Why Small Nations Surprisingly Succeed: Trade, Technology, and the Washington Consensus

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Abstract

This paper analyzes potential population responses to changing patterns of trade and technology. The mechanism studied is in wage-price dynamics, and is novel in its drawing on assumptions surrounding the cheapness of poor nations, on the one hand, and the Washington Consensus, on the other. By re-interpreting a line of reasoning due to Ricardo Hausmann, the paper shows empirically that small nations are economically surprisingly successful. This finding contradicts the implications of theoretical models of national economies where aggregate economic performance draws on diversity, complexity, or increasing returns to scale. For small states to succeed relative to those economies that are larger but otherwise comparable, trade matters importantly. The effects of technological improvement are not monotone, but vary with the wage-price characteristics of those sectors where technology pulls ahead. That advanced technology correlates with complexity is important on average, but less so among the most extreme of national economic successes.

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1 Introduction

This paper analyzes potential population responses to changing patterns of trade and technology. The standard answer is that trade is good for all; so too productivity-enhancing advances in technology. However, while those might indeed be the aggregate welfare-enhancement predictions, what a population responds to is not official accounts of aggregate quantity changes—more goods available ever more readily—but instead that population's directly lived experience, i.e., the impact on the prices of what different segments of the population buy and sell.

Thus, this paper develops a simple analysis of wage-price dynamic responses to trade and technology. It draws on assumptions related to the cheapness of poor nations, on the one hand, and the Washington Consensus, on the other.

Re-interpreting a line of reasoning due to Hausmann (2023), the resulting empirical investigation has as its most significant finding that small nations are surprisingly successful economically. This is not to say all small states are rich; instead, the inverse, almost all rich states happen to be small. Smallness is not sufficient but is (close to) necessary for economic success. The surprise is that despite small economies not having access to the same advantages in diversity, scale economies, and complexity and experimentation, small states can nevertheless succeed beyond their larger counterparts. Moreover, aggregate economic success is not just the preserve of one or two small states, but is enjoyed by a good number of them, each with apparently different special circumstances.

This paper thus focuses on not only the mechanics of aggregate economic performance, but also the domestic political acceptability of different potential drivers of growth, i.e., how a nation's technology advances and how that nation engages with the global economy. This last is not just a matter of export-import statistics but relates to the geopolitical framing of cross-nation interaction.

A critical ingredient in that interaction for the last four decades has been the so-called Washington Consensus (Rodrik, 2006; Williamson, 2002). Section 2 describes its principles clarifying what the Washington Consensus,

sets down and, importantly, what it does not. The conclusions this paper takes from that description are two-fold: the importance of trade openness and the centrality of knowledge transfer. These had also been previously emphasised by Spence (2021) and, I will argue, are the same features that are central in the analysis of complexity and export-led growth in Hausmann (2023).

Section 3 develops a simple analysis of wage-price outcomes in an economy where trade and technology matter for aggregate economic performance. Recall this paper focuses on wages and prices and their implications for the mass acceptability of different channels of growth, and not primarily the mechanics of trade and technology. Hence, the formalism of trade and technology is maximally stripped-down in this section. The discussion brings in a key empirical regularity—the cheapness of poor nations—and builds on the two key planks of knowledge transfer and engagement with the global economy, The analysis here draws from that in Hausmann (2023), but has two critical departures: first, it is not exports that matter, but trade and prices more generally; second, it is not how technology advances that matters, but where those advances occur in the space of prices and wages.

Section 4 analyses the cross-section distribution of per capita GDP to assess the empirical validity of the preceding analysis. The key finding of this section is the surprising economic success of small states, contradicting the implications of theoretical models where growth depends on diversity, complexity, or increasing returns to scale.

Finally, section 5 concludes.

2 The Washington Consensus

"The Washington Consensus" is a phrase that quickly escaped the modest confines envisioned by its 1989 framer, the economist John Williamson. But then again how could it not? In the world then of US-centered unipolarity, the very name suggested not a mild coming together of opinions but instead Washington's actively imposing ideologically-favoured policies on hapless nations. Indeed, the years that followed formulation of the Washington Consensus saw "reforms in Latin America and Sub-Saharan Africa that fundamentally transformed the policy landscape" with "more privatization,

deregulation, and trade liberalization in Latin America and Eastern Europe than probably anywhere else at any point in economic history" (Rodrik, 2006, p. 974).

The Washington Consensus was both applauded and derided even as it grew to near-mythic status. As Williamson (2002) put it, "there are people who cannot utter the term without foaming at the mouth". The phrasing's mix of resonance, controversy, and global aspiration is matched by only a handful of related tropes from the same era: "The American Century", "The End of History", and, from an opposing corner, "BRICs". As with those comparator ideas, the Washington Consensus grew in the public perception to encompass ever larger themes, including ones the original statement explicitly eschewed. The Washington Consensus was something into which even the most thoughtful observers found easy to interpolate narratives of neoliberalism and democratic convergence, even though these were political-theoretic ideas (Fukuyama, 1992; Lipset, 1959) on which technical economics in general and Williamson (2002) in particular had little to say.

In the widespread perception—accurate or otherwise—the Washington Consensus codified a small number of principles that all nations could implement and using those principles as blueprint all nations could grow to the same economic success as that experienced by the US and like-minded allies.

There are multiple, slightly different restatements of the Washington Consensus. To be precise in the discussion that follows I reproduce here the listing given in Williamson (2002) complete with his own annotations, amended for consistency in tense and imperative, and for the switch in authorial voice:

1. Exercise fiscal discipline. (This was for Latin America, "a region where almost all the countries had run large deficits that led to balance of payments crises and high inflation that hit mainly the poor because the rich could park their money abroad".)

2. Reorder public expenditure priorities ("switching expenditure in a pro-poor way, from indiscriminate subsidies to basic health and education").

