. These forecast errors can be attributed to shocks in commodity prices and services that are not directly captured by the model.

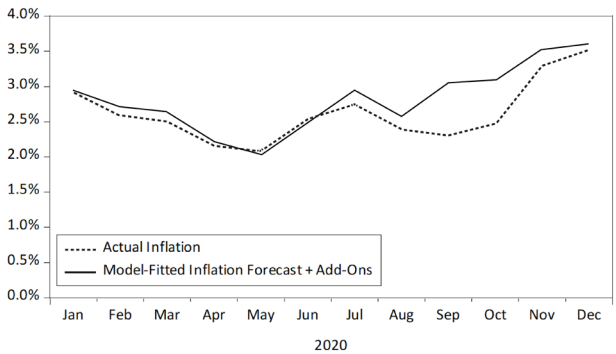
Inflation due to pricing policy changes and supply-side shocks are also the main drivers of the deviation of the inflation forecasts from actual numbers. For example, actual inflation outturns for June and July 2020 were higher by an average of 0.3 ppt compared to the model-predicted values because of actual fare adjustments to tricycles and jeepneys that were not considered in the original forecast. Meanwhile, actual inflation rates for August to October 2020 were lower by 0.9 ppt compared to the forecasts from the model due primarily to lower electricity rates following the refunds that Meralco implemented during those months. Finally, actual inflation for December 2020 was higher by 0.5 ppt compared to the model forecast due to the impact of the African Swine Fever (ASF) on pork prices.

The practice of supplementing the pure model results with estimated add-ons based on market surveillance improves the performance of the final forecasts.

Figure 13 shows the model-generated inflation forecasts plus the add-ons for rice, other food items, electricity, and sin taxes. The figure shows that the model-

generated forecasts together with the add-ons were able to track the path and direction of inflation with improved forecast accuracy compared to the purely model-generated forecasts. The MAE of the model-generation forecasts with add-ons declined to 0.2 ppt.

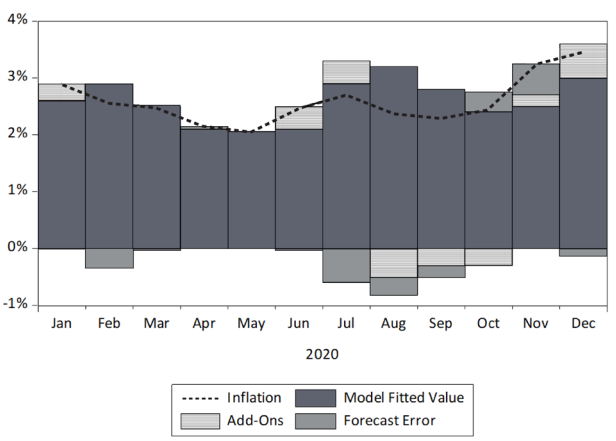
FIGURE 13. Model-generated forecast plus add-ons



Source: BSP estimates.

It should be noted that even after accounting for the add-ons along with the actual values of the explanatory variables, the forecasts still do not equate with actual inflation (Figure 14). The forecast errors at this point can be explained by several factors. First, several variables in the model, such as the output gap, are subject to measurement uncertainty given their unobservable nature. Second, the estimated coefficients of the model are also subject to parameter uncertainty especially with the significant structural break caused by the pandemic. Finally, errors can come from the specifications of the model given gaps in our understanding of the structure of the economy along with limits to economic theory.

FIGURE 14. Decomposition of inflation forecasts



Source: BSP estimates.

4. Communication of forecasts

Efforts to improve central banks' institutional credibility and transparency over the years have made monetary policy communications an essential part of the toolkit to influence inflation expectations and improve the effectiveness of the transmission of monetary policy [Batac et al. 2019]. The BSP communicates its inflation forecasts through several channels including the press conference after every policy meeting, publication in the highlights of the MB's meeting, the quarterly inflation report, and a month-ahead inflation forecast statement.

4.1. Press conference and highlights of the MB policy meeting

The MB meets eight times a year, spread out between six to eight weeks, to deliberate on the appropriate monetary policy stance. A press conference is held at 4 PM on the day of the policy meeting to discuss in detail the various factors underpinning the BSP's recent monetary policy decision. The BSP started live-streaming the entire press conference, including the Q&A portion, on Facebook starting in 2018. Previously, only the BSP Press Corps had live access to the press conference, while a recording of the Governor reading the press statement was uploaded on YouTube.

In addition, a press statement on the BSP's monetary policy stance is released. The statement presents the BSP's qualitative assessment of the inflation outlook, the balance of risks surrounding said outlook, along with the risk factors on the upside and downside to communicating the uncertainty surrounding the forecasts.

During the press conference, the Deputy Governor of the Monetary and Economics Sector provides the latest point forecasts of annual headline inflation over the policy horizon. Likewise, the DG discusses a list of factors that contributed to the revision in the forecast as well as the details of the inflation path.

The inflation forecasts are then published in the Highlights of the MB's policy meeting, which is released four weeks after the meeting. The inflation outlook section of the report shows a comparison of the latest and previous baseline inflation forecasts, the shape of the inflation forecast path, and the reasons for the revision in the inflation forecasts. Similar to the press statement, it will contain the overall assessment of the balance of risks and the list of risk factors considered.

4.2. Quarterly inflation report

In the quarterly BSP Inflation Report, the section on the inflation outlook provides the point inflation forecast and the fan chart over the policy horizon. It also discusses the major assumptions that underly the forecast on both the supply- and demand-side relative to the published path and forecast assumptions in the previous quarter. There is also a discussion on the different risks to inflation, how these are expected to affect the outlook, and their implications on the monetary policy decision of the BSP during the quarter.

Aside from inflation, there is also a descriptive discussion on the growth outlook and output gap that is consistent with the baseline inflation path. We provide the expected directional path of GDP in the current quarter as well as the trajectory of growth over the policy horizon as well the factors expected to drive output growth in the country.

4.3. Month-ahead inflation forecasts

Unlike other central banks, the BSP publishes an inflation forecast range for the current month on the last working day of the month, via the BSP's website and social media accounts. The practice of releasing a month-ahead inflation forecast started when the BSP shifted to inflation targeting in 2002. The goal of the monthly forecast range is to help anchor the public's inflation expectations especially during periods of significant price volatility.

More recently, the BSP started releasing a statement on its view of inflation over the medium term, posted on the BSP's social media accounts, right after the Philippine Statistics Authority publishes the official data on the monthly CPI. The statement aims to focus attention on the BSP's medium-term view on inflation away from short-run inflation developments.

5. Future work

The DER is continuously refining and improving its suite of models for forecasting, scenario-building, and policy analysis both internally and in collaboration with external consultants from the academe and multilateral agencies. The enhancements in the suite of models have allowed the BSP to better capture the interlinkages and emerging dynamics in the economic and financial system, and thus improve macroeconomic forecasting performance based on forecast error statistics. Nevertheless, the refinements in the modelling toolkit is an ongoing process, requiring experience and continuous training of the staff on the latest methodological developments in the field and the cooperation among central banks on the best practices in modelling and forecasting.

In 2019, the staff worked with Dr. Suleyman Ozmucur of the University of Pennsylvania on a project funded by the World Bank to develop mixed-frequency models for nowcasting inflation, GDP growth, domestic liquidity, exchange rate, and the current account. The models from the project are currently being used for short-term forecasting and analysis which are then factored in the BSP's workhorse models for medium-term forecasting.

The workhorse models are subject to periodic review and evaluation to incorporate new data as well as to reflect changes in data series or shifts in inflation dynamics. The staff is currently reviewing, re-specifying, and re-estimating the BSP SEM/MEM to capture the recent data points affected by the pandemic. The review also benefits from the feedback from the MB on DER's regular report on forecast

evaluation. At the same time, new variables and equations will be added to expand the macroeconomic variables considered in the model. These include estimation of equations for core inflation, unemployment rate, and credit among others. The new versions of the models will be internally tested through parallel runs in 2022.

Moreover, continued enhancements on the BSP's Policy Analysis Model for the Philippines (PAMPH), through a series of consultation workshops with technical experts from the GPMN, is ongoing. The PAMPH is a monetary policy model for a small open economy. It is a New Keynesian semi-structural gap model for analyzing the monetary policy transmission mechanism of key macroeconomic variables over a medium-term horizon. It features an endogenous monetary policy with forward-looking model agents reacting to the expectations of future policy decisions [Alarcon et al. 2020]. Ongoing efforts to review and improve the PAMPH will enable the BSP to formalize its FPAS and shift to the semi-structural model as its workhorse model for monetary policy analysis.

The DER has also started consultations with experts from the Japan International Cooperation Agency (JICA) to collaborate on potential projects related to macroeconomic modelling and forecasting. By 2022, the project will proceed by developing a Trend Inflation Projection System (TIPS) for the Philippines. The model will be useful in setting the appropriate medium-term inflation target for the country. TIPS will allow the BSP to quantify long-run inflation dynamics by estimating the trend components of headline and core inflation. The model can also decompose inflation into its permanent and transitory components to better explain the drivers of supply-side shocks and how it influences price dynamics over the policy horizon. Finally, the TIPS will incorporate inflation expectations coming from the private sector together with adaptive inflation expectations in its analysis. This will enhance the understanding of the expectations channel of monetary policy, which is not fully incorporated in the BSP's current macroeconomic models.

The DER has also engaged with the IMF's Institute for Capacity Development (ICD) for a technical assistance on macroeconomic frameworks covering extensions of the standard Quarterly Projection Model (QPM) for the Philippines (Guo et al. [2019]; Karam et al. [2021]). The extended model presents a practical extension of a standard semi-structural model to incorporate the credit cycle and macroprudential blocks, thus providing an avenue to answer relevant questions including the monetary policy response to shocks in the financial system (e.g., shocks to credit demand and bank profitability), complemented with macroprudential policy. Highlighting such interaction between the monetary and macroprudential policies is of paramount importance to the BSP. An extended QPM can usefully help BSP's future refinements of the PAMPH to incorporate other features, such as credit aggregates and reserve requirements. Equally important, the TA will help strengthen DER's capacity to shift to the PAMPH as the BSP's workhorse model for monetary policy analysis and forecasting.

Big data-related initiatives are being pursued to enhance further the current inflation forecasting process. For instance, the consultants from University of the Philippines crafted a proof of concept on the price indices prototype using web-scraped data for the BSP Big Data project, which the Department of Economic Statistics is working to operationalize. Once developed, the price index could be utilized in the inflation nowcasting exercises of the DER.

The TS is also exploring potential areas for improvements in the FPAS, such as the forecast combination from different satellite nowcasting models and the adoption of governance and control protocols in the forecasting process as recommended by the Internal Audit Office (IAO) in its Year 2019 Review of the BSP's Inflation Forecasting Process. The Department is also working to improve labor market indicators used in monetary policy models to better capture the interaction between monetary policy and employment, along with further analysis and estimation of the non-accelerating inflation rate of unemployment (NAIRU) and employment gap to complement existing models on the natural interest rate and the output gap.

Looking ahead, the FPAS of the BSP will continue to evolve to support the formulation of data-driven and evidence-based policy decisions. At its core, the workhorse models will be regularly reviewed and enhanced as necessary (e.g., revisions in model structure, addition of new equations, recalibration of parameters, etc.) to reflect the very fluid nature of macroeconomic environment, adopt international best practices among central banks in macro economic forecasting and policy simulations, and take advantage of technology innovations. The satellite models will be similarly developed and improved to complement the workhorse models. Furthermore, the evolution of FPAS goes beyond the modelling aspect to cover institutional arrangement, reporting system, and risk assessment, among others.

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Azcárraga's critique of mercantilism: trade as an engine of growth

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Manuel Azcárraga y Palmero's *La libertad de comercio en las islas Filipinas* (1872) was an unequivocal and consistent tract advocating free trade as a commercial policy for the Philippines. It is remarkable for its explicit and frequent reference to free-trade theory and the example of other nations (notably Britain and its colonies) as a guide to policy. It uses a historical approach in its critique of Spanish mercantilist ideas and biases, which are held responsible for centuries of foregone development opportunities for the Philippines. This article traces Azcárraga's arguments and links them to Smith's [1776] theory of international trade and its later elaborations (Myint [1958, 1977] and Schumacher [2015, 2016]). The protectionist mindset and policies Azcárraga believed to have held back Philippine progress one hundred fifty years ago are a striking portent of issues hounding the country's development in the 20th century and even later.

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1. Introduction

For both researchers and the general readership, much of the interest in Philippine commercial policy under Spain is attached to the galleon trade or the "Nao de Acapulco", the trans-Pacific trade between the Philippines and Mexico dominated by Chinese goods exchanging for Mexican silver.[1] Such attention is unsurprising given the system's longevity (roughly from 1565 to 1815), the obvious achievement of a maritime feat that first linked Asia and America, and the fact that it was a major issue in the Propagandists' later indictment of Spanish policy in the Philippines. With regard to the latter, Rizal's article "The indolence

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[1] See for example the recent work by Giraldez [2015]. The route of the galleons is briefly described in Fish [2011: 350-359] and in greater detail in Schurz [1985 (1939):178-203]. An interesting paper by Arteaga, Desierto, and Koyama [2020] relates the chosen traditional route of the galleon to deliberate attempts to delay departure from Manila to accommodate overloading.

of the Filipino" notably puts up the galleon trade as a prime example of Spain's wrong-headed policies for the archipelago and effectively attributes to it what would now be known as a "booming sector" or Dutch Disease that drew attention and resources away from the country's internal development:

> The trade with China, which was the whole occupation of the colonizers of the Philippines, was not only prejudicial to Spain but also to the life of her colonies; in fact, when the officials and private persons at Manila found an easy method of getting rich they neglected everything. They paid no attention either to cultivating the soil or to fostering industry; and wherefore? China furnished the trade, and they had only to take advantage of it and pick up the gold that dropped out on its way from Mexico toward the interior of China, the gulf whence it never returned. [Rizal 2004 (1890):62]

But while a summary judgement and caricature of Spanish policy may be understandable given the purposes of the Propaganda, later historians and students of economic policy can afford to take a more nuanced view of the changes in commercial legislation and practice throughout the long period of Spanish occupation. It was the distinct service of the late Benito Legarda, Jr. to establish work in this tradition. His major opus, *After the galleons: foreign trade, economic change and entrepreneurship in the nineteenth century Philippines* [1999], a thorough reworking of his 1955 Harvard dissertation,[2] was a detailed examination of the large-scale economic and commercial developments in the Philippines under Spain. Legarda's work documents the changes in Spain's economic policy towards the Philippines particularly after the loss of the former's American colonies, the entrepreneurial and commercial response to these late reforms, and the resulting changes in Philippine trade patterns and economic structure, along with their social implications.

An indispensable source for Philippine commercial history on which Legarda frequently drew was Manuel Azcárraga y Palmero's treatise, *La libertad de comercio en las islas Filipinas*, published in Madrid in 1872 and denoted *Libertad* or *LC* henceforth.[3] Apart from its value as a historical account, this work is significant as a critique of past Spanish mercantilist policy from a liberal viewpoint and as an explicit advocacy of free trade as an alternative economic policy for the Philippines. It therefore reflects and informs the contemporary liberal thinking that led to the late Spanish economic reforms and their consequences, as documented by Legarda. To the extent members of Propaganda

[2] A major influence in this later rewriting was Professor Jeffrey Williamson of Harvard, whose account appears in Williamson [2020].

[3] One cannot miss the mock-provocation on the book's title page, where the words "La libertad" and "en las Islas Filipinas" are printed in a larger majuscule font than "de comercio", giving the impression that the treatise deals with the more sensitive issue of political or civil liberty in the archipelago, rather than just commercial policy.

(e.g. notably Gregorio Sancianco and Rizal himself) ventured into economic issues, they appear to have drawn inspiration from the liberal perspective and proposals contained in Azcárraga's work. That this valuable tract has not received more attention may be largely due to its non-availability in translation and its non-inclusion in the famous Blair and Robertson [1903] compendium of primary sources for Philippine history.[4] The present article remedies that neglect in part by examining the economic thought implicit in Azcárraga's critique and his proposed remedies to address Philippine underdevelopment. At the outset, however, it should be clear this is not an essay in economic history—for which the reader is referred to Legarda [1999] as the preeminent reference—but in the history of thought and ideas.

