Re-thinking market failure in the light of the imperfect state

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We propose a formal re-definition of the concept of market failure based on the idea of the imperfect state. In the neoclassical taxonomy, a decentralized regime of exchange is a market failure if its laissez-faire equilibrium solution is welfare-dominated by a technically feasible alternative. If the state is perfect (that is, it is benevolent) and competent (that is, its transactions cost of intervention is zero), then every market failure can be remedied with a welfare gain. On the other hand, if the state is imperfect (that is, either non-benevolent or with non-zero transactions cost of intervention), the state intervention to correct the market failure can be welfare-reducing.

Extending the logic behind Williamson's remediableness criterion and Stiglitz' constrained Paretoness, we introduce a new taxonomy of failures: the concept "proto-failure" now denotes any failure which laissez-faire interaction cannot remedy with a welfare gain. The label "market failure" now denotes a proto-failure which the relevant state can correct with a welfare gain. A proto-failure that the relevant state cannot correct with a welfare gain we call "Remediableness Condition efficient". We use the net welfare metric which explicitly accounts for transactions cost of intervention as efficiency criterion. The new taxonomy is equivalent to the old if the state is perfect, that is, all proto-failures are market failures. When the state is imperfect, the set of market failures is smaller than the set of proto-failures. A proto-failure is a necessary—but not a sufficient—condition for a welfare-improving government intervention. This paper follows the Williamson counsel to "push the logic of positive transactions cost to completion".

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1. Introduction

When Oliver Williamson [1996, 2007] proposed the "remediableness criterion" (RC) asserting that "…an extant practice for which no superior feasible alternative can be described and implemented with expected net gain is presumed efficient," it flew in the face of the textbook notion that an arrangement is inefficient if a welfare superior alternative can be technically divined given the same taste, technology, and endowment. In the literature, the comparator regime is usually the allocation that technically maximizes the social welfare function. That poses no problem if, as Dixit [1996] observed, the policymaker and implementor is "an omnipotent, omniscient, and benevolent dictator". This latter, which we call here "the perfect state paradigm," is economics' counterpart of the "frictionless universe" in physics. Williamson [1996] observes that "…the practice of comparing an actual outcome with a hypothetical (zero transaction cost) ideal has been the frequent source of public policy confusion and error…". The "policy confusion and error" can lead to an enormous waste of scarce resources. In this, Williamson was returning to a long but downplayed tradition of recognizing the role of the imperfect state in policy making.

The modern view of market failure is due for the most part to A. C. Pigou. Pigou [1932], following Henry Sidgwick [1886], identifies the source of market failure as the "divergence" between the "marginal private" and the "marginal social" cost (benefit) leading to the failure "to make the national dividend a maximum". As a consequence, "certain specific acts of interference with the normal economic processes may be expected...to increase the dividend". Pigou [1932] observed in *The economics of welfare* that "where there is reason to believe that the free play of self-interest will cause an amount of resources to be invested different from the amount that is required in the best interest of the national dividend, there is a *prima facie* case for public intervention". Pigou [1935] reiterated that whenever "private self-interest, acting freely, subject only to the ordinary forms of law, does not lead to the best results from a general social point of view, there is…a *prima facie* case for State action". From here, Pigou introduced—and became associated with—Pigouvian taxes, which, when imposed by the government, correct the divergence according to the tort principle of "who does the harm pays". Since how the government determines these taxes—which involve knowing private damages and thus private preferences—is not tackled, the presumption is that the state is omniscient besides being beneficent. This latter strain of Pigou that came to dominate modern policy analysis we will call Pigou version I or "Pigou I". But there was a second version.

Pigou himself, like Sidgwick and other Cambridge School predecessors and contemporaries, was not blind to the dangers of such sweeping prescription. (See Medema [2009] for an excellent account). This was the imperfect-state tradition which was eclipsed in the post-WW II era that was dominated by both Keynesian

macroeconomics and the still-respectable challenge of Soviet socialism to capitalism. But that earlier tradition re-emerged (slowly at first) as the Public Choice Revolution of the 1960s.

True to the dominant laissez-faire bent of the era, Sidgwick in his *Principles of political economy* [1901] issued the following warning (also quoted in Medema [2009]): "It does not of course follow that wherever laisser-faire falls short governmental interference is expedient; since the inevitable drawbacks and disadvantages of the latter may, in any particular case, be worse than the shortcomings of private enterprise." The term "particular," which suggests spatio-temporal specificity, is of interest here. He then identifies the dangers associated with government intervention: patronage politics leading to corruption, the perverse influence of interest groups, the failure of party politics to serve the public interest, and the lack of adequate information. He was actually only reiterating his earlier [1886] position that policy making is a "choice among evils" since, even with the market performing poorly, "it is possible that governmental interference might on the whole make matters worse".

Knut Wicksell [1896] also approached the problem of government intervention in the light of an imperfect state and possible government failure. For him, the legitimacy of government action is clinched only if the government-sponsored re-arrangement clearly dominates the *laissez-faire* status quo. It is not a given that the status quo however failing from the technical standpoint will be inferior welfare-wise to state action (see also Medema [2009]; Besley [2002]).

