

Why does capital flow from poor to rich countries?

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Abstract

Lucas' classic paper (1990) highlighted the paucity of capital flows from rich to poor countries, in contrast with predictions of standard theory. He suggested four explanations – but they cannot explain the copious capital flows from certain emerging relatively low-income countries, notably China, to the USA. Empirical studies confirm Lucas' observation. Additionally, Prasad et al (2007) showed that developing countries with less reliance on foreign capital grow faster. Gourinchas & Jeanne (2009) added a second puzzle, the "allocation puzzle": flows are not only too low, they are directed toward countries with lower productivity growth and lower investment, i.e. the "wrong" ones; they attribute this to a distortion in savings, e.g. financial repression.

This paper traces the causal processes in post-reform China. Starting around 1978, reforms allowed rural households to keep their own surpluses, facilitated "township-village enterprises", established enterprise areas open to FDI (e.g. Shenzhen), and began making state-owned enterprises (SOEs) more efficient. High productivity at comparatively very low cost was gradually achieved, and openness to trade allowed Chinese goods to conquer the world.

Statistical analysis shows that the generated profits led to high levels of capital accumulation, both corporate and public sector. Together with high household savings, channelled by state banks into (primarily) SOEs, this provided ample capital for reinvestment, as well as a large surplus. No capital inflows were required, except for FDI which had a vital technology-importation role. In particular, the massive export success generated hard currency, allowing large-scale purchase of overseas assets, e.g. US Treasury Bonds.

China is not unique: previous East Asian economies had parallel experiences on a smaller scale (cf. also Buera & Shin (2011)).

Thus, a relatively simple explanation of both puzzles is possible. More sophisticated interpretations, e.g. Kalemli-Ozcan et al (2010), Sandri (2010), Reinhardt et al (2013), are discussed from a methodological viewpoint.

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One sentence version:

The Lucas puzzle and the "allocation puzzle" are examined from the perspective of copious outflows of capital from China and some other countries, and a simple explanation emerges which is then discussed methodologically in relation to the literature.

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Lucas puzzle

Lucas paradox

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allocation puzzle

The Lucas puzzle – theory

In 1990, Robert Lucas published a classic paper, entitled “Why doesn’t capital flow from rich to poor countries?” (Lucas 1990). He raised an issue which has since become known as the “Lucas puzzle” (or “Lucas paradox”): given that theory predicts that capital should flow from capital-rich high-income countries to capital-poor low-income ones, why do the data show that this does not happen?

The theoretical argument is based on the uncontroversial observation that rich economies have more capital than poor ones, and on the standard feature of neoclassical theory that capital is subject to diminishing returns. Poor countries, with little capital, should therefore have a higher rate of return than rich countries with abundant capital. Lucas’ example was that India, with production per person about a fifteenth of that of America (according to estimates by Robert Summers and Alan Heston), should have a marginal product of capital 58 times larger – based on a Cobb-Douglas production function and a plausible capital share of 0.4. Investment in India should be highly attractive from an American viewpoint – “Indeed, one would expect *no* investment to occur in the wealthy countries”. As he commented, “there is nothing at all delicate about this standard neoclassical prediction on capital flows. The assumptions on technology and trade conditions that give rise to this example must be drastically wrong, but exactly what is wrong with them, and what assumptions should replace them? This is a central question for economic development.” No data are presented in the paper, but it is clear that the theoretical prediction is very far from being borne out in practice.

Lucas presents possible reasons for this discrepancy. One is that the human capital of workers in the different societies means that investment in a country like India would be far less productive than the above calculation would suggest – although he points out that this theoretical addition would imply that there should also be no economic motive for labor flows either. A second is that there could be external benefits of human capital, the type of spillover proposed by Paul Romer, and calculates its magnitude using estimates from Denison. However, as Lucas says, this idea requires these external effects to be confined to their originating countries, whereas it seems plausible that at least some of them cross national borders. (These two arguments depend on an implicit assumption that the capital would be invested in production rather than, say, government bonds or real estate.) A further reason for the lack of capital flow from rich to poor countries is the existence of capital market imperfections, specifically the difficulty of enforcing the payment of interest payments or repatriated profits once an investment has been made – a form of political risk.

The arguments presented are intended to explain the absence of rich-to-poor country flows, not the presence of poor-to-rich country capital exports. But as is well known, recent years have seen large-scale flows from relatively low-income countries like China to the rich world, including America. The first two explanations could account for such flows, if they were invested in the highly productive real economy within the recipient rich country, but lose their plausibility when it is realised that most of the investment has been in the financial sector (e.g. bonds) or in real estate. The third explanation is not directly relevant to such flows, but the converse – more reliable institutions in the rich world – could well be part of the explanation for poor countries’ decisions on where to place their money.