2. Azcárraga himself

Manuel Azcárraga y Palmero was one of two brothers born in Manila, both of whom made prominent careers for themselves in mainstream Spanish society and politics, a rare achievement for *insulares* or "Filipinos" in the pre-revolutionary sense. Both were children of a Spanish general from the Basque region who had settled in the Philippines and a Spanish mestiza from Albay. The younger brother, Marcelo (1832-1913), pursued a distinguished military career, successfully navigating the turbulent politics of late 19th century Spain and rising to become general, senator for life, and minister of war in the cabinet of Antonio Canovas. Upon the assassination of Canovas in 1897, Marcelo succeeded him as Spanish prime minister, serving a few more terms in an interim capacity (1900-1901, 1904-1905) in various governments—the only *insular* to achieve such a distinction.[5]

Meanwhile the elder brother Manuel, the author of *Libertad*, pursued a successful legal and parliamentary career, at first in the Philippines and ultimately in Spain. Born on July 3, 1832 and spending his formative years in the Philippines, he began his studies at the University of Santo Tomas but received his law degree from the University of Madrid (1853). Returning to the Philippines, he occupied several positions in the judiciary, including an appointment as prosecutor of the Audiencia and of the Court of the Navy. He had begun to work on parts of *Libertad* since 1860 but completed the draft only in 1869, publishing the entire work in 1872, after a return to Madrid.[6] In 1871 he was appointed to higher judicial and administrative positions in the Philippines, notably: *alcalde mayor* of Cagayan and Bulacan; *gobernador civil* and *corregidor* in Manila; and member of the Council of the Philippines (*Consejo de Filipinas*).

[4] The work however is among those suggested by Blair and Robertson [1903: 358] for further reading.

[5] Until 1961, what is now CM Recto Avenue in the city of Manila was known as Paseo de Azcárraga to memorialise Marcelo. Toribio [n.d.] in the The (Spanish) Royal Academy of History's *Diccionario Biografico* provides a brief biography.

[6] Published in the previous year was Azcárraga's other major work, *La reforma del municipio indigena en Filipinas*.

In 1876, having returned to Spain to seek political office, he gained a seat in the Cortes as part of a party-list submitted by the Conservative Party, representing Lerida district (in Solsona, Catalonia). During this term he was a vocal proponent of free trade policies, particularly advocating the abolition (*desestanco*) of the tobacco monopoly in the Philippines, a measure finally adopted in 1881. He continued to represent the same district in parliament, winning in the elections of 1881, 1884, 1886, and 1890 (as senator). Shifting party affiliations however would later compel him to moderate his free trade advocacies, particularly after 1881, when he pragmatically joined the protectionist bloc of Catalan deputies led by Victor Balaguer. Azcárraga was appointed senator for life in 1895 and in that capacity was several times member of the high state council. Manuel's official biography notes "the powerful influence of his brother Marcelo" in the advancement of his career.

Notwithstanding his pro-government loyalties as a Spanish legislator however—and particularly despite his affiliation with the Conservative party—Azcárraga maintained cordial social, if not necessarily political, ties with the expatriate Filipino community at least in the beginning. This is exemplified by his presence at the 1884 banquet celebrating Luna's and Hidalgo's triumphs at the National Exposition of Fine Arts, during which Rizal delivered his famous toast.[7] Azcárraga also contributed financially to *España en Filipinas*, the newspaper published (1886-1887) by Filipino expatriates and co-edited by his nephew Pedro Govantes y Azcárraga. Any reader of *Libertad*, however, will realise that Azcárraga took a far more optimistic view of the Philippines' future under continued Spanish rule. This was especially so in light of the liberal economic reforms that he thought were finally gaining traction among policy circles and were likely to become the dominant trend. The continuous if gradual pace of reforms, he believed, boded well for the Philippines as a colonial possession, and for Spain itself as master of a prospering colony. Such an assimilationist viewpoint however was bound to conflict with the more nationalist and increasingly separatist mindset held by the younger generation of the Propaganda and would lead to inevitable division. Owing to the split that occurred among the Filipinos in Spain in 1887—partly along racial lines, with creoles on one side and indios and Chinese mestizos on the other—Azcárraga withdrew his support for *España y Filipinas* (see Schumacher [1973: 69-71] for details). He did not live long enough to witness the outbreak of the Philippine Revolution, although there can be no doubt he would have opposed it. Manuel Azcárraga died in Madrid on May 5, 1896.

[7] As reported in the newspaper *La Imparcial*, June 26, 1884. While Rizal and Lopez-Jaena's speeches contained thinly veiled criticisms of current local conditions in the Philippines, Azcárraga's own remarks as a counterpoint stressed Spain's positive past achievements in the archipelago, such as the abolition of slavery among the natives as a result of Spanish occupation.

3. Liberalism and free trade ideas

Azcárraga's strongly liberal economic views cannot have come from other than his law studies at the Universidad Central de Madrid. A free-trade tradition had already firmly established itself in the university since the late 18th century,[8] with the faculty of law being the first to include a course in economics and statistics in its curriculum. A summary account [Rodriguez Martin 1989: 90] of the state of university economics in Spain puts it as follows: between 1779 and 1806 "the hegemony of Smith was practically absolute in academic circles"; between 1807 and 1834, JB Say became the dominant figure "although [Smith] partially maintained his previous influence"; while from 1835 to 1857, the various currents of European economic thought became known and available. Much of Spanish economic thinking was filtered through French economists and French translations of English work. Notwithstanding other influences, however, the continuing predominance of Smith at least in the theory of trade can be inferred, given the continued reliance of French writers on Smithian trade concepts and their somewhat slow acceptance of Ricardo and JS Mill's ideas of comparative advantage [Bloomfield 1989].

Given the long prior history of liberal influence in academia, therefore, it is not surprising that Adam Smith [*LC* 211, 235] and Frederic Bastiat [*LC* 232] are the two major economists Azcárraga refers to by name. Among contemporary Spanish economic writers, he mentions [*LC* 174] Gabriel Rodriguez, Segismundo Moret,[9] Laureano Figuerola, and Luis Maria Pastor, all of whom were members of the free trade advocacy group *Sociedad Libre de Economia Politica*. Moret and Figuerola became professors at the University of Madrid, though somewhat after Azcárraga had graduated.

Aside from his academic milieu, Azcárraga's liberal views on trade cannot fail to have been influenced by the changed world conditions of his time. Europe after the Napoleonic wars and until the 1870s witnessed a gradual but universal trend towards trade liberalization, reinforced by falling transport costs brought about especially by transport technologies from the Industrial Revolution [Findlay and O'Rourke 2007:378-382; 395-396]. Britain led the way in the 1820s, but was soon emulated by almost all European countries including Spain. Such trends did not escape Azcárraga's attention and bolstered his optimism that free trade indeed represented the trend of the future. He was well aware of the "liberal movement" in Europe, citing England's repeal of the Corn Laws (1846) [*LC* 203], as well as the

[8] The *Wealth of nations* was first translated into Spanish in 1794, and prominent writers and statesmen such as Gaspar Melchor de Jovellanos (1744-1811) were strong adherents of Smith and advocates of free trade, whose ideas influenced intellectual opinion, if not necessarily state policy.

[9] Moret, in particular, who later served as minister for the colonies under Sagasta, was sympathetic to Filipino reformers before and even after the outbreak of the Revolution. An admirer of the *Noli*, he sought out Rizal personally in Paris in 1889 and intervened as late as 1898 to have Antonio Luna freed from prison [Schumacher 1973:187, fn. 56].

United States,[10] with the most advanced nations "recognizing their [protectionist] errors" and moving towards freer trade [*LC* 215]. Alluding to characteristic elements of the Industrial Revolution (a term which of course did not then exist), he calls trade taxes "incompatible with steam and electricity" and "an anachronism in the present century" [*LC* 215] and looked forward to the completion of the Suez Canal as offering a more promising future of trade between the Philippines and Europe [*LC* 15].

Because *Libertad* is less a theoretical treatise and more a critical history of commercial policy, we are left to infer many of Azcárraga's economic ideas only from the substance and counterfactuals of his policy critique and some obiter dicta. In relation to the theory of trade and the gains from trade, however, his admiration for and reliance on Smith's general ideas[11] is explicit:

> The balance-of-trade system[12] is obsolete; the solid doctrines of Adam Smith have spread to all nations, and *no one today believes that the prosperity of one country is obtained at the cost of another's misery or loss: science has shown that a people's progress and expanded production, far from harming others, contribute under a free-trade regime to the greater welfare of all others*; which is why Europe is interested in all parts of the globe thriving, increasing, and producing more cheaply, since in that way they might more easily satisfy their needs and produce more of their product. [*LC* 210] (Emphasis supplied.)

In the foregoing, apart from obviously dispelling the mercantilist notion of trade as a zero-sum game, it is notable how Azcárraga views the global benefits from trade as arising not from greater static efficiency but from dynamic gains associated with growth and development (i.e., "expanded production"; "produce more of their product"). His panegyric on the benefits of foreign trade—which, as will be discussed further below, went beyond even the views held by Smith—was a foundation of the argument for laissez faire:

> *Trade is the life of modern peoples and is the most powerful agent to spread civilization.* This industry, which has the privilege of doing business by serving the interests of both producer and consumer, represents nothing less than the satisfaction of all aspirations, for which reason it is essential that the action of private interest [*interes particular*] should be left entirely free

[10] In the US, Azcarraga [*LC* 202], saw as a hopeful sign the growing influence of the Democratic Party, which favored free trade and was associated with agricultural interests in the Southern (formerly slave-owning) states. In fact, however, the US would not conform to the European trend: the North's victory in the civil war and the Republican control of congress meant the dominance of Northern manufacturing interests, which "set the stage for consistently high tariffs" until 1914 [Findlay and O'Rourke 2007:399].

[11] Legarda [2011:16] was among the first to call attention to this quote in his article for PRE's issue commemorating Rizal's birth bicentenary.

[12] Smith also refers to mercantilism as the "doctrine of the balance of trade" [*WN* IV.iii.c.2]. References to the *Wealth of Nations* follow the Glasgow edition [1976] citing the relevant book, chapter, and paragraph. The preceding thus refers to Book IV, Chapter iii.c., paragraph 2.

> and untrammeled; that all the administration's attention and effort should be aimed at providing the greatest facilitation of trade; that not even the slightest obstacle should hinder its unifying movement; and that nothing should stand in the way of its march of expansion, for *it is humanity's march to progress*. [*LC* 200] (Emphasis supplied.)

4. The question posed

Azcárraga's treatise begins with a brief account [*LC* 12-21] of the Philippines' geographic and other natural advantages: the fecundity of its soil as seen in the various products it produces and currently exports; the existence of numerous natural harbors; its proximity to traditional markets such as China, India, and Japan, and to new markets, including then-French Indochina and the more distant British colonies in Australia; as well as its uninterrupted commercial relations with the US, England, and Spain, only certain to be enhanced with the recent inauguration of the Suez Canal. He notes with approval the rise since 1840 in exports of commercial crops such as tobacco, sugar, abaca, and (to a lesser extent) rice, the trade in which was liberalized in 1856, as well as the increase in internal trade.[13]

This favorable account of recent developments, however, is only a stepping stone to point to the country's commercial potential that was still far from being fully realized:

> Notwithstanding the satisfactory picture we just painted, a mistaken and excessive love for all things ours should not blind us to the fact that the Philippine islands have not prospered as much as was to be expected from the very advantageous conditions with which Providence has favored them; their wealth has been paralysed for almost three centuries; and above all their trade has not taken off as it should, instead remaining enclosed in a small circle from which it is only now emerging. [*LC* 25]

Eerily reminiscent of how development economists of the 1990s would compare a laggard Philippines with the so-called "tiger economies", Azcárraga poses a similar development puzzle. He asks: considering its locational, climatic, and other natural similarities with (and indeed, advantages over) other colonies in the region, why is the Philippines less developed and less prosperous than the latter? Azcárraga notes, for example, the distinct absence in the country of large commercial plantations of sugar, coffee, cocoa, cinnamon, pepper, and tea, which are typical in British colonies such as Sri Lanka and Penang [*LC* 26, 30]. He senses this is a problem associated with the small number of private Spanish citizens (apart from friar corporations) who take a serious interest in plantation

[13] In doing so he disputes the statistics provided by Sinibaldo de Mas, which tended to show a much smaller value of foreign trade.

agriculture. Land instead is in the hands of natives, highly subdivided, and without formally defined property rights, although he notes the increasing role of mestizo Chinese [*LC* 27-28]. With regard to trade, he marvels at the preeminent position and prosperity of global commercial centers (also British) such as Singapore and Hong Kong [*LC* 32, 33], with their volume of trade dwarfing that of Manila notwithstanding their more recent establishment and despite Manila's proximity to and long history of relations with China and other Asian countries.

In a precis of his subsequent argument, Azcárraga briefly enumerates—partly refuting and partly affirming—a number of hypotheses purporting to explain the superior performance of other (mainly British) colonies, on the one hand, and the Philippines' long-standing "paralysis" of riches and deficit in commercial activity, on the other. None of this, he argues, can be explained by any lack of enterprising or colonising spirit among the Spanish vis-à-vis the "Anglo-Saxon race";[14] or by the greater capital that London as a financial center might mobilize for overseas investment; or by the supposed pressure to find new markets for more productive British factories. Many of these supposed British advantages, after all, emerged only long after Spain had taken possession of the Philippines (i.e., in the late 18th and the 19th century).

Instead the primordial explanation for the archipelago's long-term underdevelopment, he argues, was Peninsular Spain's neglect of the islands, which for centuries were relegated to being an appendage of Mexico—"the colony of a colony", as Chaunu [1960: 20] writes—and therefore dependent on the latter for personnel, military provisioning, and finance.

> [N]o matter how great and active Spain would have been, *given America's proximity and the superior climate of its immense and fertile lands, the Spanish nation could not muster the fibre to attend to the remote provinces of Asia*; we see even today immigration from the Cantabrian coast to Buenos Aires and other places where conditions are more familiar to the European farmer, and *where no less wide a field is presented to enterprising spirits*. [*LC* 37] (Emphasis supplied.)

This initial explanation is not as facile as it seems. It anticipates the now-famous hypothesis of Acemoglu, Johnson, and Robinson [2001] that settler density may have played a vital role in creating a demand for inclusive institutions that ultimately favored development. (Azcárraga of course does not draw the latter implication.) An application of that hypothesis to the Philippines [Cruz 2013] suggests that the country's sheer distance from Peninsular Spain, the less familiar and less hospitable climate, and the paucity of especially mineral wealth—all in relation to the Americas, as Azcárraga maintains—may have served as a powerful

[14] Azcárraga rejects this explanation, citing as counter-example the adventurous spirit of Spanish explorers and conquistadors, as well as the large migration flows of Spaniards to the Americas (particularly Basques to Buenos Aires).

disincentive to large-scale colonial settlement, leading to the negative institutional consequences Acemoglu, Johnson, and Robinson hypothesized. Spain's American possessions themselves were, of course, already a negative example supporting the settler density hypothesis, but the circumstances applied to the Philippines to a far greater degree.

Azcárraga's real point, however, is not to cite natural conditions and historical events as immutable fortune but rather to seek to ameliorate these through enlightened legislation, i.e., institutional changes.

> These insuperable facts, which legislation cannot ignore, *needed to be modified by our economic legislation through provisions that would open the bosom of those islands to investors of all nations*.
>
> But not only was this not done; on the contrary, *the concern for a need for Spanish trade has marked our legislation with such a stamp of exclusiveness that it has completely removed all foreign investors from that country*, and what is even more uncommon, even within the limits of national trade, such obstacles and so many limitations have existed for a long time that directly and powerfully impeded its development. [*LC* 37-38] (Emphasis supplied.)

Spain's failure to recognize initial conditions and its preferred policy of monopolizing trade for itself is what Azcárraga believed to be the "real reason" (*la verdadera causa*) [*LC* 39] for the lack of progress and relative commercial desolation of the Philippines. His essential assertion is that if Spain had instead adopted a regime of free trade and liberal, non-exclusive rules on foreign investment, then even the limits imposed by geography and history might have been overcome. This argument included the possibility that—failing sufficient Spanish or Mexican interest in the Philippines—other nations could have taken up the slack. Azcárraga's free trade advocacy is unique in that he proposed liberalizing not only Spain's trade policy in the Philippines but its investment and possibly immigration policy as well.

Despite significant progress in liberal thought and policy promoted by a more receptive Spanish government in his own time, however, Azcárraga thought the free-trade and mercantilist systems were "still in conflict" [*LC* 7] in his day, and that further liberalisation and economic progress were still possible for the Philippines. The rest of his work is an attempt to demonstrate this by tracing the thread of mercantilist ideas and policies in various forms that had time and again prevented Philippine trade from rising to its full potential and hindered the country's development.

5. Four epochs

Azcárraga divides Philippine commercial history into four "epochs" or periods, namely: (i) from Legazpi's arrival to about 1593, a period of more or less unrestrained exchange between the Philippines and Spanish America; (ii) the longest period, beginning with the landmark royal decree of 1593 that laid down rules for the Manila-Acapulco trade and spanning the whole period to about 1750 when more or less similar restrictions remained in place; (iii) the period from about 1750 to when the galleon trade existed alongside direct trade between the Philippines and Peninsular Spain, initially carried through naval frigates and subsequently through ships of the Real Compañía de Filipinas or the Royal Philippine Company; and (iv) the final period, a distinctly liberal phase from about 1834, with the demise of the Royal Philippine Company and the opening of Manila and other ports to international shipping down to the time of Azcárraga's writing.