For Alfred Marshall [1923; 1926], the problems with government intervention revolved primarily around corruption since interventions increase the "… temptations to use public authority for the purposes of private gain". The role of powerful interest groups who get government to institute self-serving interventions [Fabella 1991], such as tariff protection regardless of damage to the public weal, cannot be gainsaid.

It was, however, A.C. Pigou [1912], the widely recognized father of modern welfare economics, who issued some of the most telling warnings apropos this enquiry: "It is not sufficient to contrast the imperfect adjustments of unfettered private enterprise with the best adjustments that economists in their studies can imagine. For we cannot expect that any State authority will attain, or even whole-heartedly seek, that ideal." The phrase "will attain" questions the state's capacity to implement the ideal; the phrase "whole-heartedly seek" questions the state's benevolence or commitment to collective rationality.

Again Pigou [1935:124] said, "In order to decide whether or not State action is practically desirable, it is not enough to know that a form and degree of it can be conceived, which, if carried through effectively, would benefit the community. We have further to inquire how far, in the particular country in which we are interested and the particular time that concerns us, the government is qualified to select the right form and degree of State action and to carry it through effectively."

Again, the repeated use of the word "particular" underlines the important point that the capacity to intervene efficiently may vary across space and across time.

For Pigou [1935:125], the quality of government and of its interventions depends on "…the intellectual competence of the persons who constitute it, the efficacy of the organization through which their decisions are executed, their personal integrity in the face of bribery and blackmail, their freedom from domination by a privileged class, their ability to resist the pressure of powerful interests or of uninstructed opinion". Thus, for him, the capacity of government for collective rationality, its executive competence, and the quality of its information set are the challenges that could render state action a failure. We call this version of Pigou, "Pigou II".

The idea of the imperfect state moved to the margins in the immediate Post-WWII period under the weathering spell of the powerful fundamental welfare theorems and the resource allocation price theory that underpinned them. Under the very strong assumption of "no market failures," the attainment of Pareto efficiency is attained by the market without the state. That seems tautological in the Pigou sense since a market failure is a failure to maximize the social dividend. Absence of market failures implies that the social dividend is maximized!

The first fundamental theorem of welfare assumes further that agents have property rights over initial assets and, by deft non-treatment, suggests that those rights are protected and enforced at no cost. It assumes that the innumerable trades among agents despite potential for opportunism occur at zero cost.

The second fundamental theorem of welfare in celebrating the existence of an initial asset redistribution which will support a more acceptable Pareto efficient market allocation completely ignores the question as to who or what will effect the asset redistribution. Since the cost of overcoming the resistance to asset redistribution is ignored, the implication is that it is zero. If transactions cost is indeed identically zero, then, as Coase seminally argued in 1960, all externalities will vanish by private bargaining. The implicit assumption of zero transactions cost then justifies (behind the back of neoclassical economics) the "no market failures" assumption of the welfare theorems. For example, consumers can bargain with an extant natural monopolist to operate at "$p = MC$" in exchange for a contractual claim equivalent to its current profit plus part of the deadweight loss recovered. The reason this does not happen is that the consumers cannot credibly commit to the contract because of high transactions cost. But who or what undergirds the zero transactions cost?

One can, perhaps, get a clue from another iconic result of that period. P. Samuelson [1954] showed that freely acting self-interested rational agents will fail to voluntarily provide the Pareto efficient level of public goods. To solve the "public goods failure," he found comfort in the state as a "benevolent central planner" who, being "omnipotent, omniscient and benevolent" [Dixit 1996], taxes the citizenry and implements the Pareto efficient level of public goods at

zero transactions cost. Samuelson's benevolent central planner, needless to say, became the cornerstone of subsequent perfect state paradigm which undergirded the welfare economics of zero transactions cost. The 1950s was when normative policy analysis became wedded to the perfect state as a fundamental if implicit assumption. If so, it seems that to render the state redundant, one has also to assume that it is perfect!

The Public Choice movement starting in the 1960s revived the imperfect state tradition and can be viewed as a reaction to the perfect state-zero transactions cost tradition. The founders of Public Choice revolution, namely Coase [1960; 1974] and Buchanan [1962] faulted traditional welfare economics for its reliance on the existence of technically defined socially optimal policies which were assumed implementable by the state at zero transactions cost. Demsetz [1969] branded as "Nirvana economics" the tendency to choose as benchmarks situations that are unattainable without the perfect (Nirvana) state. That actual state institutions are just as likely to resist as to pursue socially optimal policies became known as the "public choice critique of welfare economics" [Besley and Coate 2003]. By the end of the 1960s, even the grand doyen of the neoclassical tradition, Kenneth Arrow, had conceded that "the costs of operating competitive markets are not zero, as is usually assumed in our theoretical analysis" [Arrow 1969:48]. The Public Choice literature has since dramatically grown, identifying the innumerable situations where government failures arise. Williamson's "remediableness condition" is just the latest logical branch of this tradition.

