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Introduction to Anti-Competitive Market Distortions and the Distortions Index

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CONTENTS

Executive Summary	2
Introduction	3
Literature Review	4
Constructing the Distortions Index	6
Property Rights Protection	6
Domestic Competition	9
International Competition	12
Combined Effects	13
Data	14
Productivity Model	15
Domestic Credit Stock	16
Stock of FDI (Foreign Direct Investment)	17
Health Expenditures	18
Fuel Exports, and Ore and Metal Exports	19
School Persistence	19
Results	20
Conclusion	22
Appendix I: Estimating Weights	23
Appendix II: Results of Distortions Index	25
Appendix III: Countries Analysed in Distortions Index	27
References	28
About the Authors	32

EXECUTIVE SUMMARY

Post-Soviet era economic liberalisation has hit a roadblock in the form of anti-competitive market distortions (ACMDs). Popular discontent with free-market capitalism, including the common sentiments of feeling “left behind” in a “rigged game”, is actually a reflection of these pernicious distortions. Local-content requirements, onerous and scientifically unnecessary technical standards, and the favouring of state-owned enterprises are just three examples of the sorts of barriers to entry and competition-dampening policies which produce distortions. Distorted economies promote crony capitalism by enabling a few privileged gatekeepers to collect the gains from trade before they can be distributed to the public. The complexity and breadth of this issue have made it an especially difficult one for policy-makers to tackle.

Traditional multilateral trade negotiations have effectively reduced tariff barriers at the border, but wholly failed to address these behind-the-border barriers which directly affect competition. Some bilateral and plurilateral negotiations have enjoyed greater success in reducing distortions, but a recent political swing towards populism and protectionism across developed countries has ushered in a bleak immediate future for the “usual” forms of negotiation. Thus, we advocate concentrated liberalisation in specific zones and deep-integration trade agreements (including provisions on labour) between like-minded countries.

The failure to address competition policy can be witnessed across the global economy, from the oligarchs of the former Soviet Union to the cronies of Latin America who have dominated entire industries in their respective domestic markets. Especially in these developing economies, it is difficult, if not impossible, for governments to provide a remedy once a monopoly or monopsony power is in place. Distortion breeds corruption, which also creates an incentive for government officials to ignore consumer welfare and promote anti-competitive regulations and policies. Maximising consumer welfare should be the singular goal of every trade agreement.

In this paper, we will explain the methodology of our Distortions Index (DI), the first-ever attempt to quantify these distortions on a global scale across the areas of property rights, international competition, and domestic competition.

INTRODUCTION

The last twenty-five years have seen a transformation in many countries from government-mandated economies (command and control for the former Soviet Union, or import substitution for Latin America and India) to more market-based systems. Literature surveys by Holmes, Kitzmuller and Martinez Licetti, the OECD, and the CMA provide substantial evidence from theoretical and empirical literature of the positive relationship between productivity and levels of competition in the economy.¹

However, the last twenty-five years have seen only partial reform. While trade has largely been opened at the border and protection of property rights has become the rule and not the exception, competition on the merits as an organising economic principle remains a rarity. Partial reform has led to crony capitalism, where regulations and laws are manipulated by powerful incumbents to protect their positions from competition. The vector for crony capitalism is an uncompetitive market, or one that is separated from a welfare-enhancing market equilibrium. Therefore, the measurement of deviations from a competitive market is a measure of crony capitalism. In light of the post-crash rise in welfare-destroying protectionism and nationalism, there is a sense of urgency in determining the scale of such distortions.

Competition everywhere faces restraints imposed by governments, either directly through laws, regulations, and practices or through hybrid public-private restrictions, where government allows or encourages private anti-competitive activity. Government-imposed restrictions on competition, which we term anti-competitive market distortions (ACMDs) in accordance with the literature,² are especially pernicious because they are backed by the power of the state and may be largely impervious to attenuation through market processes. In recent years, recognising the harm they cause, international institutions have undertaken efforts to help public authorities identify and categorise ACMDs, and to estimate the consumer-welfare costs of particular ACMDs. The intent of these efforts is to help governments to move away from ACMDs. Such efforts, however, are often stymied by producer lobbies that tend to underplay the harm to consumers.

In this context, the development of a neutral measure—a metric—to derive specific estimates of the harm caused by individual ACMDs would enhance the ability of national competition authorities to build public support for dismantling these undesirable restrictions. Singham, Rangan, and Bradley (SRB) developed a model of domestic government measures that have a distortionary impact on a market by affecting supply and demand, and estimated their effects on consumer and producer welfare.³ We continue this work here by developing a Distortions Index (DI) to gauge the relative welfare impact of different categories of ACMDs across the dimensions of property rights and international and domestic competition. The DI utilises the variation in productivity and economic regulation across countries to compare the level of competition encouraged by the regulatory environment. The differences in productivity are modelled as a function of the regulatory environment, specifically related to the effect of property rights, competition, and trade on the drivers of productivity.

LITERATURE REVIEW

The relevant literature belongs to two areas: governance indicators/indices and competition-distorting government policies.

The use of governance indicators has grown in the past ten years because the availability of data has improved the potential for capturing differences between countries on a number of levels. Merry and others argue that the availability of governance indicators allows policy discussions to move from political debate to technical expertise. A well-defined indicator can drive political action because policy-makers look for evidence when making policy decisions. Kelly and Simmons discuss the importance of numbers as social pressure on states in the formation of policy. Our DI looks very specifically at the role of policy in productivity and can be used to push policy-makers towards a holistic embrace of competition as a driving force for development.

The concept of ACMDs was first introduced by Singham in a study for the Council on Foreign Relations in 2011.⁴ This study created a taxonomy of ACMDs and suggested their potential impact on economies. Singham and Abbott developed the concept of ACMDs further by defining them as restrictions that "involve government actions that empower certain private interests to obtain or retain artificial competitive advantages over their rivals be they foreign or domestic".⁵ The paper provides examples of ACMDs and discusses the inability of the World Trade Organization (WTO) to address such policy issues. It proposes creating a metric for quantifying the impact of ACMDs which would enable governments to weigh the cost of distortionary policies. The International Competition Network is suggested as a vehicle for the study and advocacy of the elimination of ACMDs.

A well-defined indicator can drive political action because policy-makers look for evidence when making policy decisions.

The major contribution of this paper is to formally acknowledge, name, and describe those distortionary policies that tend to fall outside the reach of the WTO and its predecessor, the General Agreement on Tariffs and Trade (GATT), but that have an impact on trade relations all the same. It shifts the focus to the welfare implications of such policies and proposes a framework to consider the true cost of ACMDs. In addition, it equips policy-makers with a counterargument to those in a position to benefit from ACMDs who falsely claim that if they benefit, everyone benefits. This argument rings false, as reducing or preventing competition has deleterious effects on domestic consumer welfare even if domestic producers benefit. The negative effect on foreign competition shows that ACMDs should be considered in trade negotiations too. Thus, the paper demonstrates that ACMDs influence both domestic and international welfare and should be attacked using the tools of both trade and competition law.

Building on this work, SRB furthered the theoretical work on ACMDs and began to frame an empirical approach to analysing their welfare effects. SRB begin by classifying ACMDs in single-product markets into six major types and subtypes (where appropriate). Briefly, the major types are:

1. Government laws, regulations, or practices that eliminate competition completely;
2. Government laws, regulations, or practices that lessen competition;
3. Laws or regulations that are applied differently among firms, or regulatory exemptions given to some firms;
4. Distortions caused by state-owned enterprises (SOEs);
5. Action or inaction by competition agencies; and
6. Anti-competitive state aid or support.

Each type of distortion in a given country has an impact on domestic producer surplus, foreign producer surplus, and consumer welfare in the short and long run. The size of the impacts depends on the type of distortion, the structure of the market at which it is directed,⁶ and the form of the policy itself. SRB introduce a model which takes a general perspective on the nature of these ACMDs. Each type is shown to have an effect on either domestic or foreign producers' costs in the distorted market or abroad. These cost effects are modelled in a partial equilibrium context focusing on a single-product market in the short run. The long-run implication for consumer welfare is later described. Finally, Indian sugar and Chinese cotton ACMDs are analysed using the SRB model.