3. Reform the tax system (to "combine a broad tax base with moderate marginal tax rates").

4. Liberalize interest rates.

5. Float exchange rates to allow their competitive determination.

6. Liberalize trade (noting "difference of views about how fast trade should be liberalized").

7. Liberalize inward foreign direct investment (while explicitly excluding "comprehensive capital account liberalization, because that did not command a consensus in Washington").

8. Privatise industry ("the one area in which what originated as a neoliberal idea had won broad acceptance". Williamson noted that he had "since been made very conscious that it mattered a lot how privatization is done: it can be a highly corrupt process that transfers assets to a privileged elite for a fraction of their true value, but the evidence is that it brings benefits when done properly").

9. Deregulate markets (i.e., ease "barriers to entry and exit", not abolish "regulations designed for safety or environmental reasons").

10. Protect property rights (a statement accepted by many if not all economists, but Williamson also added further that this "was about providing the informal sector with the ability to gain property rights at acceptable cost").

Summarising, the Washington Consensus can be viewed to provide guiding principles in three broad groupings: first, property rights, privatisation, and liberalization; second, monetary and fiscal policy; and third, trade and foreign investment.

Correspondingly, three critical conclusions emerge. First, while the Consensus recommended deploying markets where possible, it did not put blind faith in them. Policymakers were encouraged to liberalize interest and exchange rates; to free up restrictions on trade and foreign direct investment; to privatise industry; and to deregulate markets. But those headline injunctions came with qualification. The 2002 annotations show a consistent pro-poor emphasis: public expenditure should target basic health and education. (Williamson (2002) explicitly listed only these two but Spence (2021) mentions that Williamson had in 2004 also added "infrastructure" as a third target.) Further providing support for the poor is the emphasis

on broad-based taxation and the insistence on halting runaway inflation—which hurts the poor but not the rich. Finally, freeing up markets was with an eye to lowering barriers to entry and reducing cronyism, not about dismantling health, safety, or environmental protection.

Second, the list makes clear that the Washington Consensus targeted not economies everywhere but instead applied specifically to Latin American nations where runaway budget deficits in the final decades of the twentieth century had led to devastating macroeconomic instability. The directive to "exercise fiscal discipline" is appropriate to such a situation whereas in more normal circumstances, the word "discipline" might well be replaced by "responsibility" instead. The Washington Consensus sought to stabilize runaway macroeconomic chaos as much as point the way to sustained growth. Arguably, the Washington Consensus was a statement that sought balance between maintaining geographic humility (Latin America only) and breaking the apartheid between developing economies and advanced countries where the two blocs occupied alternate universes of economic operating characteristics. Was the Consensus meant to apply to growth experiences elsewhere, notably East Asia? It's difficult to be certain. Indeed, Spence (2021), despite making pointed observations about the Asian development experience relative to the Consensus, also suggested that "The Washington Consensus, as far as it goes, is broadly consistent with Asian development strategies" Spence (2021, p. 75).

Finally, the Washington Consensus sought primarily to remove obstacles. It did not, in the main, proactively target specific policies. Even in its statement on spending priorities, the proposed reordering was towards health, education, and infrastructure broadly, not specific, narrow sub-areas in any of those sectors. Most observers would concede that those three target domains are likely hosts for positive externalities and spillovers, so public spending on them would be both appropriate and an acknowledgement that markets alone won't provide an optimal outcome.

If these three conclusions describe the Washington Consensus as a modest kernel of possible policies, then more pro-active supplementary recommendations could certainly be appropriately added. Thus, Rodrik (2006) proposed augmenting the original Washington Consensus list with another ten items, among them installing anti-corruption measures and establishing financial standards; making the central bank independent together with its adopting inflation-targeting; improving corporate governance and rais-

ing labour market flexibility; and providing social safety nets and reducing poverty.

Spence (2021) addressed the question of general applicability by overlaying the Washington Consensus against the backdrop of global growth experiences documented in Commission on Growth and Development (2008). Development trajectories in Asia, in particular, provided stark contrast with Latin America. While Asia's economies had not entirely evaded financial turmoil, as a whole they enjoyed higher growth on average and for longer durations. Economies in Asia relied less on markets for exchange rate determination but instead exercised strong management on their capital accounts and exchange rates. Asia practiced industrial policy: Industrial sectors across Asia continued to see significant state participation, with Asian governments approaching with flexibility the imperative to privatize. On financial crises and macroeconomic instability, Asia's responses have been even sharper than the Washington Consensus: beyond exercising monetary and fiscal responsibility, Asia's policymakers proactively sought resilience and shock-absorber functions in state-owned assets and foreign exchange reserves. The outcome might well have been over-savings. But judgement on that draws on differing estimates on the right degree of prudence and risk aversion, not on disagreement about the intentions of the Washington Consensus.

Finally, Asia's economic policies have conditioned on how its comparative advantage, in the main, has been in its large pools of labour. Economic success, whether in generating growth, supporting incomes, or mass political acceptance, thus requires attention to wage performance.

In Spence's analysis, critical for economic success—both in Asia and more generally—have been two priorities: knowledge transfer and engagement with the global economy. First, high incomes come from high productivity and advanced technology: the fastest, most efficient way to advance techology levels in an economy is through knowledge transfer with the rest of the world. And second all economies, especially poorer emerging ones, are dwarfed in trade and investment opportunities compared to the global economy.

Hausmann (2023) provides an important post-Washington Consensus examination of the two priorities I have just described. Instead of knowledge transfer, he goes directly to technology levels, drawing on the important work on growth and product complexity that he has pioneered

elsewhere (Hausmann et al., 2014).

In the remainder of this paper I build on Hausmann's study to examine the earlier points I raised on the Washington Consensus. My discussion is organised as follows. Section 3 provides an alternative representation of the key ideas in Hausmann's paper. An important driver in this analysis is the empirical regularity that poor countries are cheap. This feature is not considered explicitly in the other references I have discussed, but will turn out to be critical in relating aggregate economic success, technology, and global engagement. My approach and emphases, however, differ from those in Hausmann (2023); so too will be a number of the key policy implications.