Meanwhile, within traditional welfare economics itself germinated a grudging recognition that certain market failures may resist amelioration by an information-challenged state. The concept of "constrained Pareto efficiency," introduced by Diamond [1967] and elaborated by Stiglitz [1982], hangs on the realistic idea that the state, itself plagued by information deficit similar to that plaguing private agents, may be unable to improve on a sub-optimal market status quo. This called for the partition of the set of all market failures into those that can and those that cannot be welfare-improved by an information-challenged state. A lemons market may resist attempts at improvement by the state similarly unable to observe agent types. The Greenwald-Stiglitz theorem [1986] showed that under externality, there are taxes that can re-establish Pareto efficiency, but those taxes, like the Pigouvian taxes, require potentially inaccessible private information. And information asymmetry-based market failures may be the rule rather the exception in the market.

Others suggest that the concept of market failure be abandoned altogether [Zerbe and MacCurdy 1999] in favor of transactions cost. The reason, as they see it, is that for the existence and persistence of a market failure, it must be that the transactions cost required to effect a better outcome in the decentralized regime is so high as to preclude the improvement. This is a useful observation, and we will utilize it here. But the thrust of the present endeavor is not to abandon but to

rethink and redefine the concept in the light of transactions cost and the capacity to remedy of the imperfect state.

In Section 2, we review the textbook neoclassical idea of market failure as a decentralized exchange whose outcome is welfare-inferior to another technically feasible outcome using the weaker idea of Utilitarian dominance instead of Pareto dominance. In Section 3, we introduce, following Williamson's "net-welfare calculus," the metric "net-welfare gain" which explicitly incorporates the transactions cost of intervention reflecting the informational, agential, and technical deficits inherent in the concept of the imperfect state.

In Section 4, we propose a new taxonomy with the following categories: (a) "proto-failure," proposed in lieu of the textbook "market failure," refers to a decentralized exchange whose welfare outcome is inferior to that of another technically feasible outcome; (b) "market failure," a proto-failure that can be efficiently remedied (with net-welfare gain netting the transactions cost) by the relevant state; (c) "RC-efficient" are proto-failures that cannot be remedied with net gain by the relevant state. Unlike "proto-failure," the latter two categories are no longer invariant with respect to time and space because the relevant state's capacity varies with time and space. If, however the relevant state is perfect, all these three categories collapse into just one: market failure in the textbook sense. Thus, if the state is perfect, all proto-failures are remediable which, by the way, was the underlying logic of the old market failure taxonomy!

We argue why the new taxonomy may make a difference in actual policy settings. Finally, we give examples of proto-failures that are either market failures or RC-efficient depending upon the transactions cost of the relevant state.

2. The neoclassical market failure

Let R be a regime of free and decentralized exchange, sometimes called the *laissez-faire* market regime. Let A be the set of all feasible allocations given initial endowments and taste of N self-interested economic agents, technology and the rules of game, G. Let $r \in A$ be a stable self-enforcing equilibrium allocation of R. The allocation r generates the social welfare outcome $W(r)$. Each agent i gets an allocation r_i, $i = 1, 2,..., N$, which generates i^{th} utility, U_i, assumed also well-behaved. We assume for simplicity that the social welfare function $W(r) = W(\{r_i\}) = W[U_i(r_i)]$, $i = 1,2,…,N$, exists and is well-behaved. An example is the utilitarian welfare function: $W(r) = \Sigma U_i(r_i)$.

Definition 1: R is a market failure in the sense of Pigou I if its *laissez-faire* solution r is strictly welfare dominated by another allocation h, that is, $W(h) > W(r)$, $h \in A$, $h \neq r$.

The market failure in the sense of Pigou I is a failure in the technical sense in that the welfare superior allocation h is technically feasible given taste, endowment, technology and rules of the game. Because it is purely technical, this market failure view has the property of spatio-temporal invariance - whether in Djibouti or Berlin, *R* is a market failure! The market failure in Definition 1 is weaker than the neoclassical or textbook definition in two senses. Firstly, it uses simple welfare dominance rather than Pareto dominance. Pareto dominance implies welfare dominance but not vice-versa. Secondly, in the textbook definition, the comparator to *r* is $h = \text{argmax}_x\ W(x)$ in *A* [Besley and Coate 2001]. This follows Pigou's maximized social dividend which is always attainable by the perfect state: if the state is perfect, it will not bother with halfway solutions and will proceed directly to the *maximum maximorum*. Since we allow for an imperfect state, any improvement over the *status quo* is desirable while the pursuit of the *maximum maximorum* may entail too high a transactions cost. A simple example of R which is a market failure is the 2x2 symmetric Prisoner's Dilemma Game where the unique Nash equilibrium is payoff dominated (either in Pareto or in the utilitarian sense) by its cross diagonal rival which, however, is not stable. The set of all payoffs *A* is given by the payoff profile in the four quadrants. The self-enforcing decentralized solution *r* of the game is the unique Nash equilibrium payoff profile, while *h* is the payoff profile of the cross-diagonal quadrant.