Azcárraga praises the achievements of that first period, characterizing it as an almost ideal commercial situation approximating free trade between America and Asia with Manila serving as the intermediary, "opening a new outlet on the Asian continent for those manufactures whose trade with Europe through Mediterranean ports gave so much profit and fame to Genoa, Venice, and Barcelona at other times" [*LC* 41-42]. His account is short on data but focuses on the fact that Manila was in principle free to export goods to the Americas from various Asian sources without restrictions on value, kind, and quantity. To this he ascribes the anecdotal conspicuous wealth and cosmopolitan character quickly achieved by Manila in those early decades, citing as evidence the establishment of pious foundations through citizens' donations, a university (Colegio de San Ignacio) whose inauguration was attended by Spanish "students wearing caps covered with pearls and fine gemstones",[15] the great variety of Asian goods available on the local market signifying purchasing power, the ability of provinces to pay their tribute in gold, and the colony's ability to harness enough resources to conduct expeditions against the Moro tribes of Mindanao and defend itself against challenges from the Dutch and Chinese pirates [*LC* 42].

That the burgeoning wealth of Manila in the first decades attracted a growing Chinese and Japanese population that had taken over the retail trade was also something Azcárraga viewed with equanimity and indeed as a sign of easy and early success [*LC* 45]. He notes how various embassies and delegations from various Asian countries (China, Japan, Cambodia, and Siam) were sent to Manila to establish relations with the Spanish colony essentially treating the governor in Manila "as if he were the sovereign of an independent state" [*LC* 43].

[15] De la Costa [1956:138] cites a similar anecdote from Murillo Velarde about the attire of Spanish students of the Colegio de San Jose but this was in relation to the feast of the Immaculate Conception in 1619.

> One sees, therefore, that at the beginning of the 17th century, even without great efforts on our part, and *with no other attraction than trade—the true bond that must unite all peoples*—we managed to establish very good relations with all those nations of Asia which today require costly wars and expeditions on the part of some great powers to be persuaded to open their bosoms and accept the commerce that they then requested from us—nor is one even able to say whether the question has now been settled, or whether solid relations and peaceful dealings have been established with those peoples. And one also sees how the hospitality and franchises of the early days of our colony led to the quick setting-up of a great commercial establishment, as rich and as active as the best that we see being born and developed today in those seas—an establishment that, if it continued as it had begun, would today be the most powerful capital of the East Indies. [*LC* 45-46] (Emphasis supplied.)

He underscores the laissez-faire policy effectively underlying this success and the absence of any need to grant specific privileges to private interests to achieve it:

> One surely cannot fail to view with pride and enthusiasm the high degree of prosperity reached by that capital of our nascent colony in so few years, simply by having its port open to all Asian nations and by knowing how to take advantage of its natural position in the globe, *without help from individual protections and privileges that always cause harm to the general public* [generalidad]. [*LC* 42]

(Azcárraga, of course, fails to mention that the galleon trade's largest subsidy and privilege throughout its existence was from the cost of galleon construction being borne by the crown.[16]) In any event, whether Azcárraga's assessment of Manila's early 17th century position and potential was naively optimistic should be a matter to be left to historians. Legarda [1999:34-37], for one, takes a less rose-colored view of these possibilities, noting that the early Spanish settlers were preeminently still concerned with their own security and fear of being attacked, e.g., by the Portuguese, the Chinese empire, or Chinese pirates. Even the quickly-expanded Chinese population of Manila—different from Azcárraga's benign view—was regarded by the authorities as a threat. Legarda also dampens enthusiasm over the prospects that the Manila Spanish might have traded directly with the Chinese mainland—an opportunity Azcárraga thought existed and should have been seized—given the prohibitions imposed on foreigners in the major Chinese ports and the opposition from the Portuguese who wanted to protect their

[16] Schurz [1985(1939): 164-166] details the large sums needed to maintain the galleons and the burden this represented on the royal treasury. The decree of 1593 formally declared these to be "supported at royal expense". Subsequent attempts by various Mexican viceroys to offload the costs to the Manila community as private individuals were resisted and failed.

privileged position in Macao.[17] This left only the *sampan*[18] trade from Fujian as the only possibility, with 30-50 sampans annually arriving in Manila bringing miscellaneous Chinese goods for re-export to the Spanish Americas.

What is not in doubt is that even the "sampan trade" alone made possible a rapid expansion of the value of trade between Manila and the Americas, with galleons being dispatched (in the early decades, at times more than two annually) not only to Acapulco but also to Peru and the Isthmus of Panama (i.e., Tierra Firme). A check on Chaunu's figures [1960: 136; Table 1 Column I] indeed shows a rapid expansion in the value of trade to a record level from 1586 to 1620 that would be surpassed only in 1776.[19]

6. Critique of restrictions on the galleon trade

Azcárraga uses the first epoch mainly as a counterfactual or a natural experiment to illustrate what might have been if the restrictive system imposed in the second period had not materialized. The shift towards protectionism began in the well-known January 11, 1593 decree of Philip II that would lay down the basic rules for the Asia-Americas trade with effective implementation beginning from 1605.[20] The most significant restrictions were that the Philippines should trade only with Mexico; that only citizens of Manila could engage in the trade but that no Philippine residents (or indeed any Spanish subjects) could directly sail to China for the purposes of trade; and most importantly that the Manila-Acapulco trade should be limited annually to two outgoing ships from Manila with a cargo limit of 300 tons each and a combined value not exceeding 250,000 pesos and with a returning value of 500,000 pesos (i.e., a rate of return of 100 percent). These rules were modified in 1724 without a change in principle to allow a single outbound ship annually with bigger capacity of 1,200 tons; a higher limit of 300,000 pesos in cargo; and the same maximum of 100 percent rate of return in silver on the return trip. The restriction of the annual voyage to one ship annually did not itself seem to represent a particular constraint—it was proposed by the Manila business community itself [*LC* 55-56]—and seemed to be associated with the high fixed costs of constructing and outfitting two ships [Giraldez 2015: 150-151], suggesting scale economies.

[17] In the trade coming through Macao in the 16th century, the Portuguese used Japanese silver to procure Chinese silk and other goods to serve the Japanese as well as European markets, reaching the latter via the westward route of Malacca, Goa, and Lisbon.

[18] Azcárraga and Legarda, respectively, use the terms *champan* or *sampan* to denote the Chinese vessels calling on Manila. Sampans however refer to smaller boats driven by oars. As one referee has pointed out, a better term for the Chinese ocean-going vessels would be *junk*. I retain the former term against better advice for correspondence with the translations.

[19] Trade restrictions would not take effect until 1605 (see below), and even after that, these would be enforced only unevenly; 1635 appears to be a watermark when Quiroga was sent to finally enforce those restrictions strictly.

[20] Legarda [1999: 37] notes that the restrictive trend began earlier, with legislation prohibiting direct trade between the Philippines and Peru (1582) and a series of laws passed from 1591 to 1604 limiting trade between China and the Americas only to Mexico. Later legislation also prohibited trade between Mexico and Peru to prevent transshipments of Asian goods from the former.

Rather, the binding constraints seemed to be the limits on value and volume. As Azcárraga notes wryly however:

> Fortunately, this tyrannical stipulation floundered on the powerful obstacle of the private interests that it would have so badly harmed, among which were those of the same authorities and officials mandated with its compliance and observance; this prevented the royal decree from being considered at that time, and thus the commerce with Acapulco in reality continued without a limit on volume until the year 1604. [*LC* 49]

It was clear to Azcárraga—and well-accepted in histories of this period—that the shift to restricting the Nao de Acapulco was the result of lobbying efforts of Andalusian (and to a lesser extent also Mexican) silk cloth producers,[21] who wished to protect their markets in the Americas and Europe against imports of Chinese silk arriving via the galleon trade that were frequently of superior quality. This led to ever-tighter restrictions: first on destination, i.e., preventing sales to Peru; second, on those limiting its volume, the equivalent of a modern-day quota or voluntary export-restraint; and, third, for a brief period (1720-1723), even an explicit prohibition on the carrying of Chinese silk itself.[22]

Azcárraga devotes a great deal of ink to demonstrating the lack of basis—in either fact or reason—of Cadiz and Seville's remonstrations regarding the alleged harm brought to them by the galleon trade (especially *LC* Chapter VII), and on the other hand the deleterious effects of that trade restriction on the well-being of the Philippines as a Spanish colony. His detailed account of the exchange of petitions and counter-petitions between the Manila and Cadiz lobbies is a valuable summary record. As a factual observation, he notes that even when the strictest measures were placed on the galleon trade (e.g., as when the very export of Chinese silk from Manila was completely prohibited in 1720), Cadiz could not fill the bottoms of America-bound vessels with Spanish-made textiles and had to load these with foreign-made textiles, since Spanish textiles had become demonstrably uncompetitive and moribund even in their home market:

> [E]ven absent the prohibition, it would have been very hard indeed for our American colonies to buy Spanish manufactures which nobody wanted in Spain itself, since not even these existed in sufficient quantities to sustain a trade whose protection was used as a pretext to occlude or extinguish that coming from Manila. [*LC* 87]

[21] The secret of silk-production had filtered from China through Byzantium to Europe as early as the 6th century, and led to a well-entrenched home-grown silk-making industry in Spain and Italy, and subsequently, Mexico [Bernstein 2008: 200].
[22] A description is found in Legarda [1999:32-50].

This implied, of course, that what was really involved was not even a protection of Spanish industrial production but a mere redistribution of trading profits as between Manila (which re-exported Chinese silks) and Cadiz (which was effectively re-exporting English and French textiles). He uses this fact to argue that the decline in Spanish manufacture was not due to competition from the Manila galleon but to causes internal to industry.

In a telling chronological point, he notes that the decline of the Andalusian textile industry began well before the galleon trade was even established, and he supports the opinion of other writers who point to the real reasons for that decline, namely: a labor drain to the Americas with the resulting inflow of precious metals causing a further internal diversion of talent, an extreme case of what could later be called booming sector or "Dutch Disease".

> This spirit of adventure gave rise to a continuous migration to the newly discovered lands, an idea of which is provided by those provisional kingdoms in South and North Americas and those selfsame expeditions to Oceania. That emigration caused the depopulation of the Peninsula's fields, leading to a lack of hands for the aforementioned (i.e., textile) factories but also for agriculture, where our true wealth lies.
>
> *The torrent of precious metals that poured into Spain from the mines of Mexico and Peru created a delusion among Spaniards; it created habits of laxity and sloth; it took them away from the mechanical arts, previously called servile; everyone wanted to gird their sword and enjoy the spoils of conquest*. Meanwhile the habits of other nations were changing, as were their tastes in fashion and in fabrics; their merchants and manufacturers knew how to follow and get on the right side of these changes, which Spain in the midst of its apparent greatness hardly noticed; and when industrialists and our own rulers came to their senses, they found that manufactures from France, England, and the Netherlands had invaded our markets; they had seized our consumer centers in the Peninsula and through smuggling did the same even in the newly-conquered countries.
>
> These were the true causes of the decline and disappearance of our looms and manufactures; these were also the causes of the decline of the nation itself, which lacked hands not only for the arts and agriculture, but also for the other services needed to establish a powerful state. *This was the sad picture presented by our country at the end of the 16th century at the time of the discovery of the Philippines*: hence the idea was neither new nor unfounded when the immortal Cervantes created the inspired type of hero who had a mind full of fancy but an emaciated body;[23] he wanted to represent his impoverished and poorly governed homeland without agriculture,

[23] *Don Quijote* was first published in 1605.

> without arts, and without commerce, consuming all its energies in foolhardy enterprises that were momentarily brilliant but ultimately very expensive and of no real benefit to the nation. [*LC* 84-85] (Emphasis supplied.)

From the Philippine side, the most visible source of the distortion caused by the protectionist policy was the restriction on allowable value, volume, and profits on cargo, even if these were often easily evaded through benign neglect or corruption. The relaxation of these limits was the subject of the Manila business community's numerous petitions to the court. Azcárraga condemns these restrictions as "irksome" [*LC* 49], "absurd" [*LC* 49, 60], and even "tyrannical" [*LC* 49].

Also coming in for criticism was the additional transaction cost imposed to enforce the monopoly of Philippine [Spanish] residents over the trade [*LC* 72]. This prevented the consignment of cargo to non-Filipino residents. Shippers from Manila could neither consign their cargo directly to Mexicans at the other end, nor to the galleon's captain or crew. Instead, shippers had to hire pursers or agents to accompany the cargo, as well as to compensate the real Mexican consignees who would facilitate the offloading of the cargo so that "each expedition of the Nao had two consignees, one on board and the other at Acapulco" [*LC* 72]. Far from benefiting the shippers, this "nationality restriction" represented an additional burden on trade.

A final and crucial point of Azcárraga's criticism of the 1593 regulations was the prohibition on Spanish subjects, particularly those of the Philippines, from directly acquiring merchandise from China, India, and other Asian ports. This effectively relegated Manila to the sampan trade, where the colony had to await the arrival of merchandise conveyed by Chinese and other vessels calling on Manila instead of actively seeking out products by dispatching vessels of their own. This issue touches on Azcárraga's vision of development for the country and will be discussed further below.

The static welfare analysis of an export quota or export restraint such as that regulating the galleon trade is fairly standard from a contemporary viewpoint.[24] Aside from protecting the "home" (i.e., Peninsular and Mexican) industries, its effects include the creation of rents accruing to the export source-country (the Philippines), a definite loss to the consumers of the importing country (Spanish America) owing to higher prices, and an upgrade of the types of goods sold.[25] The net welfare effect on the source-country, on the other hand, depends on whether the rents due to a higher export price—caused by the restriction of supply to the importing country—are greater than the producer's surplus under an unrestricted regime.[26] Since American

[24] For a textbook explanation, see, e.g. Saylor Academy [2012: Sec. 7.21].

[25] On the upgrading effect, see, e.g., Hamilton [1986].

[26] The higher export price is a terms-of-trade effect. The same terms-of-trade effect may yield a benefit to consumers of the exporting country, who might enjoy a lower price of the exported goods as a result. This effect is negligible in this context, however, given the small size of the domestic Philippine market relative to export demand.

demand for the type of goods in question was likely elastic, it seems intuitive that revenues and profits under restricted trade were greater than under the earlier regime of unrestricted trade; hence a net loss to the source-country can be presumed. In the case of the galleon trade, the restrictions preserved the rents to Cadiz and Seville but, notwithstanding the rents accruing to the Manila business community, which was given exclusive trade privileges, the latter's complaints against the restrictions and its unremitting lobbying for a more relaxed quota would appear well-founded.

Azcárraga seemed well aware of the comparative statics of the situation. In principle, a first-best and truly free-trade solution might have involved direct trade between Asia and the Americas without Philippine intermediation, but his viewpoint focused on the fact that the Philippines was already *de facto* a trading center in the making based on revealed private initiative:

> Would it have been better if the Chinese, Japanese and Armenians[27] took their manufactures directly to Acapulco? Better for the Americans, undoubtedly, since they would have acquired the textiles more cheaply; *but then the trading center of Manila would have lost its advantages from transporting these commodities*. Would it have been better if American vessels had come in search of Asiatic products? We believe this would also have been better for the Americans and our navigation in general, *although this would inevitably have deprived Manila of the benefits indicated. But since no such direct commerce was established, it was undoubtedly of utmost advantage for both sides that we established our colony in Manila*; that they knew how to take advantage of this business opportunity indicates to us that those adventurers, the first settlers in this country [*sic*], aside from being fearless warriors and skillful politicians, were no mean businessmen. [*LC* 91] (Emphasis supplied.)

The above shows that Azcárraga knew that from a static-welfare perspective the galleon trade even at its least restrictive was inferior to a direct Asian-American trans-Pacific exchange. His pragmatic assessment, however, was that since no move emerged from either Spanish American or Asian interests to venture into or even lobby for direct exchange, the best that could be expected was an approach to a situation consistent with what private business interest (from the Philippines) actively exhibited, namely, a system of transhipment of Asian goods to the Americas with Manila as entrepôt. That this coincided with the interests of Manila and the Philippines was a bias Azcárraga was not embarrassed to display. More importantly, however, this advocacy was based not solely on partisanship (e.g., possibly stemming from his affinity for his native land). Azcárraga criticized the restrictions not because they did not deliver large enough rents to Manila or

[27] Armenian merchants also sold silk in Manila, and there was a quarter especially reserved for them. Giraldez [2015: 114-115] traces their influence to their monopoly of the trade in raw silk and to their alliance with the British under an Anglo-Armenian agreement in 1688, which allowed Armenians to cooperate with the British East India Company.

low enough prices to America. His real advocacy was not to maximise global static welfare gains from trade but to realize the dynamic gains from developing Manila as a full-blown trading center and with that, achieving the development of the Philippines as a Spanish colony.