This paper produced two major policy contributions: a broader understanding of what constitutes an ACMD, and a system of classification for individual policies. In order to quantify the welfare effects, we first need to identify whether a welfare effect may exist. If a proposed policy fits into one of the six types of ACMDs, it will likely have a welfare effect. Then, the nature of the ACMD needs to be defined. This is accomplished by detailing how the proposed policy may affect the relative costs of producers.⁷ Knowing how costs are affected provides the context for modelling the potential impact on the structure of the market targeted by the ACMD. For example, if a policy provides subsidies to domestic farmers (ACMD type 6), this will artificially reduce the costs of those farmers and give them an advantage over foreign farmers in domestic and international markets.⁸ To model the potential effect of the ACMD then requires simulating the effect of the cost savings on the structure of the market.

Keep in mind that ACMDs can be generally classified as (1) governmental restraints that distort markets and lessen competition, and (2) anti-competitive private arrangements that are backed by government actions.⁹ Both varieties of ACMDs can manifest themselves as (i) limitations on the number and range of competitors, and (ii) restrictions on the ability of companies to compete.¹⁰ The first general classification is also manifested as (iii) favouring state-owned enterprises.

Next, we discuss our method for constructing the DI.

CONSTRUCTING THE DISTORTIONS INDEX

Each country receives a score for property rights protection, domestic competition, and international competition. Each score is equal to a weighted average value of a set of subcategories, and these subcategories themselves are equal to the weighted average value of a set of variables representing various economic policies. This section sets out the relative scores and the process for determining these scores.

The model we have developed for calculating scores is based on the notion that the three pillars of economic development are property rights, domestic competition, and international competition.¹¹ The figure opposite represents the relationship between these three pillars. Property rights protection is the key issue on which the other two pillars are built and each pillar's impact on productivity depends on the value of the other two pillars.

Different factors in various indices, such as the World Economic Forum Global Competitiveness Index, the World Bank Doing Business Index, and the Heritage Foundation Index of Economic Freedom, can be indexed into the triangle opposite to create a relative score for each country with respect to each section of the triangle.

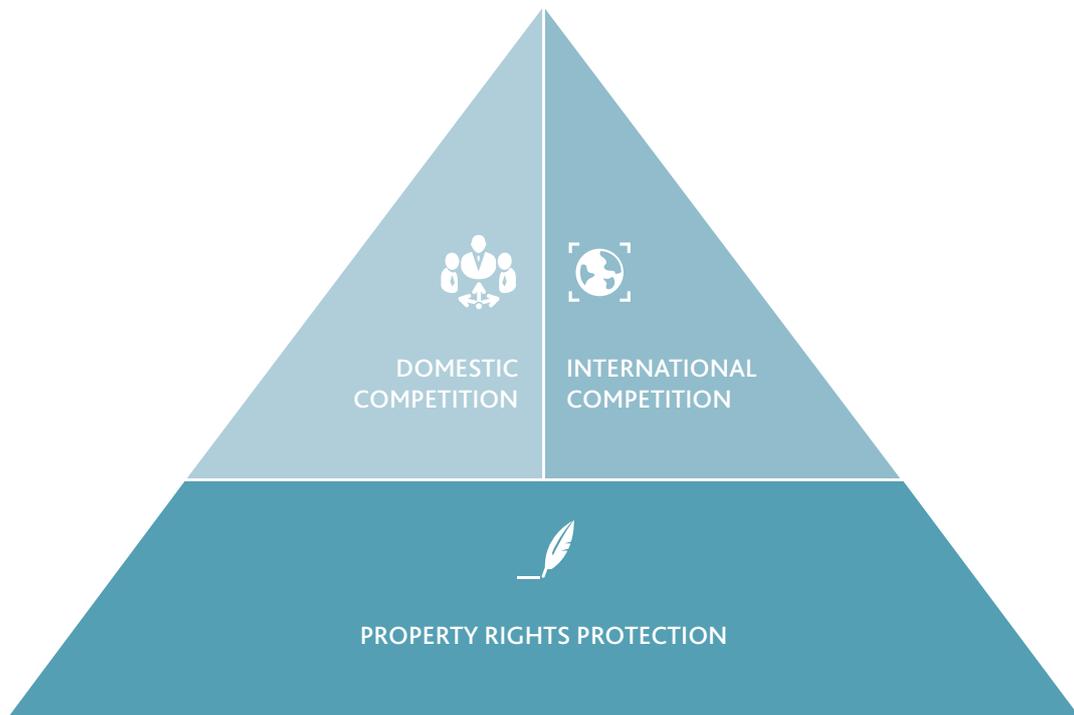
The goal of building these pillars was to give countries a score for each pillar which reflects the degree to which policy in that area promotes welfare-maximising competition. To achieve this goal, we had two primary objectives: to create subcategories in each of the three indicators according to economic theory; and, wherever possible, to use actual policy variables instead of outcome variables. To use outcome variables in the construction of our index would be to include the result of combinations of policies as a measure of how distortionary policy is, when what we want is to construct an index which shows which policies are distortionary. However, there were cases when the relevant policy variables were not readily available, or were available for only a subset of our sample, so outcome variables were used in their place.

Each of the subcategories of the property rights protection, domestic competition, and international competition indicators is defined by a set of variables normalised to take on a value of between 0 and 6.¹² The variables are each given a weight within each subcategory.¹³ Then each subcategory is given a weight and the weighted average values of the subcategories generate a score of between 0 and 6 for each pillar. Next, we will discuss why we chose each variable in the index.

PROPERTY RIGHTS PROTECTION

The foundation of a productive economy is property rights protection. If property rights are left unprotected, the incentive to invest, compete, and innovate is lost. If the returns from effort cannot be captured, can be taken away, or cannot be regained if wrongly taken away, what incentive is there to be productive? Furubotn and Pejovich describe the nature of property rights in this way:

“property rights do not refer to relations between men and things but, rather, to the sanctioned behavioural relations among men that arise from the existence of things and pertain to their use [authors' italics] ... The prevailing system of property rights in the community, then, can be described as the set of economic and social relations defining the position of each individual with respect to the utilization of scarce resources.”¹⁴



The authors add in a footnote that “Roman Law, Common Law, Marx and Engels, and current legal and economic studies basically agree on this definition of property rights”. In other words, the very nature of an economic transaction is defined by the right to property.

A lack of property rights protection undermines the ability of economic agents to exist. Particularly in developing countries, establishing and enforcing property rights plays a significant role in creating the preconditions for growth.¹⁵ Therefore, all other factors influencing economic outcomes depend on the level and quality of property rights protection.

The subcategories of the property rights protection pillar are intellectual property rights, enforcing contracts, efficiency of the judicial system, integrity of the legal system, and resolving insolvency. These subcategories follow the Heritage Foundation Index of Economic Freedom’s criteria for grading countries in terms of property rights protection.¹⁶ The justification for each is as follows:

Above: The three pillars of economic development

- » Intellectual property rights: these are themselves an important type of property rights and a crucial aspect of economic development.¹⁷ It is necessary to protect intellectual property in order to encourage innovation.
- » Enforcing contracts, efficiency of the judicial system, integrity of the legal system, and resolving insolvency: these subcategories are each different ways that policy can ensure that the effort of agents cannot be wrongfully expropriated, that when a person's rights are violated the process for righting that wrong is not prohibitively expensive,¹⁸ and that the legal system itself has integrity.

The property rights protection pillar score is calculated as follows. Variables have been developed from numerous indicators in other indices (such as the World Economic Forum Global Competitiveness Indicator, the World Bank Doing Business Index, and the Heritage Foundation Index of Economic Freedom). We also assign weights to the different variables, based on both a statistical and an empirical analysis.