Since *R* is a decentralized exchange economy and $r \in A$ is self-enforcing, *r* is autonomously attained given *G*, requiring no additional outside force to establish and maintain. The initial array of incentives in *R* implicit in the associated initial rules of the game *G* logically leads to *r*. By contrast, to install and maintain any $h \neq r$, $h \in A$ given *G* requires an outside intervening force to overcome the initial array of incentives. This outside force induces an alternative regime which supports *h* as a stable equilibrium. But this intervention is costly.

The new game embodying the influence of an outside force whose stable equilibrium is allocation *h* in *A* will be referred to here as R^h, the *replacement regime*. We refer to *R* as the *laissez-faire status quo*. There may be many allocations welfare superior to *r* in *A*.

Definition 2: Let *A** be the subset of *A* such that for every $h \in A^*$, $W(h) > W(r)$, that is, $A^* = \{h \in A \mid W(h) > W(r)\}$.

An equivalent technical definition of the textbook market success and market failure in terms of *A** is the following:

Definition 3: *R* is a market failure if and only if *A** is non-empty.

If allocation *h* as in Definition 1 exists, *A** is non-empty. If *r* is already the social optimum, *A** is empty by definition. Now we turn to the transactions cost of replacing *r* with any $h \in A^*$.

3. Transactions cost

Why does the decentralized market R not move to a replacement regime R^h with equilibrium allocation $h \in A^*$ if $W(h) > W(r)$? The reason is that every decentralized effort required to replace R by R^h (equivalently replacing r by h) incurs a non-zero transactions cost [Williamson 1975, 2007, 2009]. This follows the original 1937 Coasean "Nature of the firm" observation that market exchange is not costless. For example, the winners in the move from r to allocation h may have to bargain with and compensate the losers and pay the collective action (organization, coordination and bargaining) cost while still remaining winners. A contract may be struck beforehand to this effect, but contracts create pockets of profitable ex-post opportunism, and enforcing such contracts is costly. The reason why the market does not autonomously move away from R to R^h is that the collective action required cannot be undertaken with a net social gain [Zerbe and MacCurdy 1999]. This was the great insight by R. Coase in his seminal 1960 article on social cost.

In other words, a market failure in the traditional sense is the flip side of a collective action failure due to intervening transactions cost. If transactions costs are identically zero, all market failures will eventually vanish. The state intervention Coase recommended involved institutional changes that lower the cost of collective action, namely, assignment of property rights and enforcement of contracts. These are effectively changes in the rules of the game G which is interesting, but which we will not pursue further in this paper.

How about an outside intervention? Any outside force enlisted to replace R with R^h, given that A^* is non-empty, will also incur a transactions cost. As Williamson [2009] counseled: "The implementation stipulation requires that the costs of implementing a proposed feasible alternative (one that is judged to be superior to an extant mode in a *de novo* side-by-side comparison) be included in the net gain calculus."

We will call the outside agency, the *relevant state,* which we represent by $s \in S =$ the set of all relevant states. There is a basic critical divide among relevant states in S:

Definition 4: (a) The relevant state $s \in S$ is perfect if (i) it is benevolent, that is, it always seeks to maximize the social welfare $W(x)$ in every economic environment (taste, technology, endowments, and rules of the game), and (ii) the transactions cost it incurs by its intervention is identically zero. (b) The relevant state is imperfect if either or both of (a.i) and (a.ii) do not hold.

Remark: Unless otherwise stipulated, the term "relevant state" refers to the imperfect state operating in the jurisdiction where R exists. Since an imperfect state's transactions cost is non-zero, there arises the problem of budget constraint. The imperfect state may not always pursue the *summum bonum* since that may

entail a budget in excess of what it can provide. This is encompassed here by saying that the transactions cost is high, that is, the state has to resort to extraordinary financing to effect the intervention.

The following implements Williamson's *net gain calculus*:

Definition 5 (state failure and success): Let *m* be a direct intervention implemented by the relevant state to replace *r* with allocation $h \in A^*$ (alternatively to replace *R* with R^h) under *G*. Let $TC(h, m, s, G) \geq 0$ be the transactions cost of intervention *m* by the state *s* to install *h* under rules of the game *G*. We say that intervention *m* by the relevant state is: (i) a *state success* if it is net gain positive, that is,

$$W(h) - TC(h, m, s, G) \geq W(r); \tag{1}$$

(ii) a *state failure* if the sign of the above inequality (1) is strictly reversed.

We give examples of $TC(h, m, s, G)$ for particular interventions. Suppose a public goods failure such as the absence of a bridge across a frequently crossed body of water: the information cost may involve the cost of undertaking the field study to determine whether the bridge will improve social welfare (usually gauged by the estimated "social rate of return" and the determination that the bridge is the best intervention); the execution cost consists of the drawing up of the project specifications/bid documents on top of the cost of construction, including right of way provision and other costs of overcoming resistance, etc. If the market failure is a negative externality like effluent discharge unto a body of water, the information cost includes the cost of determining the damage and which intervention will work best, say, between the Coasian property rights approach and a Pigovian tax. If the latter, the cost of designing and implementing a truthful revelation mechanism that ferrets out the true marginal utilities (disutilities) of affected parties, while the execution cost will be cost of monitoring violations, collecting, and enforcing the tax.