For all Azcárraga's praise of private initiative, of course, the galleon trade was still a venture heavily subsidized by the crown—on whose account fell the costly construction and manning of the galleons.[28] Hence there is no question that private Spanish capital alone would not have sufficed to sustain the effort given the ceilings on cargo and returns. One might surmise however that it was Azcárraga's view that less of a subsidy might have been needed and more private capital (not exclusively Spanish) would have participated if the trade had been unrestricted. At any rate any subsidy would have been a better investment if accompanied by rules that allowed full play for the Philippines to trade with its neighboring countries as well as with all of Spanish America.

7. Manila as center for the carrying trade

Azcárraga's alternative vision for the port of Manila was its development as a hub for the "carrying trade" (*comercio de escala*) and its rise as an entrepôt in the mold of Singapore and Hong Kong. He believed this could have been accomplished from the earliest days. The "carrying trade" in the words of Adam Smith, involves merchants "purchasing foreign goods in one foreign country in order to supply the consumption of another" [*WN* II.ii.32]. Azcárraga accorded this particular species of trade a special significance.

> The carrying trade is one of the forms taken by merchant enterprise [*especulaciones*] in its fervid search for profit; it is perhaps also the form that requires the most ingenuity and energy from the entrepreneurs engaged in it. To seek goods that are abundant in foreign markets in order to deliver these to those parts of the world that need them and fancy their consumption is to render a service to both sides; and since this service is not free but rather takes advantage of the difference in prices between that in the producing and consuming countries, the result is clearly a great advantage to the merchants and the center that pursues that trade. [*LC* 90]

Azcárraga extols the virtues of the carrying trade by citing the affluence and progress it brought to trading centers engaged in it. His examples range from ancient Palmyra, to Hormuz under the Portuguese, and to the more recent and relevant examples of the British colonies of Singapore and Hong Kong:

[28] Early attempts to outfit galleons at private expense were abandoned since "private enterprise could not compete with the subsidized state galleons" (Schurz [1985(1939)]: 164-166).

> It is no other than the carrying trade that has given life and growing prosperity to the trading center of Singapore… This is trade that consists in storing all manner of products from China and goods from England, where the former are imported, not to be consumed in their entirety, but for a part to be exported to other nations, while the latter are to be exported to the Celestial Empire and even to Japan. The same is true of the new, more proximate entrepôt that is Hong Kong, formed and created in our times and before our eyes, without English traders viewing themselves as being disadvantaged by this commerce, but rather regarding it as an auxiliary; this though the balance of trade mostly turns against England, with the difference often having to be paid with a respectable sum in silver. Without this carrying and entrepôt trade, what would Singapore and Hong Kong be today? [*LC* 92]

The galleon trade itself was, of course, already one leg of such a carrying trade—albeit a deliberately crippled one. Through the Philippines, Spain was already intermediating between Asia and Mexico by supplying the latter with Asian (especially Chinese) goods in exchange for Mexican silver, of which the Chinese were in perennial want.[29] In Azcarraga's alternative vision of how Spain should have organized its commerce, however, it would have dispatched its ships to procure high-value goods directly from the major ports of Asia, especially China, India, and Japan, the source of production of such goods. The merchandise would then have been deposited in Manila, from which they would have been re-exported to the Americas and to Europe on Spanish and other foreign vessels.

Such a vision differed from the actually existing system of the Nao de Acapulco. Aside from limits on the frequency, cargo, and destinations of the galleons, already noted, Spain could not itself actively seek out Asian goods at the source. The 1593 decree prohibited any person from the Philippines from doing direct business with China, that is, from merchants sending their own ships to purchase Chinese merchandise at the source. Instead, a cumbersome system was imposed that entailed waiting for Chinese and other traders to descend upon Manila bringing such goods. These goods were then sold in the annual fair (the *pancada*[30]), where the governor unilaterally set the value on distinct lots or piles of heterogeneous goods, the lots being determined by the Chinese traders who owned them and put them on offer.

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[29] The reasons for China's perennially high demand for silver lie in the idiosyncratic currency system it implemented. Precious metals like silver were never minted into currency; the government instead minted bronze and iron coins and encouraged the use of paper notes. The failure of the paper money system, however, led the Ming dynasty to require tax obligations to be discharged in unprocessed silver ingots, thus effectively monetizing the commodity. Silver proved to be a desirable asset both in periods of economic growth (as an increase in demand for a money-like asset) and in recessions (as an asset protected from inflation). The reader may wish to consult von Glahn [1996] for a more detailed narrative.

[30] Azcárraga explains [*LC* 103] how the *pancada* (meaning "pile" or "heap") did not entail sales of distinct classes of goods but rather of lots each consisting of miscellaneous merchandise.

Azcárraga criticizes this system as having ceded unnecessary benefits to the Chinese merchants, compared to a system where Spanish ships sought out these same goods from the producer-countries, as the British and Dutch had successfully done.

> The mere fact that the Chinese themselves transported their merchandise to our port would produce, as a precise consequence, a reduction in imports and an increase in their prices. They sailed, as they still do today, using those heavy vessels called *sampans*, which are quite suited to staying afloat but not to deftly plying the seas; therefore no more than one annual expedition to Manila was possible, owing to the need to await the favorable northern monsoon in order for them to reach this port and the southwest monsoon for their return. Another irritant in this prohibition, however, was that it placed the Chinese in a position to lay down the law on Philippine trade and to exercise an intolerable monopoly, removing the competition that our ships would have undoubtedly posed to them in this commerce. For although their goods were subject to appraisal, [the Chinese merchants] could very well withdraw them from sale or not return to that trading center if they found the price unsuitable. [*LC* 75].

Azcárraga does not record—although he would have certainly regarded it as a missed opportunity—that the Manila Spaniards had in 1598 managed to negotiate the establishment of a trading outpost on the Chinese mainland near Canton called *El Pinal* [Giraldez 2015: 148]. This failed to prosper however, owing to the objections from the Portuguese, who were jealous of the privileges of the trading privileges of their outpost in Macao.

Azcárraga [*LC* 76] argues it was Spain's failure to fully exploit its first-mover advantages in the carrying trade between Asia and America that created a vacuum ("making our flag disappear from the Indian seas and China") later to be filled by the English, Dutch, and Portuguese, who had no qualms about directly dealing with the producing countries. To rub salt in Spanish wounds, French and English merchants were effectively able to game the galleon trade itself by supplying goods to Manila by flying false flags ("Armenian or Moorish")— effectively mimicking the role of the Chinese—and collecting rents from the large Asian-American price differentials without themselves having to undertake the perilous trans-Pacific crossing [*LC* 76-77].[31]

The gains forgone by not directly dealing on an unrestricted scale with Asian countries were not limited to the rents from trade, however, but extended to the stimulus this could have given to manufacturing, with increased consumption of novel products stimulating imitation and domestic production of the same:

[31] This was especially true for the exchange between Madras and Manila. On this, see Legarda [1999: 84-85] and Giraldez [2015: 114]; the latter discusses the special role of Armenians at some length.

> It should be noted, then, that the nations that strove the hardest to capture that Asian trade are those that today have the highest level of development in their manufactures; *through the imitation of porcelain and Chinese fabrics with their vivid colors, they have created new industries and therefore increased their wealth and commercial activity*. And if we also observe that this great movement in all Europe occurred in the very epoch when Spain opposed our trade in Asia, which had been reduced to a small scale between Manila and Acapulco, it will be well understood that the suppression of the same was what hurt the commerce and wealth of the Peninsula. *For if in Spain the taste or caprice for the fabrics and manufactures of China and India had also spread, there was no other conduit for these but those foreign nations that went to the East and imported them in great quantity and without competition, to the great advantage of their trade and well-known damage to our navigation*. [*LC* 89] (Emphasis supplied.)

Apart from the adverse impact on the Andalusian silk and textile industry, the other mercantilist argument against the galleons was that they drained precious metals from the Spain and funnelled these into "heathen hands". This was the advocacy of, for example Uztárriz,[32] (see Castillo [1930: 97]) an earlier writer who in 1724 supported the restriction of trade between the Philippines and New Spain, since it benefited the Chinese and Muslims and drained America of the precious metals that such writers thought should have benefited Spain. Against this hoary mercantilist idea, Azcárraga notes:

> [I]t is of no importance to us that the other million pesos a year went to China and Japan and India; because that hefty sum was not a gift from the Americans, nor a violent exaction by the Asians; it was merchandise given in exchange for the very desirable goods that our Naos brought over from these nations. What purpose would it have served Mexico and Peru to have rich mines of gold and silver if these could not be exchanged for fabrics to dress in or for other objects of need or whim? What would these coveted treasures be if they were denied conditions of exchange and circulation? Of what significance is money destined to stay quietly in treasure chests? [*LC* 91-92]

Azcárraga here was of course already well within Smithian orthodoxy in dispelling the idea that "wealth consists in in money, or in gold or silver" [*WN* IV.i.1], rather than in the consumable commodities and the productive capacity needed to acquire them.

[32] Gerónimo Uztárriz (1689-1751) was a prominent Spanish mercantilist writer. Castillo's [1930] work on this author is incidentally significant as the first doctoral dissertation in economics written by a Filipino in the modern era. Submitted to Columbia University in 1930, it is noted in Schumpeter's [1954] famous *History of economic analysis*. Again, I am indebted to Dr. Legarda for having pointed this out long ago in a conversation.

8. Critique of Basco's mercantilism

By the late 18th century, the balance-of-trade version of mercantilism that had dominated the second period had morphed into a more Colbertist version, which went beyond restrictions on imports and outflows of metal specie and began to emphasise domestic production for possible export to address the fiscal drain represented by the colony. José Basco y Vargas (governor-general from 1778 to 1787), ushered in a series of economic reforms in the Philippines by promoting the establishment of the Royal Economic Society[33] (1781) and the Royal Philippine Company (1785).

The Royal Philippine Company aimed to provide an impulse to Philippine development by connecting its commerce directly with Spain and for this reason was exempted from some of the restrictions that had hitherto bound the galleon trade. Azcárraga was aware that the Royal Philippine Company created another monopoly,[34] but he still regarded it as a signal improvement in that its charter allowed it to dispatch its own ships to fully engage in the carrying trade, i.e., to procure products directly from China and the rest of Asia and deliver these directly to Spain and the rest of Europe. Outbound company ships would sail from Cadiz to Manila, by either passing through Cape Horn and stopping over at a South American port (e.g., Callao in Peru) before proceeding to Manila, or sailing east and rounding the Cape of Good Hope. In Manila they would offload European goods and take on Asian and Philippine goods. The return voyage from Manila to Cadiz would then always take the route passing the Cape of Good Hope, possibly trading at other Asian ports along the way. As this delineation makes clear, however, the Manila community was allowed to maintain its own monopoly of the trade with Mexico: no Company ships were allowed to supply America with Asian or European goods. The Spanish court viewed this clumsy mercantilist compromise as a means of opening up a new trading channel without disturbing already-established vested interests. To have hewed in principle to Azcárraga's ideal vision, however, the Company should have been allowed not only to source its products directly from Asian countries but also to freely transport and sell these to the American colonies, thus providing direct competition to the galleon trade.

The troubles that beset the Company's foreign trade ventures and the reasons leading to its ultimate failure are well known and are enumerated by Legarda [1999: 78-80]. These included the deep mistrust and lack of cooperation shown by the established Manila traders' community, particularly their refusal

[33] *Socieded Economica de Amigos del Pais*.

[34] Regarding the premature withdrawal of the privileges of the Company in view of its shortcomings, Azcárraga concedes: "On sound economic principle, it is not possible to successfully oppose that measure, whose direction was to destroy a *monopoly that harmed the consumer and the freedom of other merchants*" (Emphasis supplied.) [*LC* 144]. He nonetheless criticises the curtailment of the company's charter on grounds that contracts needed to be respected. The latter is an echo of Smith's [*WN* IV. ii.44] gradualist warning against sudden withdrawal of monopoly privileges, once they have been granted.

to purchase the shares of the initial offering reserved for them; the inherently inferior profitability of the trade routes allowed the Company, which excluded the lucrative Manila-Acapulco trade; the government's failure to fill up the promised capital for the Company; and policy changes from the Madrid court that eroded some of its important privileges.

Azcárraga nonetheless lauds the establishment of the Company and the changes in policy this entailed. With the Company's establishment, he writes, "most if not all of the many obstacles that prevented our colony from developing disappeared" [*LC* 124]. Among others, the Company diluted the monopoly of the Nao (albeit by creating another monopoly) and, at least in principle, was a step towards what Azcárraga regarded as the judicious Spanish commercial policy for the Philippines, namely the active pursuit of a carrying trade that dealt directly with China, India, and Japan. He regarded his opinion as vindicated by the resulting increased activity at the port of Manila. The reality, of course, was a mixed picture and due in no small part to the Company's failures rather than its successes. Rather than call directly at other Asian ports, for example, the Company's agents largely emulated the galleon trade in simply awaiting the arrival of Asian goods at Manila —transhipped by both Asian and other European carriers—so that these could be loaded onto the Company's ships bound for Europe [*LC* 141]. The Company also fell short of its envisioned role as the exclusive supplier of European goods to the Philippines; that monopoly function was gradually ceded to foreign ships as the Company's voyages became less frequent [Legarda 1999: 85]. The greater presence of foreign ships in Manila that Azcárraga observed, therefore, was more a sign of the Company's failure in and abdication of its function. From the viewpoint of his free trade advocacy, however, even the failure of this mercantilist enterprise was a step forward and achieved what Azcárraga ultimately envisioned—a port of Manila open to all flags.

A second mandate of the Royal Philippine Company was to invest part of its capital in the development of manufacturing and agricultural products. This initiative was a departure from the earlier type of mercantilism centered on protecting Spanish industry (particularly the Andalusian textile industry) that had motivated the restrictive policies on the galleon trade. Instead, it affirmed the importance of trade for the Philippines (Manila, in particular) in seeking to make the colony financially self-sustaining by augmenting the profits from the Asian trade with a direct export of Philippine agricultural and manufactured products to Spain and other Asian destinations. Towards this end, the Company promoted the cultivation of various crops such as mulberry trees as an attempt at a silk industry, cotton, indigo, black pepper, and sugar. Azcárraga notes with some approval the initial successes in this agricultural diversification [*LC* 134-135]. Even so, however, he qualifies this assessment by noting that "to judge by the present-day results, the directors of that society do not seem to have been very successful; for what today forms the great wealth of the Philippine Islands—tobacco, abaca, and sugar—were

not the products that merited their greatest attention and outlays" [*LC* 197]. Black pepper cultivation was an especially large source of losses, with large advances being made and left unpaid.

With respect to the Company's ventures into supporting crafts manufacturing, however, Azcárraga is unequivocally critical. While conceding the Company's benevolent intent, Azcárraga criticized its plans to export not only Philippine "colonial products" but also manufactures based on existing craft production. Implicitly he derided the Company's idea of "turn[ing] a colony so rich in natural products into a manufacturing nation" based on "the proposition that it is possible for a country producing primary goods and supplying foodstuffs abundantly and a low cost, and in which wages are low, to have factories that would lack only special tools" [*LC* 135]:

> [The Company] believed that the looms for blankets, rayadillos, *nipis*, *guinaras*, *tapis*, terlingas, burnished canvases, *cambayas*,[35] and other fabrics that existed on the islands could serve as the basis for a great manufacturing industry and a new staple for their trade and their ships; and it proposed that these fabrics, even if they could not replace the blankets and other fabrics obtained from Bengal and Coromandel, could at least compete with the latter both in Manila and in the other neighboring markets. This was a struggle in which it incurred a good deal of expense, much of which has borne no fruit.
>
> The directors in this respect were unaware that as a general rule, *what the European nations in their distant expeditions were looking for, apart from the treasures of China and Japan, were those natural products—so-called colonial products—which, though provided by nature only in warmer climes, are highly desired by the inhabitants of cold and temperate regions, and which have become part of the needs of modern life; that as compensation and in exchange for that imported production, these nations needed to establish consumer markets as an outlet for their increasingly abundant and improved manufactures*. [*LC* 136] (Emphasis supplied.)

9. An implicit theory of trade and development

Azcárraga regarded these state-directed export-cum-production plans in crafts and manufacturing—and to a lesser degree even in agricultural products—as an unnecessary and misguided intervention leading to waste, since they ran counter to natural (i.e., absolute) advantage. He essentially envisioned a pattern of trade where the Philippines would concentrate on the export on resource-based products such as sugar, tobacco, and abaca, cotton, using the earnings it made

[35] *Nipis* was fine cloth made from piña, sinamay, jusi, or similar fibres; *guinara* was coarse cloth from abaca; *cambaya* and *rayadillo* were textiles made from cotton.

from these to support its import of manufactures. The Company's disregard for natural advantage was the point of his critique:

> Although the directors set in motion their good plans to create a great mass of natural products for export, *they apparently did not take over the limitless field that was open to the ventures of the Company*; for no matter how much advantage they would derive from the labour of the indigenous people, and *no matter how great the production of the protected articles would become, the demand would always be greater in view of the constant increase in the population consuming them*, and in view of the prodigious spread of their consumption: they did not seem to want to focus their attention on the fact that *it is the same to produce a given value, part in sugar, for example, and part in fabrics, which is to produce the same given value, everything in sugar, since with the product for sale of the largest amount of sugar the necessary fabrics could be acquired*: the disregard of these maxims and other wrong calculations induced the Company to make large unproductive disbursements, which contributed in no small manner to its ruin, or at least to the non-attainment of the beneficial results that were reasonably promised. [*LC* 138] (Emphasis supplied.)