Efficiency of the judicial system 30%	Efficiency of the legal framework in challenging regulations—80%
	Efficiency of the legal framework in settling disputes—20%
Intellectual property protection 25%	
Integrity of the legal system 17%	Strength of investor protection—53%
	Legal rights index (financial)—32%
	Judicial independence—15%
Enforcing contracts 15%	Enforcing contracts (cost)—60%
	Registering property (cost)—20%
	Enforcing contracts (time)—15%
	Registering property (time)—5%
Resolving insolvency 13%	Outcome (0 as piecemeal sale and 1 as going concern)—59%
	Time (years)—17%
	Cost (% of estate)—14%
	Recovery rate (cents on dollar)—10%

DOMESTIC COMPETITION

Domestic competition plays a significant role in the efficiency of both domestic and foreign firms. Competition among firms encourages innovation and upgrading of production processes, as well as positive externalities in local markets.¹⁹ Each of these features of competition has a positive impact on welfare.

Typically, the term “competition policy” refers to regulations—and the enforcement of regulations—concerning restraints on competition imposed by private parties. Our domestic competition pillar, instead, captures the extent to which government policy itself restricts competitive behaviour.²⁰ Muris highlights the importance of understanding and correcting restrictive government actions—not just private restrictions.²¹ He compares these two sources of competitive restrictions to the forks in a stream and states that: “Protecting competition by focusing solely on private restraints is like trying to stop the water flow ... by blocking only one channel.” Muris goes on to say that creating a system which prevents anti-competitive behaviour by firms but allows a government to dictate the same anti-competitive outcome that would have resulted from private action has not eliminated the problem, “it has simply dictated the form that the problem will take”.

Domestic competition refers to the domestic policies affecting the way in which firms make decisions and interact with one another. Any policy which limits profit-maximising firms’ ability to make their own decisions will reduce a country’s domestic competition score.²² If a policy reduces the ability of some subset of firms to make their own decisions while not restricting others in the same way, then the domestic policy score will be reduced. However, this does not mean that a country with no regulations controlling the decisions of firms will receive the highest score. The goal of this index and the scores it generates is to allow comparisons between countries regarding the degree to which policy is welfare-maximising.

If welfare is to be maximised, government regulation will be appropriate in many contexts. For example, if a market can be characterised as a natural monopoly, appropriately tailored government regulation may be crucial for welfare maximisation.²³ If there are true market failures that are not being handled through purely private action (severe adverse health effects from pollution, a shortage of funds for post-secondary education, harmfully discriminatory practices, etc.), then government regulation may be necessary.²⁴ These anti-trust, or industrial organisation, types of regulations are part of the domestic competition score. No judgement is made as far as the exact specification of the regulation is concerned. Instead, we measure the effectiveness of anti-trust policy and the cost of adhering to policy.

The domestic competition score is higher when firms are able to make independent decisions. We have an interest in the ability of firms to make independent decisions because we are trying to evaluate how well domestic policies promote competitive behaviour. Competitive behaviour refers to the behaviour firms exhibit in a particular market which will maximise welfare within the market. Therefore, the domestic competition score is higher when policies respond efficiently to market failures and anti-trust violations, but otherwise do not interfere with or dictate firm behaviour. This is because the behaviour of profit-maximising firms—faced with market demand, decisions of competitors, no market failures, no government regulation that is distortive, and no anti-trust violations—will produce and charge a price which generates a welfare-maximising equilibrium. That is, once any market and government failures are corrected for, firms will behave in a way which maximises welfare. Of course, in practice it is often very difficult or impossible to fully correct a market or government failure. However, some countries do

a better job than others in choosing and implementing policies which effectively respond to market and government failures. The closer a country is to actually eliminating a market or government failure, the closer it will be to moving a market towards its welfare-maximising equilibrium.

The subcategories of the domestic competition pillar are efficiency of infrastructure, industrial organisation regulation, regulatory promulgation process, and labour regulation. The justification of each subcategory is as follows:

- » Efficiency of infrastructure:²⁵ infrastructure and the efficiency with which it is built have serious implications for the competitiveness of a country. Reliable, well-maintained infrastructure is a crucial component of efficient markets. Here, the infrastructure subcategory reflects each type of infrastructure in an economy.
- » Industrial organisation regulation: this refers to the regulations which firms must adhere to in order to exist in a market and how anti-trust behaviour is dealt with if it arises.
- » Regulatory promulgation process: this refers to how laws are created. If the government is allowed to make decisions based on favouritism and the process is not transparent, ACMDs can be created at will. There will be no need to disguise them as market failures, or if they are disguised, they will be very difficult to recognise.
- » Labour regulation: labour regulations are defined by how free firms are to hire and fire employees, as well as how firms are then allowed to utilise those workers. Restrictions on the hiring and firing process or deployment of labour decisions will reduce the score for domestic competition. The less flexible policy makes the labour force, the higher the cost of production will be because firms will have to work around or suffer the restriction of each policy.

The domestic competition score is calculated as follows:

Labour regulation 40%	Flexibility of deployment 35%	Fixed-term contracts prohibited for permanent tasks?—55%
		Maximum length of a single fixed-term contract—17%
		50-hour work week allowed for two months a year (seasonal production)—14%
		Flexibility of wage determination—14%
	Ease of recruitment and letting go 65%	Dismissal due to redundancy allowed by law?—60%
		Redundancy costs, weeks of salary—22%
Hiring and firing practices—18%		
Regulatory promulgation process 23%	Favouritism in decisions of government officials—15%	
	Transparency of government policy-making—85%	
Efficiency of infrastructure 20%	Financial markets 45%	Availability of financial services—10%
		Affordability of financial services—22%
		Financing through local equity market—7%
		Ease of access to loans—6%
		Venture capital availability—4%
		Soundness of banks—10%
		Regulation of securities exchanges—17%
		Getting credit—depth of credit information—9%
		Ownership of banks—8%
		Number of banks (per 1,000 people)—7%
	Energy 30%	Getting electricity—cost— 78%
		Getting electricity—time— 12%
		Quality of electricity supply— 10%
	Transportation 15%	Quality of roads—30%
		Quality of ports—25%
		Quality of air—25%
Information technology 10%	Quality of railways—20%	
	Mobile telephone subscriptions—40%	
	Fixed telephone lines— 30%	
Industrial organisation regulation 17%	Individuals using the Internet— 30%	
	Starting a business—paid-in minimum capital (% of income per capita)—33%	
	Starting a business—cost (% of income per capita)—29%	
	Effectiveness of anti-monopoly policy—22%	
	Dealing with construction permits—time (days)—11%	
Agricultural policy costs—5%		

INTERNATIONAL COMPETITION

International competition refers to the degree to which a country allows foreign firms to access its domestic market and the degree to which it allows domestic firms to access foreign markets. Any restriction on the free flow of trade which is not the correction to a market failure will reduce the score for international competition. Greater access to a wider variety of goods benefits consumers and greater access to less expensive or higher-quality inputs benefits firms. Also, exposing firms to potentially more efficient foreign firms promotes innovation. All of these forces combine to generate gains in welfare.²⁶

The policies which reduce the score here are those that make it costlier or more burdensome to transact internationally. The subcategories used to construct the pillar are procedural burden, tariffs and non-tariff barriers, financial restrictions, and freedom of foreigners to visit.

- » Procedural burden: these restrictions slow the flow of goods in and out of a country, which makes trade costlier.
- » Tariff and non-tariff barriers: these restrictions add to the cost of trade or explicitly limit trade in some way.
- » Financial restrictions: these affect the flow of capital. Limiting access to capital reduces production and innovation.
- » Freedom of foreigners to visit: this reflects the general openness of the economy to outsiders visiting. Policies which restrict visitation by foreigners make it more difficult for foreign firms to have a presence in an economy.

The international competition score is calculated as follows:

Procedural burden 52%	Cost to export—31%
	Cost to import—28%
	Burden of customs procedures—17%
	Time to import (days)—13%
Tariffs and non-tariff barriers 35%	Time to export (days)—11%
	Prevalence of trade barriers—28%
	Trade tariffs, % duty—17%
	Standard deviation of tariff rates—10%
Freedom of foreigners to visit 8%	
Financial restrictions 5%	Freedom to own foreign currency—79%
	Capital controls (international)—21%

COMBINED EFFECTS

If one of these three pillars is improved while the other two are left in poor condition, the impact on productivity will be reduced or reversed. For example, if domestic competition is improved by making business registration faster and cheaper, but property rights are left unprotected and international competition is prevented, the impact on productivity will likely be nought. In such an environment, uncertainty over expropriation and weak foreign competition would still exist and drive down productivity.