Note that in the Definition 4 above, the welfare outcome is reckoned ex post—after the intervention *m* has been implemented. Definition 4.ii really defines "state failure by commission": the state implements *m* which results in a welfare gain/loss. The state can also fail if it knowingly refuses to implement a welfare-improving intervention. We have the following:

Definition 6: Suppose intervention *m* in possession of relevant state is such that, if implemented, $W(h) - TC(h, m, s, G) > W(r)$ holds and, moreover, the net gain of the intervention is the highest among all known alternative uses of available state resources. Then state commits a "state failure by omission" if it fails to implement *m*.

Remark: State failure by omission is really the formal counterpart of the familiar charge "sleeping on the job" often hurled, many times loosely, against public officials. This is a state failure because the state foregoes the highest potential welfare gain for society.

Remark: The second condition of the definition "moreover the net gain of the intervention is the highest among all known alternative uses of available state resources" indicates that the state is minimizing opportunity cost as well. The state, at any given time, may be confronted with many competing welfare-improving interventions. A state failure by omission arises only when it fails to implement, using available resources, the one with the highest welfare gain.

Remark: The divide between state success and state failure is therefore relative to the capacity of the relevant state as reflected by $TC(h, m, s, G)$ whose level is determined by the informational, technical, and agential deficits of the state as well as the rules of the game G. If $TC(h, m, s, G) = 0$, state success is guaranteed as long as it chooses from a non-empty A^* as its target.

Remark: After the state has efficiently implemented h, the replacement regime R^h is only locally efficient (only relative to R); it may not be globally efficient; allocation h may still be welfare-dominated by still another allocation h' in A^* and some m' may further install h'. The state may with improved capacity proceed to pursue h' or may switch attention to correcting another market failure which offers a higher welfare gain.

The transactions cost of intervention here is charged against the notional post-intervention aggregate welfare $W(h)$. The transactions cost may include the cost of rendering everyone better off, say by some compensation scheme designed to improve the social desirability of intervention m. Thus, the identification and implementation of a (Pareto efficient) Coasian bargain is part of the cost. It may be financed by assessing each member a tax against his individual utility at h, his share in TC being equal to his share in $W(h)$. The cost of raising the financing via taxation is also included in the TC.

A state failure is a certainty if the targeted h is not in A^* and $TC > 0$. A state failure of this type may happen for many reasons: because the state faces an information-deficit regarding A^*, or the state authorities may be pursuing a non-benevolent goal and deliberately choosing an allocation outside of A^*.

We now present a new taxonomy of failures.

4. Proto-failure, market failure, and RC-efficiency

When the relevant state is imperfect, the set of so-called failures that can be welfare-improved upon by the state shrinks dramatically. This effectively partitions the space of so-called market failures into two: those that the relevant state can remedy with a social welfare gain and those that it cannot. A market regime R that cannot be welfare-improved by the relevant state must be considered in a different light than one that can. As earlier observed, this R can be viewed as efficient in the sense of "constrained Pareto" or the "remediableness criterion". Upon the capacity of the relevant state now depends whether R is or is not remediable.

The partition of the market failure space however no longer exhibits spatio-temporal invariance, as Pigou correctly implied. It changes from jurisdiction to jurisdiction and within the same jurisdiction at different points in time. A regime R which is a remediable in Berlin may not be so in Djibouti because of the difference in state capacity in these localities. A market that is irremediable today in Djibouti may become remediable tomorrow if the state's capacity improves sufficiently. We propose, therefore, a new taxonomy based on the capacity of the relevant state. In lieu of the label "market failure" applying to both remediable and irremediable cases, we propose the term "proto-failure".

Definition 7: A market regime R is a "proto-failure" (PF) if A^* is non-empty.

The label "proto-failure" replaces the label "market failure" (Definitions 1 and 3) in the orthodox literature. Proto-failure is, like its predecessor, a purely technical concept anchored on the technical existence of an allocation that delivers a superior welfare outcome in a technical sense only regardless of whether or not R is remediable by the relevant state. Thus, a proto-failure is invariant across space and time. A natural monopoly is a proto-failure whether in Berlin or Djibouti. We now define interventions and their transactions cost anchored on the capacity of the relevant state:

Definition 8: Let $M^*(r, h, s, G) = M^*$ be the set of interventions such that for every $m \in M^*$, deployment of m replaces r with some $h \in A^*$ and realizes a net welfare gain, that is, $W(h) - TC(h, m, s, G) > W(r)$.

Remark: M^* is the *efficient intervention set* accessible to relevant state s in respect to R. Every element of the intervention set M^* employed by s realizes a net welfare gain.

Remark: M^* may be empty due to informational, agential, or organizational deficits of the state. If, for example, the binding constraint is informational, the

employment of an expert may render a previously empty M^* non-empty. M^* may be initially empty due to high agency cost of state procurement, but if outsourcing the procurement to a private entity suddenly opens up due, say, to a change in the law, it can render M^* non-empty.