In the above excerpt, Azcárraga attributes at least part of the Company's financial undoing to its failure to focus its promotion activities on those products in which the country had a natural advantage (i.e., agricultural or "colonial" products). Its efforts instead were diluted by simultaneously trying to promote a manufacturing industry based on local craft production, most of which turned out to be bad investments.

We are left to infer the trade-theoretic argument behind Azcárraga's criticism. A straightforward modern interpretation of his point is that a country like the Philippines initially operates *below* its production-possibilities curve, so that current consumption is below potential output for many or even all commodities. Holding consumption constant for the moment, a production stimulus could push the economy towards the frontier and result in more of some—or indeed even *all*—products being produced and potentially exported, i.e., since these would be in excess of current consumption.[36] This is certainly possible in a colonial economy resembling a command economy, with authorities able to push production in certain directions without immediately affecting consumption. Azcárraga argues however that, given the choice, any push for higher output should be in the direction of those products in which the country has an absolute advantage (again, agricultural or "colonial" products), and where the increased output is less likely to be preempted by rising domestic demand as incomes rose and population grew.

[36] In the familiar two-product production possibilities diagram of most textbooks, with the consumption-production point strictly below the frontier, the stimulus pushes the production point outward in a quadrant strictly northeast of the consumption point.

While it might be possible for a time to export income-elastic products such as native crafts, this would not be sustained in the long run, since the eventual rise in income and consumption would erode the tradable surplus in those goods.

This reconstruction is bolstered by his remarks in later sections, which envision an improvement in welfare caused by trade based on absolute advantage:

> *It is already an incontrovertible truth that no people can produce all the necessary articles for its well-being; for there are certain productions that can occur only in certain climes*; cotton, for example, which is so widely used everywhere, is produced only in warm or temperate zones, and yet the inhabitants of cold regions also like to dress in cotton cloth. The same can be said about tobacco, sugar, coffee, and other colonial products that require certain climatic conditions but are generally consumed worldwide; we may also mention that in the Philippines themselves, ice is highly desired for drinks, especially in the hottest season. Thus all nations are interested in importing foreign goods.
>
> It is another truth that the wealth and well-being of a country are indicated first of all *by its greater production of goods suited to its climate and adequate to its terrain, to the point where it generally exceeds domestic consumption and requires export to other countries, without whose stimulus production would neither increase nor achieve abundance and cheapness*. [*LC* 207-208]. (Emphasis supplied.)

The first paragraph supports the idea that Azcárraga held an absolute advantage theory of trade, recalling Smith's famous words on the matter[37] and in line with much of continental thought in the 19th century.[38] The second paragraph supports the interpretation that Azcárraga envisioned a pre-trade situation where a country initially operates below its production possibilities, but where trade possibilities push it closer to the frontier. In the latter he is aligned with Myint's [1958] later interpretation of Smith as positing gains from trade being a "vent for surplus".[39] This, too, is unsurprising since the idea of exports resulting from an excess in the

[37] That is, "If a foreign country can supply us with a commodity cheaper than we ourselves can make it, better buy if of them with some part of the produce of our own industry, employed in a way in which we have some advantage" [*WN* IV.ii.12]. In *WN* IV.ii.15, Smith also speaks of a country's natural advantages in producing some commodities being so great "it is acknowledged by all the world to be in vain to struggle with them". The famous example he provides is the great expense involved in producing good grapes and wine in Scotland.

[38] Bloomfield [1989: 621] writes how "French writers in the first half of the 19th century and even to some extent thereafter generally regarded trade as based on absolute differences in costs or on what has been called absolute advantage". He dates the earliest statement of comparative costs by a French author to a book by Antoine Cherbulliez published in 1862, well after Azcárraga had completed his studies [Bloomfield 1989: 626].

[39] Schumacher [2015: 583-590] disputes the interpretation that Smith assumed the existence of unemployed resources in autarky. While conceding the theoretical validity of the idea, he prefers to ascribe its real source to later writers including JS Mill, who expressed openness to such an idea more explicitly [Schumacher 2015].

production of certain goods over their consumption can also be found in the works of many contemporary authors in Azcárraga's time. Bloomfield [1989: 624], for example, cites a number of French authors who express themselves the same way—again remembering the relevant fact that a much of economics in 19th century Spain was filtered through French treatises and translations.

Azcárraga however is not vulnerable to the charge of presuming that a prior surplus or overproduction exists in autarky—a charge Schumacher [2015: 597-598] levels against Myint and one that JB Say also made against some of his contemporaries.[40] Azcárraga after all clearly states that the excess of production over consumption would not exist absent the demand coming from exports, "without whose stimulus production would neither increase nor achieve abundance and cheapness".

We might call this the first sense in which Azcárraga depicts trade as an engine of growth, i.e., mainly its *allocative effect*. It should be clear however that this goes beyond just the neoclassical idea of efficient allocation, where a country already at full employment merely reallocates its resources towards goods more valuable in trade. Rather it implies trade serving as a stimulus that overcomes certain distortions that have hitherto prevented a country from reaching its (given) full potential. In the case of the Philippines these distortions are to be understood as arising from the mercantilist regulations that stifled trade.

There is a broader sense, however, in which Azcárraga saw trade as an engine of growth, and this was his view of trade as a means of *capital accumulation*. While showing some sympathy for the Company's efforts to promote agricultural exports as compared to manufacturing, he was critical of the whole idea of a forced attempt to promote exports of whatever kind—even agricultural. He regarded the latter as a lesser error but an error nonetheless:

> As a tribute to the energetic governor (i.e., Basco) mentioned earlier, however, we prefer to interpret his words as being guided by the best intentions of wanting to expand the trade of Manila and to draw its attention to the advantages of exporting its own products, channeling them directly to the centers of European consumption; for in this sense there is no doubt that the routine and non-expanding trade of Manila left much to be desired.
>
> It might also be presumed that if commerce had found the expeditions to New Spain profitable—and, accustomed to acting freely and driven only by the powerful motive of private interest either to continue an activity or abandon it when circumstances changed—then it would have pursued other ventures in different destinations, such as say, direct trade with Europe even before this had been promoted by the government; it would have frequented the ports of China and India, and could be in those waters today, if not at the level of English trade, then at least in a position less disadvantageous than the one it now occupies. [*LC* 95]

[40] See Bloomfield [1989: 624], who quotes Say's 1848 *Oeuvres diverses*.

> But let us consider some points. *To begin with, did such natural products exist in the Islands at the time in sufficient quantities as to sustain a trade of any significance? Was there available capital to invest in promoting their production*? Was communication with Spain via the Cape of Good Hope possible at the time? And even if such natural products had existed, why should the Acapulco trade be abandoned? What incompatibility was there between the one and the other? [*LC* 94]
>
> …[I]f the natural trend of commerce that arose in Manila from earliest times had been left to expand, it would have taken off incredibly; the returns from the Nao would have grown fabulously each year; *the wealth of the city would in no time have grown annually in proportion, and there would have been abundant capitals that, dedicated to agriculture, would have yielded the natural products to sustain that an export trade and in consequence, also the import trade* [*LC* 95]. (Emphasis supplied.)

The foregoing implicitly outlines the counterfactual sequence of economic development Azcárraga envisioned that the Philippines might have followed. It was one where, first of all, the carrying trade should have been encouraged—untrammelled as to origin, nature, and quantity of products, as well as point of final sale. Based on the country's geographical location and following its "natural trend", such a liberalized carrying trade would have directly sourced products from China, India, and other Asian ports. With Manila serving as port of call and entrepôt, such products would eventually have been exported to the Americas (and not just Mexico) as well as to the Peninsula and ultimately the rest of Europe. Foreign ships would also have been allowed to call in Manila as an entrepôt. (Azcárraga was mindful of the examples of Singapore and Hong Kong.) Presuming the returns from such a trade to be highly lucrative—which seemed reasonable considering the large profits being obtained even from a repressed galleon trade—wealth and capital would have been accumulated in the Philippines, which Azcárraga asserted would have subsequently found their way into financing investments in agriculture. The resulting development of domestic production would have led in time to an export of Philippine agricultural products along the lines of absolute advantage. In accord with free trade, the natural sequence leading to development and an expansion of Philippine trade was not through state subsidies from mercantile companies that selected projects and products in a *dirigiste* manner, but through a removal of restraints on the carrying trade that already existed, leading to capital accumulation, leading to private investment in internal projects in line with natural advantage, and ultimately to exports of locally produced commodities. It is in this connection Azcárraga extols private initiative over the mercantilist approach of Basco and the Company:

> In either case, and in principle, the administration should have limited itself to facilitating activity, removing all obstacles to its citizens, even attracting foreigners, and establishing for each, all the security necessary for transactions. For the system of protections and privileges, no matter how much it would wish to meet the aspirations of private interest, is always slower to move than the latter, which presents itself in many different forms and moves at a speed that is incompatible with the formalities required by the repeal or reform of some legislative provision. [*LC* 95]

This is a virtual recounting of some passages of the *Wealth of Nations*, particularly *WN* IV.ix.50-51, where Smith speaks of the "delusions" among governments that they could ever properly perform a task for which "no human wisdom or knowledge could ever be sufficient; the duty of superintending the industry of private people, and of directing it towards the employments most suitable to the interest of the society". Instead Smith enumerates the three minimal roles of the sovereign, as providing defence, administering justice, and establishing certain public works or institutions—the first two of these, of course, correspond to the "security necessary for transactions" that Azcárraga mentions.

Once more, the parallels between the lines of this implicit debate and those between liberal and heterodox economists in the second half of the 20th century are striking. The arguments anticipate aspects of the "Great Debate" in the Philippines in the post-World War II years [Takagi 2008] between those who favored domestic industrialisation and a strong currency versus those who advocated a weaker currency to benefit exporters (then also consisting primarily of agricultural and natural resource-based products). They also anticipate the more erudite debate over industrial policy in promoting development in underdeveloped regions during the 1990s: the Company's Colbertism finds an echo in Ha-Joon Chang's [Chang and Gershman 2003] advocacy of industrial policy for developing countries, just as Azcárraga's viewpoint is represented in the World Bank's [1991] mantra of labor-intensive export-oriented industrialization with minimal state intervention and based on comparative advantage—both being competing explanations of the "East Asian miracle".[41]

10. The role of foreign capital

The parallel between Azcárraga's advocacy and late 20th century liberal prescriptions approaching the "Washington Consensus" is almost complete if one considers his favorable disposition towards foreign direct investment and towards foreigners freely engaging in trade. This is already evident in his benign regard for the Chinese in the sampan trade during the period of the galleons—an attitude that contrasts with the negative and hostile opinion of contemporary writers and colonial administrators, who viewed them as security risks. He enumerates the

[41] A brief but nuanced contrast between these positions can be found in Lin and Chang [1999].

various abuses committed against Chinese immigrants and traders [*LC* 101-102], and marvels at how, despite such impositions and vexations, the Chinese persisted in the trade.

But the crucial economic role he ascribed to foreign capital is clearest in his discussion of the fourth epoch, the liberal phase of his periodization. With the independence of the American colonies, the end of the galleon trade, and the lapse of the charter of the Royal Philippine Company, this period begins in 1834 with what he regarded as the most significant reform—the unrestricted opening of the port of Manila to international trade and shipping, which simultaneously meant permission given for English and American foreign trading houses to operate in the capital.[42] Azcárraga notes this is when "the true prosperity of the Philippines begins" [*LC* 157]. The great change, in the words of Legarda [1999: 334], was the Philippines' transformation from a subsistence economy to "an agricultural export economy". Azcárraga notes how "so many successes have been achieved by the commerce of those Islands in an arena of free trade" [*LC* 197-198]. In terms of tariffs and duties themselves, piecemeal policy changes were made, but a generally low level of average tariffs prevailed from the 1840s to the 1880s.[43] Legarda [1999: 197] notes that the resource-allocation effects of tariff legislation, particularly the 1832 legislation, which endured until 1869, may have been "at best only auxiliary" in achieving the country's transformation into an export economy by the 1870s.

These favorable developments notwithstanding, Azcárraga saw a further obstacle that prevented development from coming sooner and being more widespread. A major one was the delayed opening of other provincial ports to international shipping. Between 1834 and 1855, Manila remained the only port of call open to international traffic and the only place where foreign merchant houses were franchised to purchase and sell Philippine goods.

> [E]ven this very triumph of free trade we have just laid out suffered from a major flaw in its implementation: that is, with Manila being the only port open to foreign trade and having the only customs house through which all import and export items had to pass, all the country's products had to come to this port, even those from the most distant provinces; and from there the manufactured goods that were imported had to be distributed over the last mile for their intended consumption. [*LC* 161-162].

He points out how during those decades, sugar, rice, abaca, and other products not only from Luzon but from Visayas and Mindanao had to be transported to Manila in order to be exported. Similarly, imports having to pass through Manila would become more costly owing to the costs of cabotage.[44]

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[42] The reader is referred to the exhaustive treatment by Legarda [1999: 234-289].

[43] See Legarda's Table 14 [1999: 205].

[44] Again, interestingly, the issue of cabotage would continue to rankle until 2015, when the Cabotage Act (RA 10668) was passed, allowing foreign carriers to move cargo freely between and among domestic and foreign ports.

> This trading point (i.e., Manila), so distant from most of the production and consumption centers, necessarily makes exported products and manufactured goods more expensive in the country owing to the repeated freight, loading, and unloading forced upon them; the unnecessary risks they must run; and the losses frequently suffered by the small and poorly prepared ships that make these crossings; thus all the islands were constituted as tributaries of the city of Manila by effect of this tax system, which had no other purpose than to collect an indirect tax to sustain the expenses of the State and to provide undue protection to certain industries both in the country and in the Peninsula. [*LC* 162-163].

In the delayed opening of regional ports and in the failure to encourage the operation of foreign trading houses in the provincial centers, Azcárraga saw a persistence of mercantilist and protectionist practice in a different guise. If the Manila business community had previously represented the more liberal lobby against mercantilist policy in the Peninsula, by the fourth epoch it was the government in Spain itself that had begun to envision a more liberal trade policy for the Philippines—and it was the Manileños that foot-dragged and fought to delay the policy. Presaging complaints of a later age against "imperial Manila", the pro-Manila lobby argued against new international ports, using various arguments such as the advantages of promoting the cabotage industry, noting the capital already invested in domestic shipping and employment it provided, the added expense of setting up regional customs houses, and so on—"without accounting for the fact that those expenses incurred in export and import always ended up costing the producer and the consumer":

> [H]ere again we see private interests wanting to assume the guise of the general good: the city of Manila, which seemed to have forgotten the damages and hardships that the selfishness of Cádiz and Seville had made it suffer for two centuries, the city of Manila, which energetically resisted even the creation of the Philippine Company because it believed that institution deprived it of its right to negotiate freely with the Metropolis, proposed on this occasion to take advantage of its supremacy and exercise over all the islands the monopoly that in other times had been imposed on it: a sad human condition that requires so much time and effort to understand and to unite the general interest. [*LC* 163-164]

In the event, over the objections of the Manila lobby, the regional ports of Zamboanga, Iloilo, and Sual (all in 1855) and later Cebu (1860), were ultimately opened to international shipping. Nonetheless it took a few more years before these regional ports became viable, and the reason Azcárraga cites is the delay or discouragement of the activity of foreign trading houses that would use them as bases of operations:

> As we have already said, *the lack of development of these new foreign commercial centers comes from the fact that foreign houses have not established themselves in them*; because it must be borne in mind that almost all the exported articles from the country and imports of manufactured goods are carried by those English, North American, German, and French foreign houses in Manila, all of which buy the indigenous products that arrive in the center or that are brought to them by Spanish purchasers to whom they have advanced money, which has in turn been obtained as loans from the Bank[45] or from private persons. It is also they who then sell to retail merchants the manufactured goods from those tireless European factories (i.e., imports) which the country needs for its consumption. [*LC* 29] (Emphasis supplied.)

Azcárraga is not explicit about the conditions he thought were necessary for the establishment of foreign trade houses in the newly opened ports. Causation could have run either way: low production volumes may cause low trade levels that fail to justify international ships calling on regional ports; alternatively, the lack of trade outlets may prevent production itself from being stimulated. In keeping with the vent-for-surplus interpretation of his views, however, the latter would be his more plausible reconstruction, i.e., allowing for elements of inertia, easier access to trade outlets would result in lower transactions costs and larger margins for both foreign trading houses and domestic producers and therefore simultaneously expand both trade and production volumes. More significantly there is a dynamic effect if trading possibilities stimulate an infusion of capital in the production of goods where the country had a natural advantage. In the event, Azcárraga cites data to show how after four years, international trade had picked up in the regional ports, as seen in the rise of exports originating from them [*LC* 165-166].