Without property rights protection, agents cannot act in their own economic interest and improvements in the other two pillars will have no effect on productivity. Domestic competition determines the structure of a country's market, which determines the equilibrium of each domestic market. If firms are not allowed to decide how they will behave, then imported foreign goods will enter an inefficient market and face inefficient constraints on their position in that market. It is possible that distorted domestic competition may help or hurt foreign firms. Similarly, international competition policies can prevent foreign firms from entering the domestic market, or may prevent domestic firms from reaching foreign markets. In either case, the total effect in the long run will be a reduction in welfare.²⁷ Improving each of these three areas simultaneously will have a combined effect. If a country can correct the ACMDs in every area, it can move towards its optimal welfare level. Leaving ACMDs uncorrected in any area will negatively affect the benefits from correcting other ACMDs.

DATA

The data comes from the World Economic Forum's Global Competitiveness Index (GCI), the World Bank's Doing Business Index (DBI), and the World Bank's Global Development Indicators. Any country not used in GCI or DBI was excluded from our data, which reduced the number of countries in our sample to 144. Based on the data available from the Global Development Indicators, we reduced our sample size further to a final 136 countries.

The data from GCI and DBI was organised into the categories and subcategories discussed above. Where possible, we avoided using variables representing outcomes rather than policies. The subcategories within the three policy areas (property rights protection, domestic competition, and international competition) represent the primary components of these policy areas. We organised the data into subcategories which practically and theoretically capture the way policy takes shape in the three main areas.

Each variable is normalised to hold a value between 0 and 6. A value of 0 represents policies which are the least competitive in the world relative to other countries. A value of 6 represents the most competitive policies relative to other countries. By bookending the values of variables in this way, we can later simulate the effect of improving policy while restricting ourselves to an existing ideal.

Based on the data available from the Global Development Indicators, we reduced our sample size to a final 136 countries.

PRODUCTIVITY MODEL

Our model uses GDP per capita as a proxy for productivity, which will be positively related to the level of undistorted competition within a country. We set out to create an indicator which predicts GDP per capita by measuring the prevalence of ACMDs. Our model retains superior objectivity by (1) eliminating outcome variables in every possible instance; (2) foregoing the assumption of equal weights among factors in favour of statistically fitted values; and (3) measuring the validity of its scores using a similar, but more thorough, model to that of the World Economic Forum. Lastly, we assess our results by seeing how they work in the real world.

We model productivity as a function of factors which have a direct impact on productivity in a country. These factors are themselves influenced by the policy decisions of a country. The factors affecting productivity are: stock of foreign direct investment, stock of capital provided by the financial sector, health expenditures, educational attainment, fuel exports, and ore and metal exports. The policy decisions are captured using our three pillars: property rights protection, domestic competition, and international competition.

Productivity is measured in terms of GDP per capita. We estimate a reduced-form model to determine the factors which affect productivity. These factors are themselves influenced by the scores for domestic competition, international competition, and property rights protection. Our productivity model is:

$$\begin{aligned} \log \text{ of GDP per cap} \\ = \beta_0 + \beta_1 \\ * \log \text{ of FDI stock per capita} + \beta_2 * \text{Health expenditures per capita} + \beta_3 \\ * \text{Domestic credit stock} + \beta_4 * \text{School persistence} + \beta_5 * \text{Fuel exports} + \beta_6 \\ * \text{Ore and metal exports} \end{aligned}$$

- » The *log of FDI stock per capita* variable is the logarithm of the stock of foreign direct investment per capita in a given country in a given year and represents the stock of foreign capital available to each person in a given country in a given year.²⁸
- » The *Health expenditures per capita* variable is a dollar value per person spent on healthcare in a country in a given year and it captures the influence of overall health on productivity.
- » *Domestic credit stock* is measured as the value of credit provided in an economy by its own financial sector and is reported as a percentage of GDP.
- » *School persistence* measures the portion of the population that reports to have completed primary school and/or advanced to secondary school. This controls for the human capital stock within a country.
- » *Fuel exports and Ore and metal exports* are both reported as percentages of total merchandise exports and are both controls for differences in productivity which arise from the existence of natural resources within a country.²⁹

The specification of this productivity function follows theoretically from Robert Solow's critique of productivity growth regressions.³⁰ Solow argues for the use of productivity as the left-hand side variable and of factors directly influencing productivity on the right-hand side. Our desire to find the impact of policies on productivity also led to the decision to specify our regression using productivity as the dependent variable because it is differences in productivity—not growth—that we are trying to capture. We want to know how ACMDs are impeding economic efficiency, and thus we want to know what level of productivity countries could reach in the absence of all ACMDs. The path to that particular level of productivity is important and interesting, but it is a separate issue from the one we are exploring here.

Our right-hand side variables also extend from the Solow critique. The types of variables recommended to be used on the right-hand side can be classified into four categories: economic factors, institutions, social base, and physical base.³¹ These categories are partially captured by the variables in our productivity function, but are also covered by means of our ACMD category scores. For further inspiration in specifying our productivity function, we returned also to the traditional Solow model of productivity which models productivity as a function of capital and labour.³² In addition to the traditional approach, our model fully subscribes to the importance of total factor productivity.³³ We will now discuss the factors directly affecting productivity and how the property rights protection, domestic competition, and international competition scores influence these factors.

DOMESTIC CREDIT STOCK

In our model, the effect of capital on productivity includes financial capital and natural resources. *Domestic credit stock* is a measure of capital provided to the private sector by domestic financial institutions expressed as a percentage of GDP. The more credit available (the greater the supply), the easier it will be for firms and individuals to access capital and use it for productive activities. As it is measured as a percentage of GDP, the ease of access is relative to the size of an economy, so it captures the availability of credit given the size of the economy. It means that comparisons made across countries will pick up the relative ease of access to capital. Domestic credit available falls into the Solow critique category of "economic factors".

The amount of credit available domestically will depend on the degree of property rights protection. Weak property rights protection produces uncertainty among borrowers and lenders regarding the likelihood of the terms of their agreement being honoured. This higher-risk environment will de-incentivise lending, especially to "new" or risky borrowers who lack extensive credit histories. In general, investment (and in turn, economic growth) suffer when protection of property rights is uncertain.³⁴

Other things being equal, liberalising financial markets—and markets in general—will increase the supply of domestic credit, which leads to economic growth.³⁵ Increasing international competition will produce improvements in the domestic financial sector by increasing efficiency via competition with foreign providers. Financial institutions are tied—either directly or indirectly through other institutions—to foreign capital. Restriction of a country's access to foreign capital markets reduces the supply of domestic credit.³⁶ Therefore, policies which lower the international competition score of a country also lead to a tightening of domestic credit.

Improving the domestic competition score in a country can be thought of as liberalisation (with an emphasis on liberalisation in every sector, plus government transparency and accountability). The financial crises of the 1990s illustrate why partial reform is the friend of crony capitalism: it yields the instability on which crony capitalism feeds.

In the case of the crises in the West, financial flows were opened by improving international competition without simultaneously improving domestic (behind-the-border) competition. This led to the creation of a financial sector which remained laden with ACMDs inside the border. This distortion was made obvious by the continued existence of state-owned financial services companies (for instance, Fannie Mae and Freddie Mac). This period of liberalisation was characterised by this sort of partial reform. Examples of existing macro-issues which became detrimental once financial markets were deregulated include: unsustainable fiscal policy, defence of unsustainable exchange rate pegs, absence of meaningful oversight, and growing concern over deposit guarantees.³⁷

The financial crises of the 1990s illustrate why partial reform is the friend of crony capitalism: it yields the instability on which crony capitalism feeds.