Remark: If R is not a proto-failure, M^* is by technical reasons empty. If R is a proto-failure, M^* may still be empty due to the capacity constraint translating into high transactions cost of the relevant state s. This can be high due to either the high cost of the information and/or the high cost of implementation (agency, organization and political adjustment) of m.

Note that the transactions cost of intervention m is now contingent on the relevant state s. The efficient intervention set M^* of state s may be empty while that of another state, $s^\wedge$, is non-empty. The transactions cost incurred by s dictates whether M^* is empty.

Following Williamson's remediableness criterion (RC), we define the two important sub-classes of proto-failures based on the emptiness or otherwise of M^*:

Definition 9: A proto-failure R is: (i) a "market failure" and only if the M^* of the relevant state s in respect to R is non-empty; (ii) RC-efficient if and only if the M^* in respect to R of s is empty.

Remark: The market failure in Definition 9.i is in the sense of Pigou II. It is a proto-failure that is remediable by the state s.

Remark: R being a market-failure in the sense of Definition 9.i will not always result in a net-welfare improving intervention. The reason can be either benevolence-deficit or information-deficit on the part of the state s. A state may also choose an intervention m outside of its M^* because it is in pursuit of ends other than social welfare or because it has imperfect knowledge of M^*. In either case, the intervention m will result in a state failure. State s is a benevolent state if having zero information-deficit, the intervention it employs is always an element of M^*.

M^* being non-empty means that the market regime R is "remediable" by the relevant state s, that is, there is at least one intervention that is informationally, agentially, and technically accessible to s or its organs that efficiently replaces r with some h in A^*. Thus, R is a market failure if and only if it is a proto-failure that can be welfare-improved upon by the relevant state s. The boundary between the two classes is not fixed. This new taxonomy thus follows the Wiliamson's [2009] counsel of "pushing the logic of positive transactions cost to completion".

5. Claims and examples

We now have the following relations:

Claim 1: If the state is perfect, every proto-failure is a market failure (alternatively, the set of RC-efficient proto-failures is empty).

Proof: Suppose R is a proto-failure, then A^* is non-empty. Then there exists an $h \in A^*$ such that $W(h) > W(r)$. By Definition 4a(ii) of a perfect state we have that $TC(\cdot)=0$ and therefore $\exists\ m \in M^*$ that attains h. Therefore, the set M^* is non-empty.

Remark: The set of market failures in the textbook sense coincides with the set of proto-failures precisely because given a perfect state all proto-failures are remediable.

Claim 2 (i): If the state is perfect, a proto-failure is a sufficient condition for a welfare-improving state intervention. (ii) If the state is imperfect, a proto-failure is a necessary but not a sufficient condition for a welfare-improving state intervention.

Proof: (i) Suppose R is a proto-failure. Then A^* is non-empty, or there is an $h \in A^*$ such that $W(h) > W(r)$. (i) Since the state is perfect it will always choose an element h of A^* to target and its transactions cost $TC(h, m, s, T) = 0$. Thus $W(h) - TC(h, m, s, G) > W(r)$. Thus, a proto-failure is sufficient for a net welfare-improving intervention. (ii) Suppose the state is imperfect. It incurs a positive transactions cost $TC(h, m, s, G) > 0$ by its intervention m. If $W(h) - W(r) < TC(h, m, s, G)$, then m is a welfare-reducing intervention. If, on the other hand, $W(h) -W(r) > TC(h, m, s, G)$, m is a welfare-improving intervention. Suppose R is not a proto-failure. Then $W(h) \leq W(r)$ or A^* is empty. Then $W(h) - W(r) < TC(h, m, s, T)$ and m is a welfare-reducing intervention. Thus, a proto-failure is necessary but not sufficient for a welfare-improving state intervention.

Thus, the new taxonomy is equivalent to the old market failure taxonomy if and only if the state is perfect.

To illustrate the notions set down above, we give some examples.

Example 1 _Laissez-faire_ monopoly: Let the status quo R be an unregulated privately-owned natural monopoly in a market with substantial scale economies. It operates by the profit maximizing condition $MR = MC$. This in turn generates the monopoly welfare outcome $W(r)$, which is the sum of the consumer's and producer's surplus. This is a stable equilibrium under no intervention. R is a