The fact that the new investments in agricultural production would come mostly from foreigners was something Azcárraga viewed pragmatically as something to be encouraged, owing to the dearth or sluggishness of Spanish capital.

> Foreign commerce is, without a doubt, that which has most taken advantage of the franchises we are dealing with; it is also consequently that which has promoted the wealth of the islands of Panay and Negros, sending them capital in cash and in credit, ingenuity, and in lieu of labour, something that replaces and surpasses it, namely machinery. We have already said that the apparent wealth from exports has been produced with steam or animal-powered iron mills run by foreigners. [*LC* 170]

He argues that Spanish capital already enjoyed initial advantages, especially in the form of the flag discrimination baked into the tariff system and the close contact of Spaniards with the native population. These should have given Spanish capital a

[45] Apparently the Banco Español Filipino, in which American firms owned shares.

headstart in promoting domestic agricultural production and international exports from the regions. Yet Spanish capital was slow to respond to such inherent advantages:

> …[I]f with these advantages Spanish commerce has been unable to act, the government should not do more, because any other measure would be to the detriment of the wealth of the Islands, which can be promoted by no more effective means than exportation. If, in order to superimpose Spanish over foreign commerce, a monopoly is established, then production is harmed, and hatred is aroused against the monopolists, lowering their prestige and giving the measure a result contrary to the objective the monopoly envisioned. [*LC* 170]

The tepid response of Spanish capital, he thought, could no longer be used as an excuse for policy to prevent the major entry of foreign shipping and capital:

> …[T]he government does not have to create what should be left for private interest to do. The government must not deviate from the good principles established by science and experience, and cannot, therefore, drive away a powerful element of wealth such as foreign commerce, only so that Spanish commerce grows and prospers. [*LC* 170]

In the event, by the time Azcárraga was writing, with regional ports open to international shipping, the involvement of foreign trading firms in the Philippine economy was in full swing. A notable part of their business was merchant-financing, which involved making advances or loans, often through several layers, to agricultural producers to supply the world demand for exports. Legarda [1999: 284] retrospectively affirms that the merchant-financier stands "at the centre of economic change, growth, and progress in the nineteenth-century Philippines". All this, of course, appeared to support Azcárraga's hopeful thesis that all that was needed for growth was an opening of trade outlets that in turn would induce an inflow of capital, both being provided by the foreign trading houses. This is the third sense—*as an impetus to foreign investment*—that one might further consider trade an engine of growth.

In summary, Azcárraga viewed free trade as an engine of growth[46] in three distinct ways: (a) as a vent for surplus for the export of goods in accordance with absolute advantage; (b) as a vehicle for domestic capital accumulation, and (c) as a means to attract foreign capital and new technology. Of the three, historical events would put a premium on the last.

[46] The phrase "engine of growth" was ironically first used by 20th century writers—notably DH Robertson, R Prebisch, and WA Lewis—who observed that its effects were no longer as potent as they were in the 19th century and who for that reason advocated less, not more, reliance on trade (see, e.g., Riedel [1988]).

11. Relation to Smith's ideas of trade and development

Continuing scholarship[47] into Adam Smith's ideas on international trade fortuitously provides a deeper insight into Azcárraga's free trade advocacy and how this squares with ideas of Smith who was his source of inspiration. It was Myint [1958, 1977] who first pointed to the need to embed Smith's views on trade in his broader views of development, and we have already discussed the vent-for-surplus idea that is implicit in Azcárraga's own trade theory. More recently, Schumacher [2015, 2018] has argued that Smith's theory of trade should be regarded as part of his more general theory of capital accumulation, i.e., the "natural progress of opulence", treated in the Book III of *WN*. Schumacher disagrees with Myint's reading on the point that Smith assumed unemployed resources (hence trade as a "vent for surplus"); instead he interprets Smith as viewing capital accumulation and growth occurring at full employment in every period. Both agree however that Smith's trade theory should be understood from a dynamic growth, if not a development perspective. Smith thought the progress of trade followed the natural course of capital accumulation, proceeding as capital first began to be invested in agriculture, then domestic industry (manufacturing), then the internal (home) trade, and finally foreign trade. Investment in foreign trade itself is divided into direct bilateral trade ("purchasing foreign goods for home consumption") and the carrying trade ("transacting the commerce of foreign countries", i.e. "carrying the surplus produce of one to the another" [*WN* II.v.24]).

This sequence, it will be recalled, was Smith's original illustration of the "invisible hand" [*WN* IV.ii.9], on the principle that capital flowed from the least risky to the riskiest, and from the most to the least profitable branches of activity without need for special encouragement. In particular, the tendency of capital to flow into the home industry and manufacturing in this progression owing to naturally favorable risk-reward factors was Smith's argument to show that mercantile protectionism was superfluous. In this view, the mercantilist emphasis on foreign trade and a favorable trade balance, too, was misplaced, since the burgeoning of a country's foreign trade was not the cause of its prosperity but its consequence. Foreign trade, for Smith, far from being an engine of growth, was rather the offshoot of successful capital accumulation: countries that had become capital-rich from the development of home industry and internal trade were those that could afford to venture into foreign trade.

All this, of course, will appear contrary to Azcárraga's propositions. In particular, Azcárraga's enthusiasm for the fullest development of the carrying trade as a first

[47] Among other things, Schumacher [2015] seeks to corrects Myint's [1958] influential reading of Smith as holding a "vent for surplus" theory of trade. Beyond this, however, at least three or four interpretations of Smith's ideas on trade have been distinguished, each of which finds greater or lesser support in some passages in WN. Briefly, these are: the long-standing (neo)classical interpretation of Smith as holding a view of trade based on absolute costs and natural endowments; an increasing-returns interpretation; a theory of uneven development; and more recently his anticipation of the gravity theory [Elmslie 2018].

and key strategy for Philippine development is a complete inversion of Smith's presumed "natural progress of opulence". Smith's sceptical view of the carrying trade follows directly from his idea that foreign trade was a consequence rather than a cause of prosperity. He viewed the carrying trade in particular as a rarefied channel of investment compared even to, say, domestic trade or bilateral export or imports, gaining in importance only because capital had become too abundant:

> When the capital stock of any country is increased to such a degree, that it cannot be all employed in supplying the consumption, and supporting the productive labour of that particular country, the surplus part of it naturally disgorges itself into the carrying trade, and is employed in performing the same offices to other countries. *The carrying trade is the natural effect and symptom of great national wealth: but it does not seem to be the natural cause of it. Those statesmen who have been disposed to favor it with particular encouragements, seem to have mistaken the effect and symptom for the cause*. [*WN* II.v.34-35] (Emphasis supplied.)

It may take us a bit far afield, but it is important to note that this judgement ultimately flows from Smith's peculiar theory of value—a theory of natural price with little room for profits arising from differences in international values. Short of direct exchange between producers, Smith argues that any wholesale trade (including the carrying trade) requires a trading merchant to completely reimburse or replace the capital previously expended by producers in order to sustain employment (roughly in the form of a wages fund), even as the past period's output waits to be sold or exchanged. This means the merchant must be extended or exposed by an amount between the time he purchases the produce and the time he is able to sell or exchange it [*WN* II.v.25]. Smith's skepticism regarding all forms of wholesale trade (whether domestic or foreign) then boils down to his notion that capital suspended between purchase and sale is idle; the more circuitous and mediated the exchange, the longer the turnaround time for capital to return to production. On this basis, Smith favored capital to be invested directly in production over its being devoted to any form of wholesale trade, which he almost views as a necessary evil. Of the various species of wholesale trade, moreover, the "home trade" (i.e., domestic wholesale trade) is preferable to foreign trade owing to the more rapid turnover of the former and hence its greater ability to "return" to support production:

> [T]he returns of the foreign trade of consumption are very seldom so quick as those of the home-trade. The returns of the home-trade generally come in before the end of the year, and sometimes three or four times in the year. The returns of the foreign trade of consumption seldom come in before the end of the year, and sometimes not till after two or three years. [*WN* II.v.26].

> Though the returns, therefore, of the foreign trade of consumption should be as quick as those of the home-trade, the capital employed in it will give but one-half the encouragement to the industry or productive labour of the country [*WN* II.v.26].
>
> A capital, therefore, employed in the home-trade will sometimes make twelve operations, or be sent out and returned twelve times, before a capital employed in the foreign trade of consumption has made one. If the capitals are equal, therefore, the one will give four and twenty times more encouragement and support to the industry of the country than the other [*WN* II.v.27].

This implicitly contrasts with a situation where capital is directly and immediately invested in production or in facilitating domestic trade. It is on this same principle that Smith forms an even more negative judgement of investment in the carrying trade, citing it as the least desirable and least important use of capital:

> That part of the capital of any country which is employed in the carrying trade, is altogether withdrawn from supporting the productive labour of that particular country, to support that of some foreign countries. [*WN* II.v.30]
>
> The capital, therefore, employed in the home-trade of any country will generally give encouragement and support to a greater quantity of productive labour in that country, and increase the value of its annual produce more than an equal capital employed in the foreign trade of consumption: and the capital employed in this latter trade has in both these respects a still greater advantage over an equal capital employed in the carrying trade. [*WN* II.v.31]

To recapitulate: in Smith's view of the sequence of growth, the best and most natural channel for capital is its investment in home production (first agriculture, then manufacturing), followed by domestic trade, followed by bilateral foreign trade. Last in this sequence is the carrying trade, which is that much worse because it deals entirely in foreign goods, meaning that a home (say, British) merchant's capital is to be advanced in the interim to foreign producers rather than invested in home production. For this reason, foreign trade—and especially the carrying trade—cannot be the engine of growth.

It is important to note however that Smith's view in this case was peculiar and deficient: the profitability of any investment does not after all simply turn on the number of steps or degree of roundaboutness of the transaction without reference to the rate of return of each individual transaction. Smith's contemporary commentator Pownall [1778: 24] noted as much when he distinguished between a "circuitous trade", which involved trading at different points with a profit on exploiting divergent international values, versus a "roundabout trade", which unnecessarily diverts the course of commodities. Smith however worked with categories where commodities always and everywhere exchanged at their values,

so that no special advantages could be had in shuttling commodities between different ports.

Nonetheless, despite this apparent difference, the more important common ground between Azcárraga and Smith is their stress on capital accumulation as the source of development. Smith writes: "The industry of the society can augment only in proportion as its capital augments, and its capital can augment only in proportion to what can be gradually saved out of its revenue" [*WN* IV.ii.13]. Azcárraga differs from this only in the *means* by which he thinks capital accumulation can be best achieved. Smith's judgement was based on the presumed higher returns to be had by first investing in internal economic activity. Azcárraga thought on the contrary that the carrying trade provided the highest returns to capital, which when exploited would have been the source of capital for domestic investment. As previously quoted, he predicted that based on an unrestricted carrying trade, "the wealth of the city would in no time have grown annually in proportion, and there would have been abundant capitals that, dedicated to agriculture, would have yielded the natural products to sustain that an export trade and in consequence, also the import trade" [*LC* 95]. Alternatively, if not from domestic capital, the higher profits from free trade would attract foreign capital, which would then ultimately be invested in agriculture and (perhaps) manufacturing. It is in these more important senses that he thought trade would serve as the engine of growth. Their differing conclusions notwithstanding, the same principle underlay Smith's and Azcárraga's arguments, namely, the reliance of industrial progress upon capital accumulation. As to why Smith's order of industrial progress differed from his, Azcárraga would probably have used Smith's own argument, i.e., that laissez faire should be left to determine the "natural" course of capital; and in the Philippines this was at least initially not in agriculture and certainly not in crafts manufacturing but in the carrying trade, where mercantilist restrictions had artificially suppressed the inflow of capital.

12. Welfare effects

More generally, Azcárraga's advocacy derives from a utilitarian, essentially Benthamite, vision of maximising the "common good" (*utilidad comun*), which he believed could be achieved mainly through the lower prices and abundance afforded by free trade:

> If we study the objective idea of the system of free trade, we shall see that setting down its principles does not entail rising to some lofty sphere, but rather descending to something as mundane as commerce; *the objective of this doctrine is to provide all peoples with abundant, good, and cheap goods, that is, to make foodstuffs and other objects necessary or useful in life available to the greatest possible number of human beings*, which is, without a doubt,

> to provide the *highest degree of well-being to all classes of society and thus to contribute to the general good, the benefit of all, or what we have above called the common good* [utilidad comun]. [*LC* 202] (Emphasis supplied.)

To his credit, Azcárraga's welfare criterion for trade policy reform extended beyond the fiscal and political benefits to Peninsular Spain, or to the profits accruing to Manila's trading community. Rather it consisted primarily in uplifting the material well-being of the native population—a remarkable fact considering that his advocacy was not meant to assuage or curry favor among Filipinos but to persuade Spanish colonial policy makers:

> … [T]here is no doubt that it would be a great benefit for the Islands if, instead of the *indio* living in a poor shack, without a chair, without a bed, without a table, without any dishes to partake of his meager ration of rice and salt, we should rather see him at least living in a wooden house, with a roof that protects his modest fortune and gives him relief from the frequent scourge of fires; that we should see him eat a frugal but abundant meal at a rustic table; and that instead of covering his nakedness with rags, he should be dressed properly as the requirements of decency and hygiene demand.
>
> These improvements, which are far from the attainment of a perfect state, would mean, however, a great improvement in the welfare of the people and would give a highly favorable idea of the ruling nation, of the nation entrusted with propagating in those countries, along with the light of Christianity, the benefits of European civilization, its inseparable companion. [*LC* 204-205]

Moreover, unlike mercantilists who tended to exclusively cite the benefits coming from the export trade and a positive trade balance, Azcárraga stresses the more immediate welfare benefits that imports bring to consumption, i.e., affording consumption goods that are cheaper to import than to produce domestically ("cheapness"). He also notes the further positive effect of imports on productivity since—relative to autarky or a regulated trade regime—imports allow a country to acquire intermediate inputs and producer goods. Finally, he cites the incentive effect of newly created wants owing to exposure to new goods:

> …[W]e shall say with respect to the Philippines that free trade is cheap rice, an idea which does not arise from the delirium of a feverish imagination but, on the contrary, a practical truth that cannot be more philosophical or humanitarian.
>
> Whoever talks of cheap rice also talks of abundance and cheapness of the people's clothing, household furniture, instruments of the sciences and arts, farming tools, the means of transportation and communication—everything necessary for the development of human knowledge and the prosperity of industries, everything that leads to the provision of society's welfare. The desire

> for what is cheap is a universal fact in history; at all times and in all countries, man is always in search for what is cheapest, even if he already has something else in hand, for it is in this manner that he gains more of means, more money to meet other needs, to satisfy other pleasures. [*LC* 218]

> When rice and other foodstuffs, household essentials, tools and instruments for farming and for other industries shall have attained the greatest cheapness in their prices, then shall we see abundance on the native's table, comfort in his homes and improvement in his industries; for the amount that it costs for him to live badly today would be the same as what it would cost him to live well; and those newly created needs will be a new stimulus for work, to produce more in order to satisfy more enjoyments, and will launch the native into the great reciprocal and continuous movement of today's civilization to produce and to consume. [*LC* 206-207]

The reference to rice is portentous but the theory behind the proposal was straightforward, i.e., allowing free import and export of the good in order to moderate price fluctuations:

> [S]o that when there is a large harvest it will be easy and expeditious to bring the cereal for sale to neighboring markets to the great benefit of the producer, and when there are shortages in the islands, it is equally easy to bring it from other countries, so that this much-needed food may always retain a moderate price. [*LC* 19-20]

At the time Azcárraga wrote, the Philippines was a marginal rice exporter [*LC* 19; 221-222]. He anticipated only a minor disruption to the country's rice-surplus status resulting from a further expansion of the other major export commodities, since he believed farmers would always put a high priority on cultivating the all-important food staple for their needs. Indeed, he looked forward to expanding exports to rice-deficit countries such as China and Vietnam [*LC* 16]—an ironic conjecture in light of current circumstances. In any event, even the Philippines' relegation to a net rice importer would not have concerned Azcárraga, since it would still have achieved the goal of "cheapness".

Azcárraga did not perceive the costs of adjusting to free trade to be substantial, and his views on the production effects occasioned by trade specialisation were quite sanguine. With regard to the effects of free trade on native crafts production, he first of all argues that a minimum level of craft industry serving the domestic market would nonetheless survive trade liberalisation, since foreign products—in his example, imported versus native textiles—would be unable to compete with domestically oriented craft products in terms of price and quality (i.e., essentially product differentiation). This natural protection would be further enhanced if free trade made available intermediate inputs and machinery needed by crafts.