The Lucas puzzle – evidence

There is now abundant evidence of the scale as well as the direction of these capital movements, which are termed “uphill” because they flow in the direction opposite to that predicted by standard theory. For example, Prasad et al (2007) divided countries in their sample into those having a surplus or a deficit in their current account, and calculated the purchasing power-adjusted per capita GDP for the two groups, weighting the estimates by each country’s contribution to the surplus or deficit. In the early part of the period that they cover, the 1970s and early 1980s (and especially 1975-1981), surplus countries were richer than deficit countries, i.e. the Lucas puzzle did not exist. This is true also for most of the 1990s. From 1984 until 1990, the time that Lucas was writing, there is evidence of a small uphill flow. And from 1998 a wide gap develops, with the surplus countries now being clearly the poorer ones (Figure 1). It is true that FDI flows downhill, but it represents only about 40 percent of private capital flows to developing countries.

Prasad et al (2007) also provide a different perspective on this issue by examining the association of capital flows with growth rates rather than with level of prosperity. This is what Gourinchas & Jeanne

call the allocation puzzle (see below). A focus on fast-growing countries should bypass what they call “a variety of problems – inadequate infrastructure, a poorly educated labor force, corruption, and a tendency to default on debt from abroad, among other factors – that reduce the risk-adjusted returns to investment”. This is because whilst the Lucas puzzle in principle can be explained away by such factors, on the grounds that they would impede profitable investment and therefore also growth, the same does not apply to fast-growing countries that have evidently largely overcome them. Their findings are that in 1970-2007, the net amount of foreign capital flowing to relatively high-growth developing countries was smaller than that flowing to the medium- and low-growth groups. A more extreme pattern was seen in 2000-2004, when out of all developing countries, only the low-growth ones received significant amounts of capital, with China and other high-growth countries exporting large amounts of capital, and with India and medium-growth countries exporting moderate amounts.

They also carried out a cross-country analysis, plotting the average level of GDP growth for each country against the average current account as a percentage of GDP, for 1970-2004. Theory predicts a negative relationship – a downward-sloping curve. Instead, the scatterplot shows a rising regression line (Figure 2). And in particular, the group of economies with a positive current account of more than 2 percent of GDP that also had strong growth contains China, South Korea, Singapore and Malaysia. The other countries in their sample with a positive current account of more than 2 percent of GDP were Venezuela, Iran, Nigeria and Trinidad & Tobago – large producers of oil and/or gas – an issue to which we will return.

Prasad et al (2007) also state that “countries that had high investment ratios *and* lower reliance on foreign capital (lower current account deficits) grew faster – on average, by about 1 percent a year – than countries that had high investment but also a greater degree of reliance on foreign capital.” This finding reinforces that of Aizenman et al (2004), who observed that countries with high self-financing ratios grew faster.

The economic emergence of China

In order to explore the forces that lie behind this apparently puzzling phenomenon, I will first examine the most dramatic case, that of China. I will then discuss the extent to which China’s experience has been typical of the whole phenomenon.

In 1978, not long after the death of Mao Zedong, economic reforms began to be implemented. The main changes were: rural households were now allowed to keep their own surpluses (the “household-responsibility system”); Township and Village Enterprises were allowed to operate in a manner similar to capitalist firms; Special Economic Zones such as Shenzhen were set up, based on foreign capital and the export market; and State-Owned Enterprises were increasingly required to operate according to market logic to improve their economic efficiency (Lin et al 2008). The first two of these, peasant agriculture and Township and Village Enterprises, did not need large quantities of investment at first, as they were both low-cost activities; in very many instances they gradually expanded by ploughing their profits back into the business. The capital for investment in State-Owned Enterprises continued to be the responsibility of government, in continuity with the pre-reform era. In contrast, the Special Economic Zones did rely on new sources of funding, largely foreign direct investment – which had the additional advantage of bringing technology and knowhow with it – but also some portfolio investment. Much of this foreign capital was from neighbors that had already developed substantial modern industry, and that also had close cultural links, e.g. Hong Kong and Taiwan.

Replacement of Soviet-style centralized planning by organizations that operated more like capitalist firms had a dramatic impact on the economy. In particular, the manufacturing sector developed on the basis of very low unit costs – low wages relative to the productivity level. This, together with an undervalued currency, enabled Chinese products to be marketed extremely cheaply, which became known as the “China price”. The result was that Chinese manufactures conquered the world.

Within China, the large and ever-growing volume of exports led not only to unprecedented levels of sustained economic growth, and rising living standards for an increasing proportion of the population, but also to soaring quantities of capital. Primarily, this consisted of corporate profits from export sales, predominantly in foreign hard currency. In addition, household saving rates were extremely high, due to increasing wages together with an important precautionary element because of low social security provision, plus very likely a strong cultural element as well. These household savings were channelled

by state banks to State-Owned Enterprises, allowing massive capital investments to be made, albeit not always in the most efficient manner.

The saving rate, as a percentage of GDP, fluctuated between 35 and 43 percent – already high by international standards (especially if one excludes oil exporters) – until the early 2000s, when it rose to 50 percent or above (figure 3). The well-known near-exponential Chinese GDP growth was thus accompanied by equally strong growth in gross savings, with an even steeper increase during 2001-2006 (figure 3). It is plausible that the rise in percent savings in this latter period was at least partly due to the ever-increasing prosperity of industry and of its employees.