proto-failure because there is at least one technically feasible welfare outcome $W(h)$ where h is the allocation supported by $p = MC$. This welfare-improves the private monopoly status quo given the same endowment, taste, and technology, that is $W(h) > W(r)$. Thus h is in A^*. One intervention it can employ is "state ownership" (*SO*). If the nationalized firm operates at $p = MC$, the deadweight loss is zero and consumer's plus producer's surplus is maximized. If further, the transactions cost associated with state ownership is less than the recouped deadweight loss, the intervention SO is an efficient intervention. We say that *SO* $\in M^*$ and the latter is non-empty. But the transactions cost incurred for *SO* by *s* could also be very high. Political interference, soft budget constraint and agency problems such as cited by Sidgwick and Marshall can raise the per-unit cost of output and incur losses for the state firm creating a fiscal drain for the state (Cook and Fabella [2001]). If the transactions cost associated with state ownership is very high, it may exceed the recouped deadweight loss and the intervention *SO* is not in the M^* of *s*. Now there can be many other interventions apart from *SO* that the state can deploy against R, say, different forms of monopoly regulation. If at least one of the latter, say a price cap regulation, when employed by the relevant state net-welfare improves R, then R is a market failure in the sense of remediable. This means that the efficient intervention set M^* of *s* is non-empty. The state can welfare-improve R. If the welfare-improvement represents the best use of the budget (zero opportunity cost) and the state does not intervene the market failure R is also state failure by omission. It may also happen that none of the possible interventions available to state *s* at that time is net welfare-improving because the informational, the technical, managerial and political costs of every conceivable intervention are so high that M^* is empty for *s*; then R is *RC*-efficient for that time and space. But as technical, informational and organizational capacity of *s* advances, R may move from *RC*-efficient to a market failure.

Example 2 Decentralized allocation game: Let the decentralized economy R consist of two agents U and V with utility $u = x^{1/2}$ and $v = y^{1/2}$ where x and y are shares of U and V, respectively, in total resource B. The decentralized problem is that U and V must agree on a device to allocate B among themselves exhaustively. The feasible set is $A = \{(x, y): x + y = B\}$. Suppose society is benevolent and always maximizes the social welfare function, $W = u^{1/2} + v^{1/2}$. The allocation $(x^*, y^*) = (B/2, B/2)$ uniquely maximizes W. Suppose that the decentralized *laissez-faire* exchange R solves the problem by the allocation $r = (x^\wedge, y^\wedge) \neq (B/2, B/2)$. Any $(x^\wedge, y^\wedge) \neq (B/2, B/2)$ is welfare-dominated; thus A^* is non-empty and R is a proto-failure. For illustration, let $B = 18$ and the decentralized allocation be $(x^\wedge, y^\wedge) = (2, 16)$. The welfare outcome of decentralized exchange is $W^\wedge = 2^{1/2} + 16^{1/2} = 1.41 + 4 = 5.41$. That of the optimal $(B/2, B/2)$ is $W^* = 3 + 3 = 6 > W^\wedge$. Suppose that the state is benevolent and does not have an information deficit: it knows the utility functions of U and V, the *laissez-faire* equilibrium $(x^\wedge, y^\wedge)$ of

R and its being a proto-failure in the sense that it knows allocation (9, 9) to be socially superior. Suppose it knows that the decentralized outcome is generated by bargaining rules of the game between the agents which respects the players unequal maximin positions (say, Nash bargaining) which is an inherited political settlement. Can state intervention aimed to install allocation (9, 9) do better? The state intervention *m* may, for example, mandate the use of the "I cut, you choose" allocation mechanism which forcibly disregards the individual maximin positions but will generate the favored (*B*/2, *B*/2) solution. But this does some violence to the inherited political settlement and will normally be politically resisted especially by the favored agent *V* who originally gets 16 units, though applauded by *U* who gets 2 in the status quo. Overcoming this resistance entails a resource cost *TC* associated with convincing *V* to agree; for example the state makes the two players agree to a contract whereby *U* gives up enough to *V* so that $v = (16)^{1/2} + \varepsilon$, $\varepsilon \geq 0$. If *U* gives up 1 after receiving 3, it still has 2 > 1.41, its original position. Meanwhile *V* still gets its original 4. If the relevant state is perfect (benevolent and incurs *TC* = 0), then the state will employ *m* to secure the welfare maximizing (*B*/2, *B*/2). In this case, *R* is a market failure. Suppose, however, that the relevant state is imperfect and faces a *TC* > 0 to do the same. This cost comes from, say, getting the relevant information, crafting the intervention and overcoming the political resistance by *V*. Let this particular intervention *m* incur a *TC* = 0.20. Then the net gain of employing *m* remains positive: (*W** – 0.20) = 5.80 – 5.41 > 0. Taking 0.20 from *U* still gives him 1.80 > 1.41. Thus *R* is a market failure in the sense that the efficient intervention set is non-empty. If, however, every intervention *m* accessible to the state has a *TC* > 0.60, then the efficient intervention set *M** is empty and *R* is *RC*-efficient. It is also possible that the state is benevolent but faces an information deficit. Suppose the deficit is in the form of ignorance of the utility functions of *U* and *V*. Then the state may fail to recognize that allocation (2, 16) is a proto-failure. Indeed, suppose the utility function of *U* is $u = x^{1-\varepsilon}$ and of *V* is $v = y^{\varepsilon}$, $0 < \varepsilon < 1$, the allocation (2, 16) is a utilitarian maximizer for some $\varepsilon \rightarrow 1$. Overcoming the information deficit would entail devising a truthful revelation mechanism which may be costly. If *TC* > 0 is high enough, then *R* is *RC*-efficient or constrained Pareto.