> The Philippine islands are not strictly speaking a sphere of manufacturing; their great wealth lies in agriculture and consists in the production of items desired in all parts of the globe: it is true a good part of the fabrics consumed in the country are the product of domestic industry, such as gingones, rayadillos, *nipis*, *piña* and *sinamay*; but we doubt that similar foreign fabrics can compete advantageously with those in terms of price; it is necessary to take into account two very important points with respect to these industries: one is that almost all of them need cotton and silk, whose raw materials will abound in the market owing to the free entry that our system would give to everything that comes from abroad; and the same would happen in regard to all the machinery that these industries need to perfect and to be able to reach all the cheapness that we seek for the life of the natives. [*LC* 218-219]

The second reason he cites for low transition costs is the low level of fixed capital involved in any crafts production that might possibly be displaced. A reallocation of resources would therefore not result in large capital losses:

> The other point is a special characteristic of that country; all this non-negligible volume of manufacturing that is produced in it comes from industries that can be called domestic, comes from looms in which a small number of male and female workers work, which most often are the family itself and some close friends of the modest businessman: there are therefore no large factories and no capital employed in these industries; thus, *if with the approach of our system it was necessary to abandon these manufactures, which we doubt, there would be no lost capitals, there would be no ruined industries; with the same ease with which they set up their looms, they will adopt another way of living and if they dedicate themselves to agriculture, exploiting those immense valuable lands, they will improve their situation and the country will win, greatly*; To verify this assertion, one need only compare the wealth and well-being of the provinces that produce only rice and those textiles with that of others that produce sugar and abaca. [*LC* 219] (Emphasis supplied)

13. The customs house—the last obstacle

Any consistent advocacy of free trade must ultimately deal with the issue of the imposition of any form of trade taxes—both tariffs and export duties. This final issue preoccupied Azcárraga when he discussed the final epoch of development of Philippine commercial policy.

Even as he extolled the virtues of free trade and advocated the complete abolition of trade taxes as a matter of principle—calling customs duties "the biggest hindrance the progress of humanity has encountered" [*LC* 215] and an "anachronism" in the century of steam and electricity [*LC* 216]—Azcárraga

nonetheless wrote pragmatically when it came to the sequence of reforms needed for progress on the issue of complete trade liberalization. He recognized first of all that tariffs constituted a significant source of government revenue. To replace the customs revenue to be potentially foregone, he proposed to gradually replace them with various internal taxes, applied sequentially in a well-defined manner.

As a first step, he proposed levying location-specific taxes on provinces associated with specific exporting industries such as abaca, sugar, and coffee, which he argued would benefit with certainty and immediately from the reduction in transactions costs from the opening of regional ports to international shipping. It is important to note that he did not appear to have in mind trade taxes on the exports *per se*, but on economic activities within the exporting provinces, including agricultural production and processing as well as the wholesale and retail trade, the professions, and activities entailing significant capital investments [*LC* 227]. It is less clear how he proposed to determine the exact bases of taxation for such different activities. At any rate, he saw such domestic taxes as effectively skimming off some of the windfall gains from the expansion of trade and the economic activity it would stimulate, not only among the direct exporters but among the broader provincial population of exporting provinces.

More interestingly, he saw this as an important step in demonstrating to the native population that justice and equity could be embodied in the tax system, since it would not exempt people on the basis of race or privilege:

> …[T]he natives would be shown a healthy example of justice where *he who has more, pays more*; and one would thereby combat the preconception—widespread in the country and founded in the current tax system—that paying a tax is a diminution, while not paying denotes, if not nobility then least a kind of superiority that is hard to reconcile with a prudent policy of assimilation that accords with the spirit of our laws of the Indies and modern provisions. [*LC* 227-228] (Emphasis supplied.)

This proposal must be viewed in the context of the then-existing system where Spanish citizens were exempt from paying the head-tax or tribute. Azcárraga was effectively proposing a gradual application of a personal tax regardless of race.

Azcárraga then turns his attention to the abolition of the long-standing tobacco monopoly,[48] up to that time a major source of revenue. As replacement, he proposed a system of taxes on the harvesting, manufacture, and sale of tobacco products. Mindful once more of the possible loss in revenue in the transition, however, he proposed to abolish the monopoly only *after* taxes on the other exporting provinces had been levied. Here, a practical inkling of the theory of second-best can be detected, since Azcárraga proposed to remove a major distortion (the replacement

[48] The monopoly was finally abolished in 1881, an event Azcárraga hailed in his intervention at the Luna-Hidalgo dinner.

of the monopoly with taxes) only after other branches had also been "distorted" with the application of taxes. Ultimately, he argues that abolishing the internal monopoly might even take priority over the adoption of free trade itself.

> …[T]he principle of freedom of trade and industry requires that all branches enter into free exchange so that they may grow and improve. It therefore requires the suppression of another source of revenue which is the tobacco monopoly: the huge production of this commodity, the full benefit from which has not yet been realized, has for a century suffered the burdensome and most absurd of all contributions, and thus *efforts towards the abolition of this monopoly should almost be preferred over the abolition of customs duties; for in the end customs duties weigh equally upon all productive activities of the country, while the monopoly weighs down on only one branch of wealth, making its producers shoulder over half of the Islands' budget of expenditures*. [*LC* 225-226] (Emphasis supplied.)

In the above, Azcárraga argues that the adoption of free trade, a first-best measure, may not be optimal in the presence of domestic distortions. In his view of a reform sequence, once other export-benefiting areas have been properly assessed and taxed, the tobacco-producing areas may be liberated from the tobacco monopoly and placed on a similar footing without occasioning envy or distortion. This in turn would pave the way to the extension of internal taxation to the other areas of the country, including the larger non-exporting areas such as the great rice-growing provinces:

> When these taxes are raised on commerce and industries and on the main branches of agricultural wealth, the injustice that other minor industries, trades, and other wealth do not also pay their corresponding share will jump out at you, and it will then be easy to make the rice-harvesting towns and all the natives understand that everyone, in proportion to their income or earnings, must contribute to the support of the different expenses of the State which benefit everyone; *thus we shall have established direct taxation, which is the fairest of all, and we shall be able to present in the Philippines a practical model of a perfect economic system*. [*LC* 230-231] (Emphasis supplied.)

There is every likelihood that Azcárraga's ideas directly influenced subsequent legislation enacted of his time. Aguilar [2019: 397-398] enumerates a series of proposals and actual measures of internal taxation beginning from 1874 to 1884 that seem to align both in rationale and form with Azcárraga's ideas. This is unsurprising since, it will be recalled, Azcárraga was appointed to the *Consejo de Filipinas*[49] in 1871 until he left for Spain to pursue a parliamentary career in 1876.

[49] The council was created by a royal decree of December 4, 1870 as a consultative body for Philippine affairs under the Overseas Ministry.

Especially striking is the language of the reform proposal from that same council in 1874 that envisioned a replacement of the racially biased tribute with a "direct contribution based on wealth with no racial distinction". This was to "demonstrate to the indio's eyes that not to pay is not a sign of superiority. On the contrary, he who earns more and has more possessions pays more" (*el que más vale y posee, mas paga*) (as quoted in Aguilar [2019: 399]). This is a virtual paraphrase of Azcárraga's words already cited [*LC* 227-228] about showing the natives a "healthy example of justice where he who has more, pays more (*mas pague el que mas tiene*)" and "combat[ing] the "preconception…that paying a tax is a diminution, while not paying denotes, if not nobility then least a kind of superiority". Ultimately, of course this merely repeats the well-known Smithian maxim [*WN* V.ii.b.3] of payment based on ability to pay.

Equally striking however is the gradualism and sequence in which internal taxes were actually introduced, i.e., almost entirely in accordance with the reform sequence Azcárraga outlined in *Libertad*. Aguilar [2019: 399] notes that the council shied away from immediately replacing the tribute with a personal tax based on ability to pay—which would be the *cedula* introduced only in 1884. Instead, two taxes were introduced in 1878: a tax on urban property (*Urbana*) and one—more akin to licenses than a proportional tax—on business, trade, and the professions (*Industria*). These two, but especially the last, closely resembles the amorphous tax Azcárraga contemplated for the provinces that benefited from the opening of regional ports. They fall short of, but are nonetheless a step towards, that system of direct and proportional taxation he aspired to, which is "fairest of all" in a "perfect economic system" [*LC* 230-231]. It was subsequent to the introduction of these internal taxes that the tobacco monopoly was abolished (1882) whereupon the tribute was also finally replaced by the personal tax (*cedula personal*) (1884) which was imperfectly proportional to means. All in all, therefore, the sequence of legislated tax reforms conformed closely with what Azcárraga had outlined in *Libertad* more than a decade earlier.[50]

14. Sequel and significance

At around the time he wrote, Azcárraga had all the reason to hope that the Philippines would prosper under Spanish rule by pursuing to the utmost the liberal trade policies he advocated. Spain's own "Glorious Revolution" (1868),

[50] Aguilar [2019: 397] reports on Dela Costa's speculation that a connection existed between Gregorio Sancianco's [1975(1881)] treatise and the pace of reforms proposals by the Consejo, specifically the abolition of the tribute. The more reasonable direction of influence based on chronology, however, would be that Sancianco's ideas built upon and reinforced those of Azcárraga, with which he will have been familiar. Sancianco's proposals for presumptive taxation (see, e.g., de Dios [2013]), for example, were step closer to a system of proportional taxation than the *Urbana* and *Industria* taxes. Also significant is that Sancianco, like Azcárraga, clearly favored free trade as soon as internal sources could replace lost revenues from trade taxes [Sancianco [1975(1881):95].

despite its tumultuous aftermath, had created a succession of governments that invariably brought to power liberals and republicans receptive to economic and social, if not always political, reforms in the Philippines. Segismundo Moret, in particular, whom Azcárraga mentions in several places, was a free trade advocate who briefly became overseas minister under Prim.

Nonetheless the republicans who governed Spain at the time always sought a delicate balance between the liberal programme they wished to implement in the metropolis—which their Enlightenment ideology, by rights, required them to extend to the archipelago as well—versus supporting the conservative frailocracy whose cooperation was deemed essential for controlling the colony [Sarkisyanz 1995].[51] It is perhaps for this reason Azcárraga chose to focus on economic reforms more than political ones, stressing instead the material benefits of trade and making clear his moderate to conservative political leanings:

> We who have always shown ourselves more inclined to material reforms than to contests over political rights—because we see the latter only as means and the former as ends—have already stated on another occasion that the first among all rights is the freedom to sell goods wherever and in whatever form it best suits the owner, and the first of all freedoms is that of freely acquiring all objects, regardless of origin, that may suit the individual without the fiscus being allowed under any circumstances to impose limitations to the exercise of these important rights; for we believe that abundance and cheapness constitute the well-being of a people, and these can result only from the genuine and rigorous application of free trade to its fullest extent and with all its consequences. [*LC* 199-200]

Writing of that period, Legarda [1999:181] documents how the Philippines finally became transformed "from a subsistence economy to an export economy", with developments to a great extent vindicating the mechanism Azcárraga's envisioned. In particular, as trade was increasingly liberalized—with first Manila, then regional ports being opened to international shipping, with low tariffs enacted, and with the differential flag rights removed—foreign capital did indeed come to take a much larger interest in the Philippines, to the point that the country could almost be called an "Anglo-Chinese commercial colony flying a Spanish flag" [Legarda 2012]. Foreign merchant houses advanced capital to farmers for crops and introduced machinery that facilitated the cultivation of export crops, particularly sugar and abaca, causing an unprecedented regional specialization. The weakness of Spain's ability for commerce and capital created a unique phenomenon where the colonial power could not exercise monopoly control, so that foreigners had to deal directly (and more favorably) with local entrepreneurs

[51] This difficulty is exemplified by the fate of Moret's radical act as overseas minister (1870) to secularize the University of Santo Tomas and convert it into the State University of the Philippines, a move that was suspended upon facing opposition by the Dominicans [Sarkisyanz 1995:103].

and producers. Legarda [2012: 46] shares Chaunu's [1960: 21] assessment of "the great period 1820-1898 which, all things considered, constitutes in the history of the Philippines the only moment of real near-independence". In particular, Legarda [2011:14] calls the second half of the 19th century "a period of growth and diversification" and details the advances in communications, finance, and infrastructure that occurred during the period.

However, Azcárraga's prognosis underestimated the adjustment costs arising from trade liberalization (perhaps a cautionary tale in a modern setting). He had argued that labor mobility, combined with low fixed-capital in the activities to be displaced, would mean only minimal welfare losses as the working population shifted from activities oriented to the domestic market to those meant for exports. Any losses or reduction in food crop production might easily be replaced by imports financed by the more valuable export crops. The actual results were less than ideal, however, since the areas and populations that gained from the new export economy were different from those that lost from because of it and compensation of the losers from trade was far from assured. Legarda [1999: 173-180] cites Panay and Ilocos as examples. Panay's economy previously involved rice production alongside a native weaving industry run mostly by women who provided supplementary incomes for their families. The weaving industry however was ruined by imports of manufactured textiles, which displaced a good deal of labour, particularly among women. The diversion of labour to the emerging sugar sector (in neighboring Negros) affected food production in Panay, which together with the loss of supplementary incomes from weaving created serious regional food shortages and famines in the 1870s. Legarda hypothesizes that the resulting poverty and emigration out of the Ilocos region in the 1870s may have been the result of similar forces, namely the decline of cotton cultivation and weaving as sources of side-incomes as manufactured textile imports came to rule the field. The country in the meantime turned from a marginal rice exporter to a permanent rice importer. Changing world prices for export crops caught in the rapid technological changes of the Industrial Revolution (e.g., indigo being replaced by chemical dyes) also required a nimbleness in shifting production that for many peasant smallholders was simply absent.

Still, there was no doubt that the country prospered in aggregate terms during this period, and the efficiency and productivity Azcárraga predicted would arise from freer trade did indeed bring about the economic improvement he desired. This was most visible in the rise of a nascent native middle class that profited from the economic opening, from whose ranks would later rise the *ilustrados*. The absence of an adequate transport infrastructure and a competent national administration, however, meant that the gains from trade would always be unevenly distributed across regions and across classes.

Azcárraga had originally expected the new prosperity to demonstrate Spain's benevolence towards its colony and therefore serve to bind the Philippines

closer to the metropolis. Material improvement would, he thought, preserve the Philippines for Spain. Pardo de Tavera saw the same forces at work which Azcárraga predicted but also the radical social and cultural changes this new affluence brought:

> Freedom of trade was bound to bring capital and active people from outside the archipelago. Capital would be of use to develop production and, naturally, consumption and exportation. Persons who came freely brought new ideas, new methods, new moral and intellectual needs, without the support of privileges which served for exploitation, so that such men had to influence favorably the progress of the Filipinos…Freedom of trade brought about the development of agriculture which had already been initiated by the Real Compañia…Wealthy citizens would come to Manila, make purchases, become acquainted with the great merchants who entertained them in their quality as customers, whose trade they needed; they visited the Governor-General, who would receive them according to the position their money gave; they came to know the justices of the Supreme Court, the provincials of the religious orders; they brushed up as a result of their contact, with people of the capital and on returning to the pueblo, they took in their hearts and minds with them the germ of what was subsequently called subversive ideas and later *filibusterismo*. (Quoted in Legarda [1999: 215].)

It was not only travel to the capital, of course, that provided the source of these dangerous ideas. More potently, the newfound prosperity would allow many native families to send their scions abroad, particularly to Spain for studies, where Filipinos would find a fountainhead of republican, liberal, even revolutionary thought that could feed the dry wells at home. It might therefore be said, if crudely, that free trade made possible the likes of a del Pilar, a Lopez-Jaena, a Rizal—and ultimately even a Bonifacio.[52] But even as they were its creations, such men would demand more than the freedom of commerce and material progress Azcárraga advocated. They would push further and demand that the political rights and freedoms they knew existed in Spain—which Azcárraga regarded only as "means" rather than "ends"—should also be extended to the Philippines.

The final outcome of the struggle for those demands was one Azcárraga was unlikely to have foreseen.

[52] Although Bonifacio did not travel abroad or have a family background in commercial crop agriculture, he was employed by foreign merchant firms that were a crucial element of the export economy.

Acknowledgement: This essay is dedicated to the memory of Dr. Benito F. Legarda, Jr., who many years ago first called the author's attention to Azcárraga's work. Quoted passages from *Libertad* are my translations from the original Spanish; page numbers refer to locations of the quoted material in the original publication. I am grateful to an anonymous referee for suggested improvements. Remaining errors and omissions are my own. A grant to professors emeriti from the University of the Philippines is gratefully acknowledged.

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Book Review

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Hoe Ee Khor, Diwa C. Guinigundo and Masahiro Kawai, eds. *Trauma to triumph: rising from the ashes of the Asian Financial Crisis*. 2022. Singapore: World Scientific Publishing Co. Pte. Ltd. and ASEAN+3 Macroeconomic Research Office (AMRO).