It is also important to note that significant failures in domestic competition policy have endured in OECD countries. Indeed, many new ACMDs originated in hurried responses to the 2008 crash. While it is not within the scope of this paper to address the causes of the most recent financial crisis, nor to analyse how governmental responses may or may not have played a role in elongating the crisis, we nevertheless note that any deviation from an optimised environment will distort and damage the economy.

STOCK OF FDI (FOREIGN DIRECT INVESTMENT)

Log of FDI stock per capita captures the amount of foreign money that has come into a country and its average distribution. The stock essentially tells us the amount of foreign money available to the average individual. Current flows, on the other hand, will slow down once the stock reaches a certain threshold and pick up if the stock starts to dwindle. The stock of FDI also reflects the openness of an economy. If trade is allowed to flow freely in and out of a country, then FDI stock will be higher because the costs associated with investing will be reduced. FDI brings "needed capital, skills, and know-how, either producing goods needed for the domestic market or contributing new exports".³⁸

Property rights play a significant role in FDI inflows. Strong intellectual property rights protection has a positive effect on FDI inflows since greater intellectual property rights protection attracts investment in innovative technology.³⁹ Ensuring that property will not be expropriated is a necessary insurance for foreign entities considering investment.⁴⁰ FDI is low in developing countries despite potentially high returns because of what Lucas called "political risk".⁴¹ Lucas described political risk as an imperfection or absence in the mechanism for enforcing international borrowing agreements. Put differently, the exceptionally high potential returns offered in the developing world are offset by even higher levels of uncertainty.

Domestic competition-related policies also play an important role in attracting FDI. The less costly it is to start a business, the greater FDI inflows will be—especially in developing countries.⁴² Improving domestic competition regulations can make countries that are less abundant in natural resources more competitive in attracting FDI.⁴³

Other things being equal, reducing or removing trade barriers will increase FDI, as firms considering investment will observe fewer barriers to success. The degree to which open-trade policies or free-trade agreements positively influence FDI is entirely dependent on the “investment climate” and “political stability” in the host country.⁴⁴ Put differently, the quality of domestic competition and property rights protection in a country each combines with the quality of international competition policy to determine the amount of FDI entering the country. If any of these factors is poor, it will divert FDI to a more open, stable environment.⁴⁵

HEALTH EXPENDITURES

The *Health expenditures per capita* variable is a proxy for health outcomes.⁴⁶ The initial goal was to measure health outcomes here, but an ideal single measure of health outcomes is difficult to define because there are many indications of overall health (life expectancy, infant mortality, malnutrition, etc.) and the data for each is not uniformly available. Health expenditures per person are a labour input in the original Solow context. Other things being equal, a healthier population will be more productive.

Improvements in domestic competition will increase the quality of healthcare services, and therefore increase the returns to health expenditures.

Property rights have a mixed effect on health expenditure. On the one hand, if property rights are protected, the returns to innovation can be captured by the innovator, which increases the incentive for novel research. On the other hand, healthcare is an industry which can generally be characterised by highly inelastic demand and the necessity of large financial and time investments for innovation. High costs and inelastic demand can lead to high prices for medications, equipment, and training. In the face of such high costs, limited government resources may be diverted away.⁴⁷ However, increased protection of property rights (particularly patent protection) has a positive impact on the availability of medications across countries.⁴⁸ The negative effect on health expenditures from increased property rights protection is due primarily to increased prices.

Improvements in domestic competition will increase the quality of healthcare services, and therefore increase the returns to health expenditures. Competition among insurers will lead hospitals to lower prices—particularly if insurers are competing for clients.⁴⁹

Health expenditures have become linked to international trade relationships. Health services trade is growing and the potential gains in health outcomes, and therefore returns to health expenditures from trading health services openly, have been documented.⁵⁰ These potential gains can make an important difference globally, as the demand for health services is predicted to grow as populations become “older, wealthier, and subject to more chronic disease”.⁵¹

FUEL EXPORTS, AND ORE AND METAL EXPORTS

The effect of natural resources on productivity is captured using *Fuel exports and Ore and metal exports*. These factors clearly have a direct effect on our measure of productivity because GDP includes exports. When a large percentage of manufacturing exports consists of these goods, the relative productivity of workers will be impacted. *Fuel exports* bias GDP per capita upwards because large export values can be generated with relatively few workers. Oil’s share of GDP reaches almost as high as 50 percent for some countries,⁵² and oil exports can reach a value equal to over 40 percent of GDP.⁵³ *Ore and metal exports* bias GDP per capita downwards because fairly low export values for the volume of goods produced are generated with relatively many workers.⁵⁴ Also, the types of infrastructure and other businesses which exist in high fuel-exporting and high ore and mineral-exporting countries are different from those that exist in other countries. So, these variables capture their direct effect on productivity as well as the indirect effect generated by the relative dependence of countries on these goods.

SCHOOL PERSISTENCE

School persistence is our measure of human capital in a country. The more people who have reported to have completed primary school or attended some amount of secondary school, the better educated the population will be. The higher the level of education, the more skilled, and hence the more productive, the population will be.⁵⁵

Counterintuitively, our model shows that school persistence is largely uncorrelated with our policy indicators. This is probably because school persistence can simply be mandated or prohibited by a government regardless of the quality of domestic competition, international competition, or property rights protection. So, instead, we use school persistence as a control in our productivity function to control for differences in human capital stock. In reality, for a particular country it is likely that improving the regulatory environment may provide a new path to improve education where necessary. Because the pattern across all countries is ambiguous, we treat school persistence as a control.

RESULTS

Each variable is statistically significant at the 99 percent confidence level and the regression as a whole explains about 90 percent of the variance in GDP per capita between countries. This production function captures the determinants of productivity within a country at a given time with a high degree of accuracy. The mean absolute prediction error is about 4 percent, which means that the above regression is roughly 96 percent accurate when estimating GDP per capita when given the values for the independent variables. This level of accuracy is much greater than other comparable indicators, such as the World Economic Forum (WEF)'s Global Competitiveness Index indicators, which have an accuracy of about 19 percent when used to predict GDP per capita.

That is, when using the WEF's own indicators in the regression structure they suggest, the regression has a mean absolute prediction error of about 19 percent. This is probably due to the fact that the WEF's GCI score is a single value which is meant to capture the overall competitiveness of a country, and the indicators therefore generate a weighted average of very different types of variables (such as cost of terrorism and telephony, as one example). Also, the WEF indicators include many variables which are actually the direct result of the competitive environment, as opposed to characteristics of a pro-competitive environment. Finally, the WEF suggests a very simple linear regression which directly estimates the change in GDP per capita through the GCI score and GDP growth. This fails to capture the fact that changing policy does not increase GDP directly (that is, removing a distortion is only productivity-enhancing because it allows participants in the market to optimise their behaviour, not because the policy itself is productive).

To determine the impact of improving a score in one or more policy areas on GDP per capita, we find the impact of changing that score on each of the three policy areas above and then calculate the impact of that change in each of the three areas on GDP per capita. For example, if property rights protection increases by 1, domestic competition equals 4, and international competition equals 3, then log of FDI stock will increase by 1.038, health expenditures by 476.58, and domestic credit stock by 25.93. These increases will then increase log of GDP per capita by 0.55, which is equivalent to a 70 percent increase in productivity.

Using our model, we want to answer the following questions:

1. Which policies influence productivity?
2. How important is each type of policy relative to all other types in determining productivity?
3. If we eliminate ACMDs in a country, what will happen to productivity?

The answer to question 3 can be found by changing the appropriate variables within the subcategories of each policy area. For example, if a country plans to seek workforce flexibility by allowing dismissal due to redundancy and we want to know what effect this will have on productivity (question 3), then the value for “Dismissal due to redundancy allowed by law?” variable in the “Ease of recruitment and letting go” subcategory of the “Labour” subcategory of domestic competition will be changed from 0 to 6. Then the domestic competition score can be recalculated using the change in weighted value of “Ease of recruitment and letting go” and the corresponding change in “Labour”. The change in this value can be used to predict the change in stock of foreign investment, stock of capital provided by financial sector, and health expenditures from changing labour regulation. These changes can be used to predict the change in GDP per capita, giving us a predicted impact on productivity from removing an ACMD.