6. Why the new taxonomy matters

The proposed taxonomy starts from the assumption of an imperfect state. Normative public policy analysis still largely assumes an over-arching perfect state. If the policymaker is the perfect state, every market failure can be welfare-improved by state intervention. There is an implicit bias for intervention in the policy analysis. This reinforces a more general moral hazard proclivity among policy makers. Every policy maker, even well-meaning ones, faces a skewed risk-reward gamble: either he does nothing and faces the almost certain criticism for "sleeping on the job," or he intervenes, earns the plaudits of winners, and risks

the remote, uncertain, and easily rationalized cost of a mistake. A bad outcome after all can be blamed on peripheral excuses as insufficient budget and bad luck. Likewise, if policy turns out wrong, the mess will fall on the lap of subsequent administrations. The label proto-failure like the old market failure also suggests a foregone welfare, but it does not indict the market or private action as the culprit.

Why is this of substance? F. Hayek [1988] vehemently argued that man is afflicted with a "fatal conceit": the innate self-belief that he can always replace with benefit a spontaneous order with a purposively engineered order. And a *laissez-faire* market is a "spontaneous order," which emerges out of men's repeated interactions and not by men's deliberate design. For the ordinary mind, Hayek claims "…can conceive of order only as the product of deliberate arrangement…" [1998:45]. Without a recognizable designer, chaos is predicted to rule. This conceit is reinforced by engineering feats that tame nature such as the Holland Dykes and the Three Gorges Dam. Hayek furthermore argues that words contain implicit directions for behavior. Labeling some women "witches" meant a call to burning at the stake. Likewise, the old textbook label "market failure" obliquely frames the market (*laissez faire* or its crude counterpart "letting alone," or worse, "doing nothing") as the causal root of failure. Thaler and Sunstein [2008] following Kahneman, Tversky, and Slovic [1982] earlier showed how behavior is heavily influenced by how options are framed. The old taxonomy implicitly blames *laissez faire* or the market as villain. It thus reinforces the natural human aversion for the trial-and-error and contingent character of an extended spontaneous order. Sweeping away the culprit becomes a natural behavioral response.

By contrast, "proto-failure" is agent-neutral. It is akin to an "act of God". Likewise, the new label "market failure" puts the burden of proof squarely on the door of the would-be interventionist or his/her advisor—he/she must ex ante show that he/she can indeed improve on the spontaneous arrangement. This contrasts with the textbook label "market failure" which, like a disease, cries out for immediate remedy. Hayek concludes, "The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design." Good economics should be among others a lesson in humility.

7. Conclusion

This attempt to re-think the textbook concept of market failure starts from the assumption that every intervention to improve upon a market failure is effected by an imperfect state. We reviewed the imperfect state tradition in the pre-WWII era before it eclipsed in the 1950s under the combined withering onslaught from the Arrow Impossibility Theorem, the Arrow-Debreu paradigm, the embrace of the Samuelsonian "benevolent central planner", the acclaim accorded Keynesian macroeconomics, and the grudging recognition of the Socialist central planning. These underpinned the "perfect state tradition" in policy analysis. The imperfect

state tradition was given a new push in the early 1960s with the Public Choice Revolution starting with Coase [1960] and Buchanan [1962] and further impetus by Williamson [1975] but remained a decided subculture in economic policy analysis.

The attraction of a perfect state assumption is that there is only one way for the state to be perfect, while there are innumerable ways for a state to be imperfect. Dixit [1996] renders Samuelson's *benevolent* central planner as an "omniscient, omnipotent, and benevolent state". In this paper, the perfect state is one that is benevolent and intervenes with zero transactions cost. So endowed, the perfect state cannot but make the "*maximum maximorum*" as the target of state intervention. The implication is straightforward: every market failure, defined as a regime R which does not attain the *maximum maximorum* can be improved upon.

The dynamic of normative policy analysis changes drastically when one moves from the perfect state to the imperfect state. The imperfect state is defined economically as one that is either non-benevolent and/or its intervention entails a positive transactions cost. If so, this effectively partitions the set of market failures into two: those that the state can and those that the state cannot improve on. The same message is implied in the Diamond-Stiglitz notion of "Constrained Pareto," a market failure that a state cannot improve upon because, like market agents, the state is information-constrained. Using the same label "market failure" for both is productive of much mischief.

We propose an alternative taxonomy based on the transactions cost of intervention by an imperfect state. A regime R is a "proto-failure" if its *laissez-faire* solution r is welfare-dominated by another outcome h in the same feasible set A. A "market failure" is a proto-failure that can be improved upon by the relevant state. An "*RC*-efficient" regime is a proto-failure that cannot be welfare-improved upon by the relevant state. The relevant state is the state under whose jurisdiction the regime R is located. The transactions cost of intervention depends upon the capacity of the relevant state. Since this capacity varies across time and space, the boundary between market failure and *RC*-efficient regimes is not fixed. We illustrated these concepts by familiar examples of failures. Finally, we argued that contrary to the old taxonomy, the new taxonomy will serve as a pushback to what F. Hayek called "fatal conceit": where men of authority believe they can always do better than inherited "spontaneous order" exemplified by the market. ∎

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