Interspersed in Section 3 are already elements of empirical evidence I use to highlight my key points. Section 4 provides empirical evidence that seeks to go further. In contrast to the close examination of growth rates in Hausmann (2023), I examine the cross-nation distribution of GDP levels.

The key finding of Section 4 is that small countries are surprisingly successful economically. Singapore is a tiny sovereign nation with population only 5.6mn and a land area of 734 sq km. It is smaller than New York City or urban London. Yet its per capita income, as an average since 2013, makes Singapore the world's sixth-richest nation in World Bank accounts. The obviously largest nation among the top nine is the US, ranked eighth. This might make it seem that Singapore is an outlier, rich only because of exogenous circumstances unique to it. However, the average population among the nine richest nations, taking out the US, is only 4.2mn, i.e., less than Singapore's. The largest nation in the group, excluding the US, is Switzerland with population (averaged since 2013) only 8.5mn. Among rich nations, small states are not the exception; they are the norm.

At the same time, however, that small nations are the most successful in the global economy, many small states are also among the poorest nations on the planet. Size does not determine economic success, but neither is diminutiveness an insurmountable barrier to economic prosperity.

For this discussion, the most interesting implication of the empirical findings in Section 4 is how the success of small nations sheds light on the channel by which technology advance occurs. Compared to large economies, small nations don't have the luxury of producing a wide range of products, thereby leveraging variety for growth and prosperity. They cannot exploit increasing returns to scale, They cannot rely on using the extreme points of the statistical distribution of scientific discoveries, to har-

vest best practice and ideas as effectively as can a large economy. Nearly the only way by which, in theory, small nations can succeed is exactly by engagement with the far, larger and more diverse global economy. Openness for small states is, indeed, measured as it is for all other states, through exports, imports, and foreign investment. But for small states the consequentiality of these channels of international exchange goes well beyond that for large nations.

Finally, Section 5 summarizes the paper's key findings. Those are threefold: First, poor countries are indeed cheap. Second, in contrast to the focus and indeed the title of Hausmann (2023) the analysis in the current paper suggests that it is trade, rather than exports alone, that should be the appropriate target for policy. Third, small nations are surprisingly successful, in a way that is at odds with thinking that suggests it is economies of scale, diversity and variety, and, by implication, economic complexity that might be the principal drivers for prosperity. Small nations, provided they remain open to the global economy, can draw importantly on different channels of knowledge transfer. Advanced technology levels are indeed critical for prosperity and aggregate economic performance—but they can come through multiple pathways, not only homegrown research and domestic-economy complexity.

3 Poor Cheap Countries in the Global Economy

Two key assertions in Hausmann (2023) are important to highlight. First is that the Washington Consensus doesn't work: Latin American countries that followed Washington Consensus policy recommendations have not been as successful as Asian ones that did not. Second is that traditional growth models also don't work: Demographic-transition explanatory variables—life expectancy, fertility, employment per capita, and female labour force participation—and neoclassical growth factors—workers per capita, capital per worker, education, and urbanization—have all converged across nations. However, per capita incomes remain widely dispersed in the cross section of nations.

Why, if countries have grown so similar in essential economic characteristics, are some nations still so much richer and others so much poorer? The leading explanation for this failure to converge economically is that

countries have differential levels of technology: rich countries have more advanced technologies than do poor nations.

Sharper insight is available drawing on the widely-noted observation that poor countries are cheap.[1] The informal understanding on this is that poor countries use older technology that is cheap. The cheapness of poor economies therefore must confirm the hypothesis that economies are poor because they use less advanced technology.

But experience in less advanced economies suggests that that informal understanding is far from obviously correct. As just one example, recall that in the early 2000s, many poor countries did not have widely available high-speed, broadband WiFi Internet service. Instead, users there had to get by with relatively costly, slow wired Internet cafes. Those last were far from state of the art. In this situation, less advanced technology did not make Internet use cheap. Instead, the opposite: Users in poor countries had to make do with costlier Internet use, not cheaper.

As a second example, consider farming. Traditional agricultural methods that reduce technological input and raise labour intensity are of course appropriate for nations with plentiful cheap labour. But if this makes agricultural output cheap in poor countries, it is because workers there are paid low wages, not because agriculture uses less advanced technology. To see this, simply note that as wages rise, staying with low-technology agriculture quickly results in unreliable and expensive agricultural output. Here, it is not less advanced technology that makes a poor country cheap. Instead, it is low wages.

But, as an empirical regularity, poor countries are indeed cheap. Hausmann (2023, Fig. 1) documents this, as do others, using PPP Purchasing Power Parity adjustment factors. But unless one is clear what convention is being used for numerator and denominator in the definition of a PPP adjustment factor, it will be unclear how exactly a downward-sloping line in that Fig. 1 shows what it intends. (Does a high adjustment factor mean the country is poor? Or expensive? What is the direction of the adjustment?) Since "poor countries are cheap" will be central to the reasoning that follows, it is helpful to be clear how exactly the empirical regularity is understood.

Define U as the number of local currency units (LCUs) needed to pur-

[1] This is also known as the Balassa-Samuelson effect after the economists who early on proposed explanations for it.

chase in domestic markets what 1 international dollar will similarly be able to buy. This variable has dimension LCUs per international dollar. (It is available as PA.NUS.PPP in the World Bank's World Development Indicators database.)

A low U means not many LCUs are needed to make a purchase: it is apparent, therefore, why low U indicates cheapness. But although U begins to get at the idea of the domestic economy being cheap, it also misleads: The variable U can fluctuate with nominal currency exchange rates independent of circumstances in the underlying domestic economy.