The answers to questions 1 and 2 can be found within the weightings themselves. The subcategories and variables within those subcategories with the greatest weights have the greatest influence on productivity (question 1). The size of the weight of one subcategory within a policy area relative to another in the same policy area (or the size of one variable within a subcategory relative to another variable in the same subcategory) will tell us the relative importance of subcategories (or variables) (question 2). Also, the model will tell us the real magnitude of removing ACMDs, and so can show real-world impacts of each ACMD type and the size of one impact relative to another.

CONCLUSION

Our alternative model uses loss of productivity as a proxy for welfare loss, and is therefore much easier to deploy for developing country competition agencies and other policy-makers than a standard econometric analysis based on welfare. Future research will focus on building a more dynamic model, improving the underlying data to include only policy indicators, and trying to better understand why the weights look the way they do.

A striking feature of the results of our model is the importance of microeconomic interactions. While most policy-makers focus their attention on the large fiscal and macroeconomic policy tools at their disposal, these microeconomic factors are largely ignored. The Washington Consensus failed in this regard and did not engage with the specifics of building competitive markets by reference to welfare effects.⁵⁶ Arguably, this was a contributing factor to the failure of these first-generation reforms to build competitive markets behind the border. The lack of progress in combatting behind-the-border barriers has led to the highly distorted world in which we now live.

The purpose of this paper is to outline a new approach for comparing the regulatory environment across countries. We have established an objective measure of the degree to which policies are pro-competitive at the country level.

We succeeded in creating this objective measure by (1) demonstrating that the three pillars which underpin economic growth are property rights protection, domestic competition, and international competition; (2) showing that these mutually reinforcing pillars can lead to a poverty-alleviating cycle of growth for countries; and (3) confirming that the absence of any of the three pillars will lead to the destruction of wealth.

The lack of progress in combatting behind-the-border barriers has led to the highly distorted world in which we now live.

APPENDIX I: ESTIMATING WEIGHTS

To calculate the scores for each policy area, we took the data points and arranged them into subcategories in each policy area as described previously. We began by equally weighting each variable within a subcategory, and each subcategory within each pillar. Next, we estimated the following equations:

Equation 1

$$\begin{aligned} \log FDI\ stock = & \alpha_{fdi0} + \alpha_{fdi1} * Property\ rights + \alpha_{fdi2} * Domestic\ competition + \alpha_{fdi3} \\ & * International\ competition + \alpha_{fdi4} * (Property\ rights * Domestic\ comp) + \alpha_{fdi5} \\ & * (Property\ rights * International\ comp) + \alpha_{fdi6} \\ & * (Domestic\ comp * International\ comp) + \alpha_{fdi7} * (Property\ rights \\ & * Domestic\ competition * International\ competition) \end{aligned}$$

Equation 2

$$\begin{aligned} Health\ expenditure\ per\ cap = & \alpha_{(health0)} + \alpha_{(health1)} * Property\ rights + \alpha_{(health2)} \\ & * Domestic\ competition + \alpha_{(health3)} * International\ competition + \alpha_{(health4)} \\ & * (Property\ rights * Domestic\ comp) + \alpha_{(health5)} \\ & * (Property\ rights * International\ comp) + \alpha_{(health6)} \\ & * (Domestic\ comp * International\ comp) + \alpha_{(health7)} * (Property\ rights \\ & * Domestic\ competition * International\ competition) \end{aligned}$$

Equation 3

$$\begin{aligned} Domestic\ credit\ stock = & \alpha_{dcs0} + \alpha_{dcs1} * Property\ rights + \alpha_{dcs2} * Domestic\ competition + \alpha_{dcs3} \\ & * International\ competition + \alpha_{dcs4} * (Property\ rights * domestic\ comp) \\ & + \alpha_{dcs5} * (Property\ rights * International\ comp) + \alpha_{dcs6} \\ & * (Domestic\ comp * International\ comp) + \alpha_{dcs7} * (Property\ rights \\ & * Domestic\ competition * International\ competition) \end{aligned}$$

That is, we predicted the value for the productivity factors using the DI scores and their interactions. We assigned a random weight to each variable in each subcategory and a weight for each subcategory in each policy area. Then Equations 1 to 3 were estimated using Ordinary Least Squares (OLS) regressions. The fitted (or predicted) values for each regression were then used to estimate the regression for GDP per capita. The mean absolute prediction error was calculated as a percentage of GDP per capita. Then the program assigned a new weight to each value and subcategory, re-ran the regressions, and then predicted GDP per capita using the new fitted values. We repeated this process in order to minimise the distance between the mean absolute prediction error and perfect predictive power (0 prediction error).⁵⁷ The resulting weights predicted GDP increases with 93 percent accuracy, using the simple regression set-up, and now predict GDP increases with 96 percent accuracy using the current framework.

The goal was to minimise the mean absolute prediction error of the productivity model, while maintaining statistically significant explanatory power of the scores themselves in the models of productive factors as functions of the scores. The program would throw out any scores which did not yield statistically significant coefficients in the models for productive factors. We also restricted the weights to be integer percentage values (i.e. 1%, 2%, 3%, etc., but not 1.5% or 2.5%, for example) and did not allow any of the data points or subcategories to hold no weight. In the end, the scores which generated fitted values for the productive factors which then yielded the smallest mean absolute prediction errors for the model of productivity were chosen and the weights associated with these scores used.

The likelihood of multiple equilibria is a concern which remains largely unaddressed within the model. One sign that we have discovered a fair representation of reality is the fact that the set of weights which were most similar to the predictive power of our results was similar to the final weights we found. In other words, the sets of weights which were dissimilar to ours also did a poorer job of predicting productivity. While this does not rule out the possibility of another set of weights yielding equal predictive power when no restrictions are placed on weights, it does tell us that within our parameters we have probably found the strongest results possible.

APPENDIX II: RESULTS OF DISTORTIONS INDEX

The coefficients in the productivity function are estimated using an OLS regression with heteroscedasticity robust standard errors. The regression's results are as follows:

log of gdp per capita	Coefficient	Standard error
log of fdi stock	0.362***	0.0254
Health expenditure	0.000258***	0.0000
Domestic credit provided by financial sector	0.00197***	0.0006
School persistence	0.0217***	0.0023
Fuel exports	0.00695***	0.0120
Ores and metal exports	-0.00537***	0.0016
Constant	3.592***	0.1430
N	383	
adj. R-sq	0.903	
*** p<0.01		

Each variable is statistically significant at the 99 percent confidence level and the regression as a whole explains about 90 percent of the variance in GDP per capita between countries. This production function captures the determinants of productivity within a country at a given time with a high degree of accuracy. The mean absolute prediction error is about 4 percent, which means that the above regression is roughly 96 percent accurate when estimating GDP per capita when given the values for the independent variables.

Next, we evaluate the effect of improving a country's score in domestic competition, international competition, and/or property rights protection on the stock of FDI, the stock of domestic credit, and overall health in an economy. Counterintuitively, our model shows that school persistence is largely uncorrelated with our policy indicators. This

is probably because school persistence can simply be mandated or prohibited by a government regardless of the quality of domestic competition, international competition, or property rights protection. So, instead, we use school persistence as a control in our productivity function to control for differences in human capital stock. In reality, for a particular country it is likely that improving the regulatory environment may provide a new path to improve education where necessary. Because the pattern across all countries is ambiguous, we treat school persistence as a control.

As described above, each factor influencing GDP is itself influenced by policy, and these policies determine the scores a country receives for domestic competition, international competition, and property rights protection. Therefore, we estimate the impact of the three policy scores on the productivity factors using Equations 1 to 3.