Trauma to triumph: rising from the ashes of the Asian Financial Crisis (edited by Hoe Ee Khor, Diwa C. Guinigundo and Masahiro Kawai) is an epic endeavor to link the devastation and "trauma" from the 1997-98 Asian Financial Crisis (AFC) in the ASEAN+3 region to the adoption of key domestic structural reforms and the establishment of regional financial cooperative mechanisms, which would be instrumental to the region's "triumphs" of recovering and growing in the AFC's aftermath, weathering the adverse effects of the 2007-08 Global Financial Crisis (GFC) and even thriving in the post-GFC period. In the midst of the still looming threat of the COVID-19 global pandemic, and the new threats posed by the Ukraine-Russia war and cost-push global inflation, the titular "triumph" may also extend to the current opportunities for greater regional cooperation to overcome these challenges.

With its almost 900 pages spread over five main parts, this book is indeed a deep wellspring of reference material for classes on macroeconomics and monetary and financial economics. Economic history classes would also benefit from the richness of the narratives and diversity of perspectives on the effects of two financial crises on the region and the corresponding policy and institutional responses. "Part I: Introduction and Overview" alone may be used as a stand-alone supplementary reading for both undergraduate and graduate classes as it not only contextualizes, but also presents a preview of the main points of the succeeding chapters.

"Part II: What Happened During the Asian Financial Crisis and the Global Financial Crisis" is a never-before-seen compilation of interviews of those who were at the helms of their respective economies, as well as representatives from the International Monetary Fund (IMF) and the World Bank, who were directly involved in the policy discussions during the AFC. These interviews bring to

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light the rationale and motivation, including the socio-political considerations, for the concoction of policies adopted to address the AFC, and at the same time enable the reader direct insights into the interviewees' forthright assessments on the appropriateness of these policy responses. Some of the main takeaways from these interviews are as follows:

- The AFC was unlike any crisis seen anywhere before. Except for Thailand (Chapter 2), whose fundamentals were already considered weak in the eve of the AFC and where the speculative attacks first occurred, the rest of the Asian countries that were subsequently subjected to speculative attacks had fundamentals that were considered sound. Accordingly, the severity and speed with which the contagion spread was largely unexpected in Hong Kong (Chapter 7), Indonesia (Chapter 3), Malaysia (Chapter 5), the Philippines (Chapter 6), Singapore (Chapter 8), and South Korea (Chapter 4).
- The AFC brought to the fore hidden vulnerabilities among the hitherto hailed "Asian Tigers", mainly in terms of "double mismatches" in currency and maturity, large unhedged external corporate debt, and banking supervision weaknesses and regulatory oversight.
- Countries that sought the help of the IMF, such as Indonesia, South Korea, and Thailand, were subjected to its "panacea" of contractionary fiscal policy to raise fiscal surplus and contractionary monetary policy to raise interest rates and prevent currencies from further depreciating, along with impositions for fast-tracking structural reforms in the midst of uncertainty, which turned out to be more destabilizing, and thus, aggravated the recessionary effects of the AFC in these economies. This largely stemmed from the IMF's limited technical capacity and resources to understand and address the country- and region-specific features of the crisis. For instance, the high interest rates imposed in Korea discounted the fact that promissory notes were used as credit in corporate transactions [Khor, Guinigundo, and Kawai 2022:100]. Thus, raising interest rates, which rendered some firms insolvent, had adverse cascading effects even on firms that were in good standing, but held the former's post-dated checks. Moreover, the IMF was unprepared to mete out large-scale bailout packages in a timely manner [Khor, Guinigundo, and Kawai 2022:101], so that Japan had to initiate what became known as the "Friends of Thailand" group, which provided supplementary financial assistance of about USD 7 billion [Khor, Guinigundo, and Kawai 2022:164].
- The right policy implemented in the wrong way may have disastrous effects. In particular, wrong timing and conflicting political interests may derail the best laid plans. The IMF-imposed structural reforms

such as pushing for greater liberalization, restructuring of the financial system, bank closures, etc., which would likely have been beneficial to an economy during normal times, only served to exacerbate the AFC-induced recession when there was much uncertainty in the economy, resulting in adverse unintended consequences, such as the bank runs that happened in Indonesia [Khor, Guinigundo, and Kawai 2022:78]. Moreover, "politics undermined the bank reform effort" in Indonesia [Khor, Guinigundo, and Kawai 2022:78], as some favored yet weak banks were kept liquid, while others more deserving of liquidity support were closed.

- In contrast, countries that did not seek IMF funding, like Malaysia and Hong Kong, were able to adopt policy remedies to tailor-fit the shape and form that the crisis took in their respective economies. Malaysia correctly identified the large roles that speculators and the offshore ringgit market played in shorting the ringgit and facilitating capital flight, exacerbating the crisis in Malaysia (Chapter 4). To further prevent speculators from wreaking havoc on the Malaysian ringgit market, it imposed selective exchange controls, particularly on short-term flows—a move, which was heavily criticized by the US Federal Reserve System (Fed) and the IMF at that time. This, however, turned out to be the appropriate response for the Malaysian economy, further enabling policy makers to implement expansionary fiscal and monetary policies and at the same time implement much-needed reforms in the banking and corporate sectors even at the height of the recession. As a result, Malaysia experienced one of the strongest recoveries in the region, supported by strong external demand; and its aggressive imposition of capital controls on short-term flows served to attract instead more growth-enhancing long-term investments.
- In response to the "double play" made by speculators in shorting both the HKD and the Hong Kong (HK) stocks, the Hong Kong Monetary Authority (HKMA) came back with a "double counter play" by then secretly setting up stocks and futures trading accounts for the HKMA with the three largest stock brokers in Hong Kong. This enabled the HKMA to prevent speculators from shorting the Hong Kong stock market (Chapter 7). While this unconventional monetary policy move was met with international criticism, it was able to successfully stave off speculative attacks against both the HKD and HK stock market.
- As Duck-koo Chung opined, "International finance is closely related to aspects of international politics…" [Khor, Guinigundo, and Kawai 2022:199]. Japan advocated an "Asian Monetary Fund" or AMF (Chapter 9), "a regional financial safety net" [Khor, Guinigundo, and Kawai 2022:166], "which would be more attuned to the needs

and circumstances of its Asian member countries as compared to a globally-oriented IMF" [Khor, Guinigundo, and Kawai 2022:167] and would provide financial assistance supplementary to IMF assistance to troubled member countries. However, the idea was vehemently opposed by the US and the IMF, citing that the presence of such a mechanism for disbursing rescue funds without strict conditionalities, such as those imposed by the IMF, would run the risk of encouraging moral hazard [Khor, Guinigundo, and Kawai 2022:168]; although Eisuke Sakakibara, Japan's vice minister of finance for international affairs, contended that the "unspoken reason" for such opposition was that the AMF would have diminished the dependence of the region on the IMF and the US [Khor, Guinigundo, and Kawai 2022:169]. Thus, the AMF was unable to see the light of day in the face of such international politics at play, including the neutrality of two key regional players—Australia and China—even though the rest of ASEAN+3 were open to the idea.

"Part III: The Asian Financial Crisis and the Global Financial Crisis: Experiences from the ASEAN+3 Economies" is a collection of more in-depth country-specific analyses of what occurred from the eve of the AFC to the GFC and the post-GFC "Taper Tantrum". The analyses benefit from the advantage of both better-evidenced hindsight and a wider perspective afforded by the availability of longer and updated time series data, the use of more formal statistical methods for verification of hypotheses, and the availability of policy lessons from two financial crises. This part also includes a chapter on how ASEAN's newer members—Brunei Darussalam, Cambodia, Lao People's Democratic Republic (PDR), Myanmar, and Vietnam (BCLMV)—fared during the two crises. While each chapter primarily deals with a specific country experience, there were common threads scattered in the different chapters.

1. Before and during the AFC

- "Too early" financial globalization, without the appropriate regulatory and supervisory mechanisms to manage an onslaught of short-term financial flows, resulted in a "buildup of vulnerabilities" [Khor, Guinigundo, and Kawai 2022:247], rendering these Asian economies susceptible to the occurrence of a self-fulfilling bad equilibrium. The Philippines, which did not experience as much capital inflows as its neighbors and already had some of the necessary regulatory and supervisory mechanisms in place as part of the lessons learned from its own balance-of-payments-cum-financial crisis in the early 1980s, was relatively insulated from the adverse effects of the AFC (Part III, Chapter 5).

- The disregard for the warnings of the Mundellian Trilemma at work in the face of financial account openness and pegged currencies (to the USD), coupled with the inordinate focus on the current account instead of the capital account, resulted in a misjudgment of the nature and severity of the crisis, and a subsequent mishandling of IMF policy prescriptions and an aggravation of the AFC's adverse effects.

2. Post-AFC recovery

- Export-led growth enabled the most affected Asian economies a relatively quick bounce back, as currencies were allowed to float and depreciate against the USD, enhancing competitiveness in the global markets for goods and services. Singapore, which kept its currency pegged to the USD, suffered a protracted recovery from loss of competitiveness until it was able to build a comparative advantage in financial services and rise to become a financial center in East Asia.
- To discipline monetary policy in the face of floating exchange rate regimes and open financial/capital accounts, most economies adopted an inflation-targeting regime.
- Given that the pre-AFC definition of "fundamentals" failed to adequately capture the country risks involved, other indicators should be included in the expanded definition of "fundamentals", namely, the real exchange rate, the banking system's strength, and the foreign reserve size [Khor, Guinigundo, and Kawai 2022:249]. For instance, including these considerations would have raised a red flag on Indonesia's vulnerability (i.e., in terms of large unhedged private foreign debt and banking sector regulation weaknesses) to a speculative attack (Chapter 2).
- While the AFC experience showed that reserves alone cannot prevent a massive speculative attack mounted against the local currency in the midst of a crisis, an extensive reservoir of precautionary reserves along with meeting the requirements for an expanded definition of "sound fundamentals" may serve as a signaling mechanism to ward off speculative attacks. Accordingly, the post-AFC period saw monetary authorities in the region building up substantial official reserves as a precautionary measure.
- The common subsequent recognition that financial development is important to overall economic growth spurred domestic financial sector reforms and greater efforts to foster both bilateral and multilateral financial cooperation to build stronger and more resilient financial systems in the region.

3. During the GFC, Post-GFC and Taper Tantrum

- The fallout from the GFC in Asian economies was mainly in the form of reduced export demand for the goods and services by the affected developed economies. Greater dependence on China and intra-regional export demand afforded some insulation during the GFC and V-shaped recoveries in its aftermath.
- Risk aversion and structural reforms and policies adopted as part of the lessons learned during the AFC meant that Asian financial systems were less exposed to "toxic assets" that plagued the financial systems of developed economies in the eve of the GFC.
- In the aftermath of the GFC, the troubled financial sectors of the US and other developed economies in Europe coupled with near-zero interest rates as a result of credit easing in these economies saw financial flows favoring China and emerging economies in Southeast Asia. This resulted in credit and liquidity expansion, and lower costs of borrowing, which contributed to regional growth. However, the surge in financial flows, particularly, in short-term flows, did not come without a downside, as this threatened (1) the stabilities of Asian financial systems in general, as private-sector risk appetites increased with easy credit and liquidity and of inflation-targeting regimes to a certain extent; and (2) the competitiveness of their respective export sectors as domestic currencies started to appreciate in real terms.
- The GFC brought to light the importance of overseeing and managing systemic risk via macroprudential policies (as provided in Basel III) to ensure the overall soundness of the financial systems, as opposed to the pre-GFC emphasis placed on monitoring the soundness of individual financial institutions via microprudential measures. Acknowledging that systemic risk has both cross-sectional (interconnectedness of financial institutions) and temporal (procyclicality) dimensions, countercyclical capital buffers were introduced by monetary authorities in 2011 [Khor, Guinigundo, and Kawai 2022:483] in line with then Fed Chair William McChesney Martin's statement that the monetary authority's role is "to take away the punch bowl just as the party gets going" [Fraser 1955:12 as cited in Khor, Guinigundo, and Kawai 2022].
- The late-2013 "Taper Tantrum", which occurred when the Fed announced its plan to taper its credit easing, resulting in an increase in US bond yields, further resulted in sudden reversals from financial inflows to outflows from Emerging Asia. However, strong fundamentals as well as greater monetary policy credibility and transparency and financial system resilience with the adoption of Basel III requirements enabled Asian economies to weather this with relatively less disruption to their respective financial systems.

"Part IV: Assessments of the Crises and the Development of Regional Financial Cooperation in Asia" takes off from a more regional perspective on the crises and how these crises necessitated the birth and subsequent evolution of key regional financial cooperative mechanisms. Chapter 12 revisits the role that the IMF has played during the AFC and GFC; and how the mishandlings in policy prescriptions in response to the AFC resulted in "IMF stigma" [Khor, Guinigundo, and Kawai 2022:712]. This led the IMF to reevaluate its intervention strategy, shifting from the heavily intrusive "structural conditionality" to "national ownership" of IMF conditional programs.

Chapter 13 details how issues regarding the sufficiency, timeliness and appropriateness of the IMF financial assistance packages drove Japan and other ASEAN+3 economies to initiate regional financial cooperation in the form of the Chiang Mai Initiative (CMI) in 2000—a network of bilateral swaps among member central banks, designed to provide to troubled members "large-scale financing in a timely manner" [Khor, Guinigundo, and Kawai 2022:725] to serve as a supplement to IMF lending; and CMI's subsequent multilateralization, the Chiang Mai Initiative Multilateralism (CMIM) in 2010. To support the operations of CMIM and conduct economic surveillance in the ASEAN+3, the ASEAN+3 Macroeconomic Research Office (AMRO) was established in 2011, and its scope and influence have only expanded through the COVID-19 pandemic.

Chapter 14 assesses the post-GFC performance of regional financial cooperation, discussing the fortification of the scope and modality of CMIM, and the evolution of AMRO as an international organization—a status, which accords it autonomy, enhanced capacity, transparency and accountability, and its own legal identity to institutionalize crucial partnerships with multilateral organizations like the Asian Development Bank (ADB) and IMF. As of this writing, AMRO/CMIM yet falls short as a credible regional monetary fund, but the current global pandemic is expected to fast-track endeavors to strengthen CMIM in particular to ensure that it remains relevant in these crucial times.

Chapter 15 focuses on the contributions of the Executives Meeting of Asia-Pacific (EMEAP)—an annual venue for 11 monetary authorities in the region—to promoting economic and financial cooperation and development in the region; and, in particular, its instrumental role in establishing and developing the Asian Bond Fund (ABF) to promote financial market deepening in the region and provide the necessary liquidity in the face of another speculative attack on the currencies in the region.

Chapter 16 highlights the expected role of the Asian Bonds Market Initiative (ABMI) in mitigating Eichengreen and Hausmann's [1999 as cited in Khor, Guinigundo, and Kawai 2022] "original sin" of using the domestic currency "to borrow abroad or to borrow long term even domestically", as doing so with the existing weaknesses in international financial markets would only lead to currency and term mismatches. Salvation from original sin may come in the form of either

dollarization or the development of "deep and liquid domestic markets long-term domestic-currency-denominated securities". While the Asian bonds market has grown in leaps and bounds in the last two decades, it still has a long way to grow for it to be able to adequately address the fast-growing and fast-changing needs of the region; and remains hampered by glaring gaps in levels of financial systems development across the region.

"Part V: Conclusion and Challenges Ahead" reiterates the AFC's deep impact on the region's growth and development trajectory and landscape of integration. The AFC uncovered hidden structural vulnerabilities in ASEAN+3 countries and in addressing these enabled these economies to build back better, to weather the GFC and to thrive even in the post-GFC period. Moreover, both the AFC and GFC highlighted the importance of "holding hands among regional peers to prevent regional crises" [Khor, Guinigundo, and Kawai 2022:855] and to be able to respond appropriately when they do occur. While the ongoing COVID-19 global pandemic has derailed regional growth and development, it has also opened up new challenges and opportunities to further strengthen and deepen existing regional financial cooperative mechanisms to fortify the region's resilience to shocks, and to expand the scope of these mechanisms to enable them to respond with sufficient resources and in a timelier manner.

Given its recurring emphasis on and expectations for greater regional cooperation moving forward, one would expect a discussion of the prospects for an Asian Monetary Union. However, it stops short of doing so, perhaps due to the existing divide not only in levels of economic development, but also equally important, if not more so, the diversity of socioeconomic and political ideologies in the region.

This book is not indeed for the faint-hearted. The main challenge to the reader is the sheer length of the tome, enforced by thematic repetitions, particularly in Parts II and III and also, to a certain extent, in Part IV. Given the multiplicity of authors involved, this is largely unavoidable. And yet this feature might also be considered a strength in that each country chapter may be used as a largely self-contained reference by the interested reader.

Reference

Khor, H.E., D.C. Guinigundo, and M. Kawai, eds. [2022] *Trauma to triumph: rising from the ashes of the Asian Financial Crisis*. Singapore: World Scientific Publishing Co. Pte. Ltd. and ASEAN+3 Macroeconomic Research Office (AMRO).