So, define R to be U divided by the market exchange rate. Doing so removes the nominal character to U. If one were to bring 1 international dollar to the country, then exchanging that dollar gives the bearer the market exchange rate U/R in LCUs. When one discovers it takes U to make the intended purchase, if R is low and thus U/R is high, then the bearer finds it takes less to make the purchase than the LCU currency holdings obtained using 1 international dollar. Thus low R indicates, in a dimensionless way independent of nominal currency fluctuations, that the country is indeed cheap. This generated variable R directly measures whether an economy is costly or inexpensive. (It is available as PA.NUS.PPPC.RF from the World Bank's World Developments Indicators database.) Call R the real price of the economy; it is, by construction, measured relative to the value of the World Bank's international dollar. An economy is cheap when its price, R, is low.

This reasoning also explains why my empirical analysis will hereafter use incomes measured at market exchange rates, not correcting for a poor economy's cheapness (i.e., using incomes PPP-corrected). Doing the latter makes a poor economy seem larger and more significant in the global economy. While correcting for purchasing power is appropriate for understanding the well-being of a nation's people, it is inappropriate for assessing that nation's international standing and its role in the global economy: jet fighters and Apple iPhones are purchased not with PPP-corrected dollars but with dollars bought at market exchange rates.

In the empirical analysis to follow I present snapshots at the beginning and the end of the available timesample, where beginning means taking the timeseries average over the decade 1980-1989 and end means the timeseries average over the decade since 2013.

Fig. 1 graphs on the vertical axis the real price of the economy R against

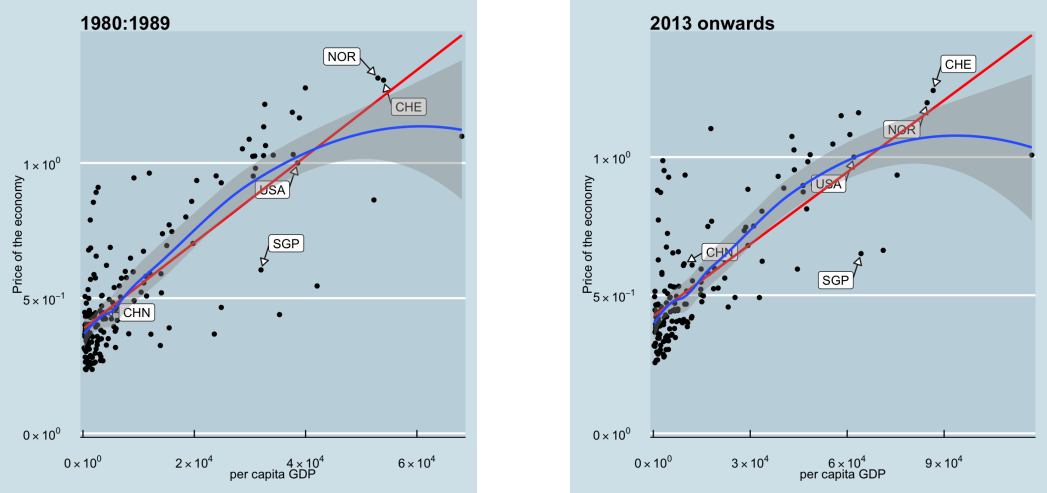

Figure 1: Poor countries are cheap. The left panel shows the 1980s; the right, since 2013. The vertical axis is the real price of the economy, or R in the discussion in the text; it is the reciprocal of cheapness. The horizontal axis is per capita GDP. The datapoints are all the national economies in the World Bank's World Development Indicators database. Each graph displays OLS and nonparametric loess (locally estimated scatterplot smoothed) lines, the latter together with its 95% confidence interval. The panels also explicitly indicate Switzerland, Norway, Singapore, the US, and China—useful to calibrate the reader's intuition on what the figures show, and to which the analysis will return subsequently. All regions, countries, and territories are named according to their ISO 3166-1 alpha-3 designation.

per capita GDP on the horizontal axis. The figures show the OLS straight line and a nonparametrically-fitted trend line, together with 95% confidence interval. The World Bank's international dollar is close to but not identical with the US dollar, so the US appears near but not on the value 1 on the vertical axis.

Fig. 1 shows that on average poor countries are cheap: the best-fitting lines slope upwards.[2] However, there is considerable variation in datapoints

[2]The nonparametric loess line begins to turn around for the very richest countries but that negative slope is not significant and is pretty much due to just Luxembourg, the richest nation in the sample. Note that the 95% confidence interval around the loess line does not have to include within it 95% of the datapoints. The confidence interval denotes how precise the sample estimate is, not sample coverage. The empirical evidence presented

around the positively-sloped lines. Where the bulk of the cross-section distribution rests, the loess line is firmly positive with confidence interval tightly around the estimate. It is striking, however, in that mid-range there are significant outliers both upwards and downwards. Singapore, for one, has been consistently cheap relative to what its high per capita GDP would predict; in the cross-section Singapore is balanced by others more expensive: Switzerland, Norway, Iceland, and Denmark.

To connect cheapness, technology, and economic success, begin with the the simplest relationship between wages w, prices p, and productivity θ:

$$w = p \times \theta \tag{1}$$

To understand this equation, notice that it can be derived from the consequence of two more fundamental assumptions: first, that wage equals workers' value marginal product, i.e., the result of multiplying together output price and the marginal product of labour; and second, that technological improvement makes labour more productive. For the purposes here, in equation (1) I suppress explicit mention of the production function and simply refer to θ to represent technology.[3] All the theoretical analysis will use only equation (1), and so is obviously not embedded in a completely specified explicit equilibrium model. At the same time, however, it is difficult to imagine any equilibrium model that doesn't have equation (1) in it, or something close.