In each function, the only explanatory variables entering are the scores for the three policy areas. These scores enter the equations alone and multiplied with other scores. The multiplications represent the interaction effects from changing each score included in the interaction. The coefficients on the scores by themselves represent the change in the dependent variable when that particular score changes and the other scores equal zero. For the interactions, the coefficient represents the effect on the dependent variable of changing at least one score while the other score or scores remains constant—and greater than zero—or of changing all scores in the interaction. If none of the scores for a country equals zero, then the effect of changing one score on the dependent variable will be the total of the individual effect plus all of the interaction effects containing the score that is changing. Changing the score for any of the policy categories will impact each dependent variable through the total effect of the interactions and the solo effect.

The results of the OLS regressions above are:

	log FDI stock	Health expenditures	Domestic credit stock
Property rights	-0.652	-3463.2***	-169.5***
	(0.98)	(1059.50)	(39.85)
International competition	-3.011***	-15.02	-133.5***
	(0.71)	(611.60)	(22.51)
Domestic competition	-4.845***	-1498.4**	-129.8***
	(0.74)	(631.30)	(20.82)
Property rights * Domestic competition	0.475**	792.0***	39.13***
	(0.24)	(280.00)	(9.08)
Property rights * International competition	0.374*	496.5**	52.55***
	(0.21)	(245.70)	(9.64)
Domestic * International	1.020***	-115.1	28.68***
	(0.16)	(147.80)	(4.91)
Property rights * Domestic * International	-0.111**	-59.81	-9.895***
	(0.05)	(58.74)	(1.89)
Constant	19.17***	6186.5***	535.6***
	(2.63)	(2194.00)	(78.99)
N	807	803	774
adj. R-sq	0.634	0.623	0.494
Standard errors in parentheses	* p<0.10	** p<0.05	*** p<0.01

It is important to remember that the effects of changing a score in one policy are equal to the total effect from each component of the regression. So, a negative coefficient should not be seen as a negative impact on the dependent variable from improving a score, but should be seen as reducing the positive impact of the effect from the change somewhere else in the regression. This portion of the model explains between 49.4 and 63.4 percent of the variation in the factors affecting productivity.

APPENDIX III: COUNTRIES ANALYSED IN DISTORTIONS INDEX

Albania	Denmark	Kyrgyz Republic	Russian Federation
Algeria	Dominican Republic	Latvia	Rwanda
Angola	Ecuador	Lebanon	Saudi Arabia
Argentina	Egypt	Lesotho	Senegal
Armenia	El Salvador	Luxembourg	Serbia
Australia	Estonia	Macedonia, FYR	Sierra Leone
Austria	Finland	Madagascar	Singapore
Azerbaijan	France	Malawi	Slovak Republic
Bahrain	Gabon	Malaysia	Slovenia
Bangladesh	Gambia, The	Mali	South Africa
Barbados	Georgia	Malta	Spain
Belgium	Germany	Mauritania	Sri Lanka
Belize	Ghana	Mauritius	Suriname
Benin	Greece	Mexico	Swaziland
Bolivia	Guatemala	Mongolia	Sweden
Bosnia and Herzegovina	Guyana	Montenegro	Switzerland
Botswana	Haiti	Morocco	Tajikistan
Brazil	Honduras	Namibia	Tanzania
Brunei Darussalam	Hong Kong SAR	Nepal	Thailand
Bulgaria	Hungary	Netherlands	Timor-Leste
Burkina Faso	Iceland	New Zealand	Trinidad and Tobago
Burundi	India	Nicaragua	Tunisia
Cambodia	Indonesia	Nigeria	Turkey
Cameroon	Iran, Islamic Rep.	Norway	Uganda
Canada	Ireland	Oman	Ukraine
Chad	Israel	Pakistan	United Arab Emirates
Chile	Italy	Panama	United Kingdom
China	Jamaica	Paraguay	United States
Colombia	Japan	Peru	Uruguay
Costa Rica	Jordan	Philippines	Venezuela
Cote d'Ivoire	Kazakhstan	Poland	Vietnam
Croatia	Kenya	Portugal	Yemen
Cyprus	Korea, Rep.	Qatar	Zambia
Czech Republic	Kuwait	Romania	Zimbabwe

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6. "Structure of the market" refers to market size and concentration, as well as outcomes (equilibrium price and quantity).
7. "Relative costs" here may refer to all domestic producers versus all foreign producers; some domestic producers versus other domestic producers and foreign producers; and all domestic producers and some foreign producers versus some foreign producers. Also, the producers may be privately owned, state-owned, or some combination of the two (for example, they may be state-supported).
8. Assuming that transportation cost differences are small or overcome by the ACMD, and that no significant trade barriers or countervailing ACMDs exist within trading partner countries.
9. Singham and Abbott, op. cit.
10. Shanker A. Singham, "Freeing the Global Market: How to Boost the Economy by Curbing Regulatory Distortions", Working Paper, Council on Foreign Relations (October 2012).
11. As proposed and argued in Shanker A. Singham, *General Theory of Trade and Competition: Trade Liberalisation and Competitive Markets*, Kent: Cameron May (2007).
12. Where a value of 0 represents the most restrictive form of policy and 6 represents the most pro-competitive form.
13. Intellectual property protection is both a subcategory and a variable within property rights protection.
14. Eirik G. Furubotn and Svetozar Pejovich, "Property Rights and Economic Theory: A Survey of the Recent Literature", *Journal of Economic Literature*, Vol. 10, No. 4 (December 1972), page 1139.
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16. That is, Heritage Foundation describes why a country receives each level of score, and this in turn provides a framework for the aspects of policy which we considered in building our indicator. www.heritage.org/index/property-rights.
17. For a detailed treatment of the importance of intellectual property rights, see Shanker A. Singham, *General Theory of Trade and Competition: Trade Liberalisation and Competitive Markets*, Kent: Cameron May (2007), chapter 9, footnote 28.
18. Either financially or through time commitments.
19. Michael E. Porter, *The Competitive Advantage of Nations*, New York: Free Press (1990). As cited in Mariko Sakakibara and Michael E. Porter, "Competing at Home to Win Abroad:

Evidence from Japanese Industry”, *Review of Economics and Statistics*, 83.2 (May 2001), 310–22. Positive externalities include “supplier availability, easier access to technology and market information, and specialised human resource development” (Sakakibara and Porter, page 310).