Assume further that θ evolves in time continuously—technology can only advance (or degrade) gradually—whereas wage and price can jump, i.e., can show discontinuous time trajectories. The economy has consumers as well but I will assume they are passive. While trade and technology benefits consumers unambiguously, the last are also mostly silent from being diffused across an economy. It is the production side of workers and firms that, in this analysis, have greater agency on economic outcomes.

If as Fig. 1 suggests, it is important to understand how prices evolve, we might begin with w causally prior (in the language of timeseries macroeconomics (Sims, 1972, 1977)). This does not mean w is fixed or exogenous or

in this paper will all take this same format, so the Figures below will not repeat the details as here.

[3] More generally, equation (1) can be replaced with $w = g(p, \theta)$ as long as the derivatives g_p, g_θ, and $g_{p,\theta}$ are strictly positive. All the conclusions I will obtain hereafter will go through unmodified, only with more elaborate notation.

sticky, but that it is determined from outside the local domain of analysis: prices of tradeables for instance are causally prior in a small open economy even though such prices, once viewed in the proper domain of multi-nation general equilibrium, are as economically determined as any other variable. Because

$$p = w/\theta \tag{2}$$

price is decreasing in θ. Equation (2) shows that in a wage-prior poor economy, improvements in technology drive down price. As in the examples described earlier, less-advanced technology raises price: such a poor, technologically backward country is not cheap, but expensive.

Alternatively, consider hypothesising that it is not wage but price that is causally prior. The way to do that without being completely arbitrary is by bringing into the model the global economy, and taking the approximation that trade determines price p to be the same value as that in the global economy. This assumption of price-priority implies, from equation (1), that low-technology economies have low wages, and that as technology advances, wages rise in tandem. This gets closer to poor economies being cheap and growth raising wages. But then price p in a poor economy is not lower than in the rest of the trading world but instead only equal. More generally, an assumption of price-priority allows technology to bring along wages, and is in opposition to the price effect in a wage-prior world.

Even without assuming price is tied to world levels, however, these two possibilities of wage-priority and price-priority—with price and wage moving in opposite directions relative to technology—have no reason to exactly offset each other. Thus, unlike what Hausmann (2023, Section 2) seems to suggest, these opposing forces do not imply "poor countries should be just as expensive as rich ones with their lower productivity being compensated by their lower wages". Instead, what the two possibilities do is provide a consistent way to think about the effects of the global economy and advancing technology—whether through knowledge transfer, the experience of producing complex products, or research and development—against a background of poor countries being cheap.

To that end, suppose the economy is a hybrid of wage-prior and price-prior sectors. Assume no worker is different from any other and thus that workers can move freely across sectors. This generates a tendency for wages to converge; for simplicity suppose that that convergence has occurred and so wages are equalized. For ease of exposition, suppose only two sectors,

and subscript them N and T to indicate non-tradeables and tradeables, following the Balassa-Samuelson reasoning in Hausmann (2023, Section 2). Assume that the T sector is price-prior. That wages converge then makes the N sector effectively wage-prior.

Consider the versions of equation (1) that apply in each sector:

$$w_N = p_N \times \theta_N \tag{3}$$

$$w_T = p_T \times \theta_T. \tag{4}$$

While I will carry out the discussion in terms of tradeables and non-tradeables, the reasoning applies equally even if the two sectors are, alternately, modern and traditional, urban and rural, complex and simple, or yet other possibilities. What is critical is only the assumption of wage-price causal priority, namely that T is price-prior and workers are free to move between the sectors. A natural way to make T price-prior is to say T is the tradeables sector, but it is obviously not the only way to justify price-priority in T.

Since the tradeables T sector is price-prior and wages converge:

$$w = w_N = w_T = p_T \times \theta_T. \tag{5}$$

By wage-priority in non-tradeables N, price there is then

$$p_N = w_N/\theta_N = p_T \times (\theta_T/\theta_N) \tag{6}$$

Equation (6) shows that in this hybrid, multi-sector economy the price p_N is lower, the less advanced is the level of technology θ_T in the other, price-prior sector. In other words, less advanced technology in one sector θ_T lowers price in the other sector p_N.

However, price p_N is also lower, the more advanced is technology in its own, wage-prior sector. Advancing technology θ_T of the price-prior sector raises incomes; wages, through equation (5); and price p_N, through equation (6). Since the other price p_T is causally prior or, in this interpretation of T being tradeables, fixed at world levels, we can also say that when θ_T advances, no prices fall. Growth through trade and technology in this way is acceptable to all workers and businesses.

It is also possible to characterise explicitly when p_N is lower than its foreign counterpart. To that end, denote the other economy's technology,

wages, and prices, by a * superscript. Then using the foreign-economy version of equation (6) and substituting out p_T gives:

$$p_N = p_N^* \times \frac{\theta_T/\theta_N}{\theta_T^*/\theta_N^*}$$

so that

$$p_N < p_N^* \iff \theta_T/\theta_N < \theta_T^*/\theta_N^*.$$

Poor countries are cheap not because their technology is not advanced, but because their θ_T technology in the price-prior tradeables sector is worse compared to their other technology θ_N, than the similar comparison elsewhere. This of course only makes sense when N and T are indeed non-tradeables and tradeables, as otherwise there is no comparison to be made with a foreign economy.

Returning to the main argument, in the economy just described, technical progress is welcomed by all when it occurs in the T or price-prior sector. Not so, however, when technical progress occurs in the wage-prior sector as it then lowers output price. For an economy to experience growth that is unanimously welcomed, that growth must come from the price-prior (or, in this case, tradeables) sector. The analysis in this paper is silent on how that technology improves. Hausmann (2023) proposes that it is through the economy making more complex products. Others say it comes from domestic R&D. Yet others will point to how both of these channels are too slow compared to knowledge transfer from the global economy. As long as some engineering accelerates θ_T advance, it does not matter what form exactly that engineering takes.

When opening up the economy to trade raises the price-prior price p_T, then all else equal, that raises incomes, wages, and prices by equations 5 and 6. This would be welcomed by all. However, if trade lowers the price-prior price, then the opposite happens: trade depresses incomes, wages, and prices across all sectors. In the language of Great Power rivalry this is what happened with "The China Shock" (Quah, 2024). The only way to overcome this deterioration is to improve θ_T technology in the tradeables sector.

A natural interpretation of why an economy prefers the price of tradeables to rise is that it allows domestic producers to sell at higher prices. Going outside the model that is used here, selling to larger markets allows

leveraging scale economies in production. This is the reasoning that underlies the emphasis on export-led growth in Hausmann (2023). However, in the analysis of the current paper, it is not exports that is critical but instead the price-prior price p_T in the tradeables sector that drives incomes and wages. It is natural that exports raise the price-prior price p_T; imports lower it. But other factors might increase or decrease p_T, and policymakers need to be mindful of these more general circumstances. High prices in the T sector might emerge because of, say, government support for domestic industry. If such support does not drain government resources, then that elevated p_T serves exactly the same function for economic growth as would an increased p_T from exports. In this regard, the emphasis on trade in the Washington Consensus does not have to be replaced entirely by an emphasis on exports. Indeed, overly emphasising exports for growth can easily veer into mercantilism.

Policymakers have a range of options for trade and technology that will raise economic performance, increase growth, and also be politically acceptable. What does not work, however, is to simply boost technology or seek greater trade openness, without working through their impact on wages and prices.

4 The Global Distribution of Economic Success

This section provides empirical evidence to highlight a number of key points from the earlier discussions of Sections 2–3. To anticipate some of the key results to follow and so as not to present redundant information, the analysis here is in per capita terms—as it had been earlier in Fig. 1, except when obviously it doesn't make sense (e.g., for the real price of economies R and Hausmann's Economic Complexity Index). Because business cycle fluctuations will distort underlying, longer-run features of the data, I take 10-year averages and present results for just the beginning (1980-1989) and end (2013-2022) of the data sample. All data are from the World Bank's World Development Indicator's database or Ricardo Hausmann and Cesar Hidalgo's *Atlas of Economic Complexity* website.

First, consider the distinction between trade in general and exports in particular. Do exports need to be highlighted as the engine of growth and prosperity? Or will total trade—the sum of exports and imports—in

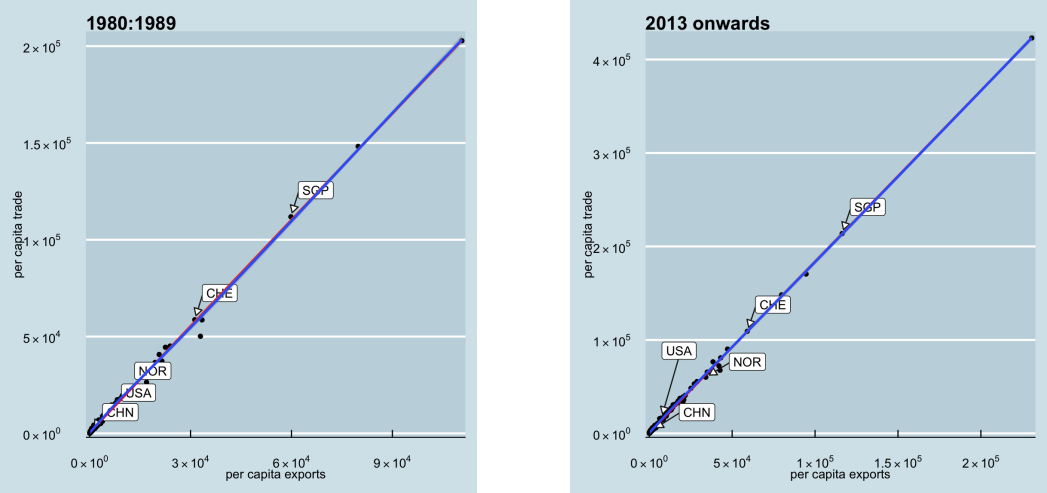

Figure 2: Modulo a proportionality constant, trade and exports are indistinguishable.

general suffice?

Fig. 2 shows how tightly these two variables are related in the cross section of nations, once business cycle variations have been removed. Over the longer-term, total trade just equals twice exports. The slope of the OLS line equals exactly that ratio with deviations from the line too small to be visible to the human eye.

The lesson from this is that it will be not possible to tell if it is exports that drive growth, as suggested in Hausmann (2023), or whether it is more generally trade that does so. But then, given how these variables covary across nations, it might not be meaningful in any case to seek that distinction.

Next, consider the hypothesis that engagement with the global economy encourages technological advance and thus increases growth and raises economic performance more generally.

Fig. 3 shows that for both beginning and end of the datasample, income and trade are indeed strongly positively related. Economies are richer, the greater their openness. This positive relationship has a relatively narrow confidence interval around it. At the same time, however, the data show significant outliers. Singapore is one. Conditional on its trade patterns, Singapore's per capita GDP is unexpectedly low. Two other outliers, but now in the opposite direction, are Norway and the US: these two nations are unexpectedly rich given the amount of trade they do.