20. As part of our domestic competition indicator, we include an indicator of the success of policy in limiting the ability of private entities to restrict competition through the “effectiveness of anti-monopoly policy” variable in the “industrial organisation regulation” subcategory.
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22. Similarly, the Washington Consensus includes privatisation as one of the ten key areas of development because of the belief that “private industry is managed more efficiently than state enterprises, because of the more direct incentives faced by a manager who either has a direct personal stake in the profits of an enterprise or else is accountable to those who do. At the very least, the threat of bankruptcy places a floor under the inefficiency of private enterprises, whereas many state enterprises seem to have unlimited access to subsidies.” This theory is the backbone of our domestic competition indicator. However, regulation of private markets is not discussed in the Washington Consensus. We correct this oversight by emphasising the importance of policies which allow firms to make their own decisions.
Originally conceived in: John Williamson, “What Washington Means by Policy Reform”, in John Williamson (ed.), *Latin American Adjustment: How Much Has Happened?*, Chapter 2 (April 1990). iie.com/publications/papers/paper.cfm?ResearchID=486. See also www.who.int/trade/glossary/story094/en; www.economicshelp.org/blog/7387/economics/washington-consensus-definition-and-criticism; www.piie.com/publications/chapters_preview/6628/02iie6628.pdf.
23. When changing market characteristics, such as new technologies, eliminate natural monopoly conditions, however, maintaining government regulation may become counterproductive and welfare-inimical, and such regulation should be lifted.
24. Before the government acts, care should be taken to ensure that the private sector cannot adequately rectify the market failure at issue, and that the costs associated with government intervention are not likely to outweigh the benefits that flow from eliminating (or reducing) the market failure.
25. The ideal infrastructure measures would be those that reflected the policy for awarding contracts for infrastructure projects (specifically, for building, managing, or maintaining infrastructure). However, the primary data available is concerned with outcomes, with only a couple of exceptions in financial infrastructure.
26. For a description of the theory, see Claustre Bajona, Mark J. Gibson, Timothy J. Kehoe, and Kim J. Ruhl, “Trade Liberalization, Growth, and Productivity”, prepared for the conference “New Directions in International Trade Theory” at the University of Nottingham, 2008. www.econ.umn.edu/~tkehoe/papers/BajonaGibsonKehoeRuhl.pdf. Note: these authors also highlight the fact that trade openness does not always lead to increased GDP and that the theory does not predict an increase in GDP from openness. The theory does predict greater welfare from openness, however. We use GDP per capita as our proxy for welfare because we do not have a direct measure of welfare. Also, there are many sources which do find a positive relationship between openness and GDP. A few examples include (as cited in Bajona et al., *op. cit.*): J. A. Frankel and D. Romer, “Does Trade Cause Growth?”, *American Economic Review*, 89 (1999), 379–99; R. Hall and C. Jones, “Why Do Some Countries Produce So Much More Output per Worker Than Others?”, *Quarterly Journal of Economics*, 114 (1999), 83–116; F. Alcalá and A. Ciccone, “Trade and Productivity”, *Quarterly Journal of Economics*, 119 (2004), 613–46.
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28. Source: unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sRF_ActivePath=p,5&sRF_Expanded=p,5.
29. Source for health expenditures per capita, domestic credit stock, school persistence, fuel exports, and ore and metal exports: databank.worldbank.org/data/home.aspx.
30. Robert M. Solow, “What Have We Learned from a Decade of Empirical Research on Growth? Applying Growth Theory across Countries”, *World Bank Economic Review* (2001) 15 (2): 283–8; doi:10.1093/wber/15.2.283.
31. *Economic factors* include things such as “size of the government” and “openness of the economy”; institutions include things such as “political stability” and “democratic rights”; *social base* includes things such as “ethnic and religious composition of the population”; *physical base* includes things such as “location of a country”, “climate”, and “access to sea”.
Source: Nazrul Islam, “Determinants of Productivity: A Two-Stage Analysis”, Working Paper Series, Vol. 2005–13, International Centre for the Study of East Asian Development (October 2005).
32. Robert M. Solow, “A Contribution to the Theory of Economic Growth”, *Quarterly Journal of Economics*, Vol. 70, No. 1 (February 1956), 65–94.

33. Total factor productivity (TFP) has been shown to be a key component of productivity as well (for example: Robert M. Solow, "Technical Change and the Aggregate Production Function", *Review of Economics and Statistics*, 39 (August 1957), 312–20; Edward F. Denison, *Trends in American Economic Growth, 1929–1982*, Washington: Brookings Institution (1985); Charles I. Jones, "On the Evolution of the World Income Distribution", *Journal of Economic Perspectives*, 11 (summer 1997), 19–36). TFP is typically measured as the Solow residual, which would be the residual in our model. Our concern here is estimating the effect of removing ACMDs on GDP through the effect of reducing ACMDs on capital and labour. This is essentially the first step in the process of using the ACMD index to evaluate the impact of ACMDs. Future research should attempt to disaggregate the types of inputs (capital, labour, TFP) to find the specific way in which ACMDs reduce productivity and welfare.
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43. E. Nnadozie and A. E. Njuguna, "Investment Climate and Foreign Direct Investment in Africa", Mimeo, United Nations Economic Commission for Africa (2013).
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45. This interdependence has been documented many times. Some examples include: John H. Dunning, "The Role of Foreign Direct Investment in Upgrading China's Competitiveness", *Journal of International Business and Economics* (autumn 2003); United Nations Conference on Trade and Development's World Investment Reports (numerous reports, but the 1998 and 2012 reports focus on trends in determinants of FDI, and investment climate, political stability, and openness of trade are factors in each report).
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56. See note 22.
57. In order to reduce the number of iterations performed, no variables or subcategories could receive a weight of zero. Also, the first iterations only adjusted weights by 10 percent intervals at a time and the set of weights with the highest predictive power were stored. We then adjusted weights by plus or minus 5 percent around the stored weights. The best weights were stored again. Finally, we adjusted by single percentage points up to plus or minus 3 percent around the stored weights. The weights with the lowest mean absolute prediction error in this final iteration are the weights used in the final DI.

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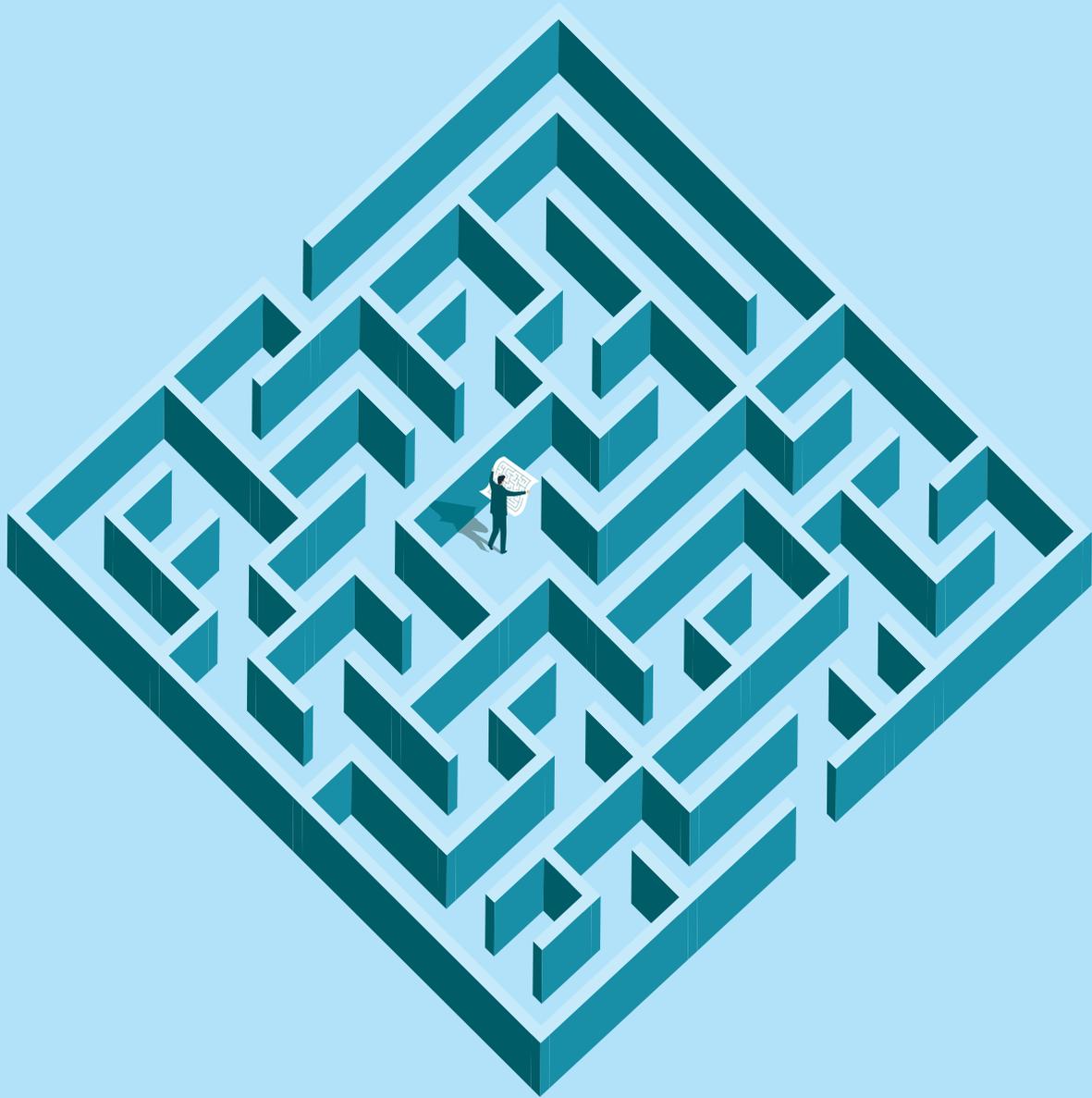
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