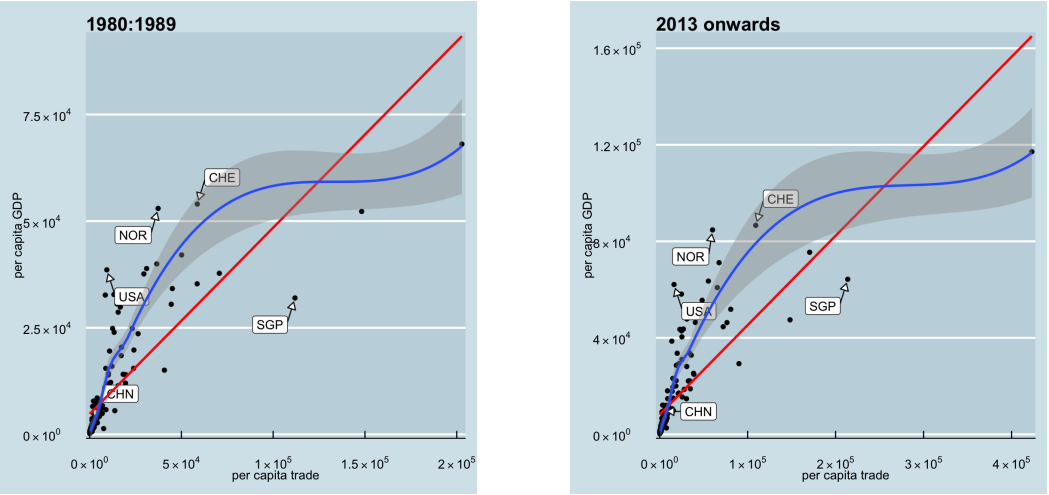

Figure 3: Incomes and trade are positively related. The vertical axis is per capita GDP; the horizontal axis, per capita total trade. The positive relationship has a relatively narrow 95% confidence interval, but with significant outliers. Singapore, conditional on how much it trades, has relatively low per capita income. Norway and the US, on the other hand, deviate in the opposite direction. Relative to how much they trade, those two nations are unexpectedly rich. Finally, given its very large population, China's pattern of trade and income is unremarkable.

One of the most interesting features of Fig. 3 is how China's position in the Figure is strikingly unremarkable. For all the attention China attracts in its being nearly every other nation's leading trading partner, in reality, China undertakes relatively little trade per person. Many other nations do much more. Singapore, for one, does about fifty times the trade that China does, per capita. In the world, China's trade is notable primarily because its population is so large. In terms of trade per capita, China is unremarkable.

This empirical regularity on trade and size is sometimes dismissed with the suggestion that arithmetic alone mechanically and misleadingly makes small states appear to trade more. However, Fig. 4 shows that that is not the reality. Many small states do as little trade per capita as do large nations. Some big states trade hardly at all; others, considerably more. Nations exercise considerable agency in how much they choose to trade. On average the relationship between trade and size is negative, but only slightly so. Instead, the most outstanding empirical feature in Fig. 4 is how the successful nations, such as Singapore and Switzerland, consistently trade orders of magnitude more than world average. It is not that small nations trade a lot. Instead, it is that successful nations who trade a lot happen to be small.

That last point needs to be clarified. Fig. 5 graphs the relationship between per capita income and population. The Figure shows small states succeed at economics.

Over 2013-2022, of the nine richest nations on Earth, only the US had population greater than 10mn. With a population over 300mn, the US was obviously an outlier. Singapore's population, by contrast, was only 5.6mn. Even more remarkably, the average population of the nine richest states, excluding the US outlier, only came to 4.2mn. The largest of these eight, Switzerland, had population only 8.5mn. To be clear, Fig. 5 is not a statement that small states always succeed. The Figure shows many small nations are poor. Instead, the lesson in Fig. 5 is that successful nations are small, not that small states succeed.

Finally, and most critical for the analysis in Hausmann (2023), we turn to complexity and economic performance. Does complexity account for the the greatest economic successes? Is complexity the best, fastest way to improve the level of technology in the price-prior T sector and to maintain it at a high level? Is complexity the best way to raise the price-prior p_T

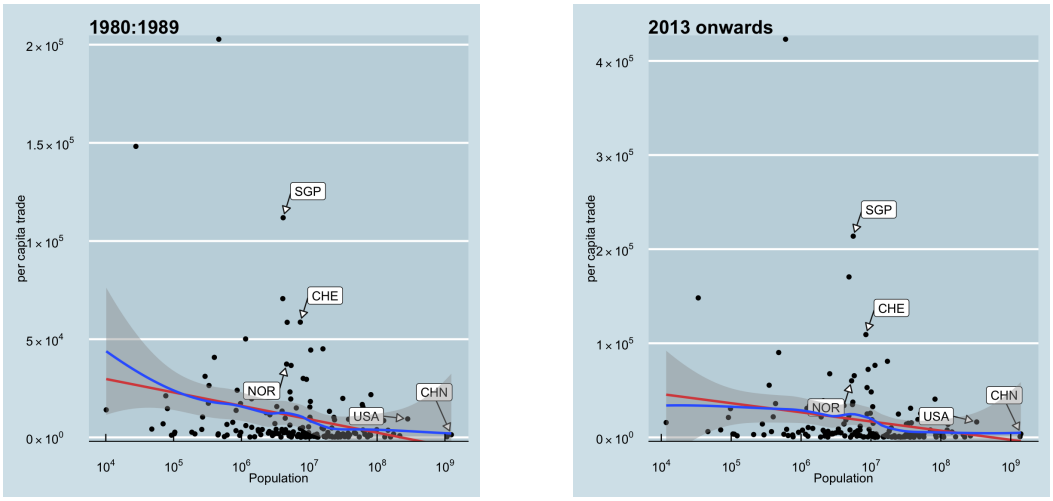

Figure 4: On average, per capita, small states do not trade significantly more than large economies. The vertical axis is trade per capita; the horizontal axis is population, measured on a log (base 10) scale. The most striking feature is how nations, like Singapore and Switzerland, consistently trade orders of magnitude more than world average.

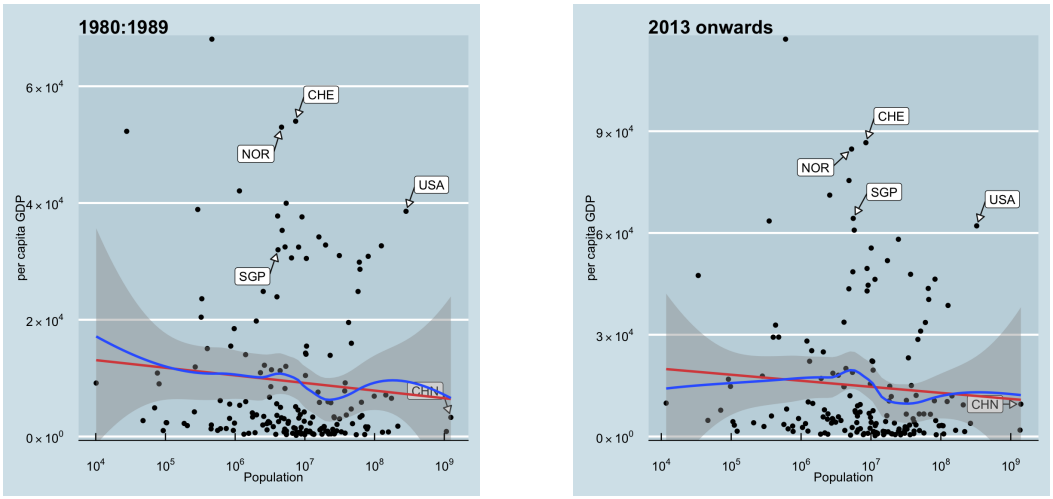

Figure 5: Small states are the richest nations on the planet. Since 2013, of the nine richest nations only the US had a large population, exceeding 300mn. Singapore's population then was 5.6mn. But, more striking, the average population of the nine richest states, excluding the US, was only 4.2mn, with the largest, Switzerland, having population just 8.5mn. Obviously, many small nations are poor. Successful nations happen to be small; but not all small states succeed.

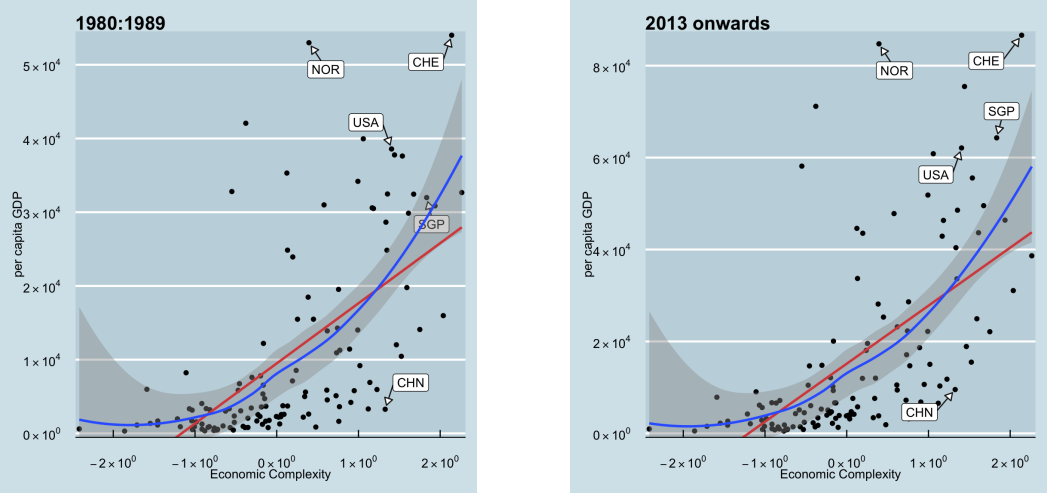

Figure 6: Incomes and high-complexity production are strongly positively related; at the same time, however, complexity cannot account for the performance of the small-state, successful economies. The Figure graphs per capita GDP on the vertical axis and the Hausmann-Hidalgo index of production complexity on the horizontal axis.

and thus allow incomes, wages, and prices to rise without mass opposition?

Fig. 6 shows the relation between incomes and complexity is strongly positive. However, the most successful economies are distinct upwards outliers relative to that relationship. By contrast, those nations that do not outperform the positive relationship are many and hew close to the OLS and loess lines. Complexity accounts well for average economic performance, but not for successes.

This pattern of outliers is predicted from the earlier finding that small states are surprisingly successful. By logic, small states do not have the size to have the wide diversity of skills and insights that create complex products. When they succeed, therefore, they escape in an upwards direction the predicted average relation between incomes and complexity. This reasoning helps explain Fig. 6. It leaves open, however, the reasons underlying the success of those small states that do succeed.

Small states will, naturally, tend to make too much of what its people can, and too little of what its people want. It is trade—both exports and imports together—that overcomes these bottlenecks. Both the empirical evidence of this Section and the theoretical reasoning of the previous Section 3 support the relevance of this mechanism.

5 Conclusion

This paper has developed a simple analysis of the effects of trade and technology on aggregate economic performance, with a focus on why mass opposition might emerge in opposition to those different effects. The analysis was developed against a backdrop of the Washington Consensus and of poor nations' being cheap.

The paper drew extensively on Hausmann (2023), but departed from that work in two important conclusions: (1) what matters is trade generally, not exports in particular; (2) what matters is technological progress generally, not complexity in particular. It is important, however, that technological advancement occurs in sectors with particular wage-price patterns. Empirically, for average nations, technological advancement through complexity matters; for extreme successes, it is trade that matters.

The paper's key empirical findings, however, concern the economic performance of small states. An economy that is small, all else equal, will tend to produce too much of what its people can and too little of what its people want. Small states cannot match the scale, variety, or complexity on which bigger economies can draw. They face significant obstacles for growth and economic success. Yet, small states are the most successful economies on the planet.

Trade helps successful small states overcome their natural bottlenecks. Trade with the global economy is essential for small states whereas larger nations can afford autarky. Thus, although a more elaborate analysis is not given in the current paper, a simple conjecture is natural on the role small states can play in the international system. All else equal, small states have the most to gain from an open global trading system. It follows that it is they who will show greatest commitment to such an international order (Quah, 2024).

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