Much of this capital was ploughed back into domestic investment in industry and infrastructure. But not all of it – copious quantities flowed overseas. The destinations were diverse: some was used to purchase bonds, e.g. US Treasury bonds. Some went into buying existing infrastructure, or building new infrastructure (especially in Africa). Some went into productive investment in western industry, giving access to technology as well as brands. The Chinese current account rose from its previously positive but relatively moderate level close to the range 20-40 billion US dollars annually in 1998-2003 to a peak of 420 billion in 2008, before falling back to approximately 150-250 billion since then (State Administration of Foreign Exchange, China; World Bank).

One factor that may have contributed to the export of capital from China was a precautionary motive, following the experience of many East Asian countries during the crisis of the late 1990s. However, the figures do not support this as an important factor, because the main rise in capital exports did not begin until 2004 (figure 3), several years after the East Asian Crisis.

In summary, international capital flows involving China have shown a persistently positive current account. In other words, capital has been exported from this relatively poor country, e.g. in terms of GDP per capita, mainly to rich countries such as the USA. There is no puzzle about this, because the quantity of corporate profits and of domestic savings has been so enormous that it is unsurprising that some of it would flow abroad.

How typical is China?

One response to the analysis so far could be, China is unique. There is some plausibility to this idea, particularly in the magnitude of the transformation of the Chinese economy and its impact on the rest of the world. But in fact it is only an extreme example of a more general, if not necessarily universal, phenomenon.

The East Asian economies that have previously experienced prolonged rapid growth have had highly profitable industry, and have been major capital exporters. This was true of Japan, and later of the four smaller “tigers”, Taiwan, South Korea, Hong Kong and Singapore. More recently, they have been joined as capital exporters by Malaysia, Thailand, Indonesia and subsequently India (Alfaro et al 2014). The tendency for huge profit generation to lead to capital exports is now a well-established Asian pattern, in Southeast and South Asia as well as East Asia. Another recurring pattern is that the capital has flowed from the early developers to later ones, e.g. Japan to Taiwan, then Taiwan to China, and subsequently China to elsewhere in the region (as well as outside it).

A similar outflow of capital is seen if it is generated from a different source. In figure 2, we noted that the countries in the sample of Prasad et al (2007) which had a positive current account of more than 2 percent of GDP included not only Asian economies with strong growth records in 1970-2004 (China, South Korea, Singapore, Malaysia), but also four with poor or negative growth during this period: Venezuela, Iran, Nigeria and Trinidad & Tobago. This suggests that large-scale production of oil and/or gas is an alternative source of abundant exportable funds. Table 1 shows all those countries that exported more than ten billion US dollars' worth of capital in 2012. Economies with a strong track record in manufacturing exports, both Asian and European, are strongly represented. The other main category is a group of oil and/or gas producers, which may or may not have economies that perform well in broader terms, but which have large foreign-currency incomes from hydrocarbon exports. These findings confirm the idea that copious quantities of capital tend to lead to a strongly positive current account.

There is another parallel. Much of the poor-to-rich investment is done by sovereign wealth funds and central banks, both in the industrial and the oil/gas power houses. It puts a country in a strong position if it is able to “help” the rich world, e.g. by bailing out troubled financial institutions in a crisis, which can be useful in geopolitical terms. In addition the hydrocarbon exporters are thus able to diversify their economies, so that reducing reliance on a finite resource is one motivation. But in addition, many of these countries contain extremely wealthy individuals who are able to buy assets in the West, including prestigious buildings and other assets such as football clubs. Non-state organizations may also be involved, e.g. private equity firms. The common thread is that abundant capital creates pressure to find outlets, and this occurs through multiple pathways.

Causal direction

In figure 4, panel (a) shows the causal direction assumed by Lucas, and by more recent authors who have adopted the same theoretical framework. The starting point is the existing quantity of capital, which implies a certain marginal productivity of capital – given a negative sign in the diagram because of diminishing returns. This in turn leads to a predicted capital flow, which depends positively on the marginal productivity of capital as an incentive. This two-link causal model is applied to the real world by adding the uncontroversial assumption that in general, poor countries tend to have a lower capital stock.

In contrast, the evidence on profit generation and capital flows that we have just reviewed suggests that capital generation leads to its increase in quantity, and thence to its outflow – all of these being positive relationships, so that the predicted consequence is the reverse of that predicted by Lucas. The generation of capital can come from profitable manufacturing, or from a natural resource such as oil. This is shown in a schematic causal diagram in figure 4, panel (b).

The view expressed schematically in panel (b) of figure 4 implies that saving would be a consequence of economic growth. This contrasts with the assumption that is conventionally made that the causal direction is from savings to growth. Statistical evidence, mainly using Granger-causation techniques to investigate the time order, strongly favours the former (Blomström et al 1996; Carroll et al 2000; Rodrik 2000; Attanasio et al 2000), although Attanasio et al comment that it is not very stable, is quite weak, and disappears once controls are introduced – an issue to which we will return.

Another way of looking at the same issue is that panel (b) answers the question, “where does capital come from?”, whereas panel (a) does not appear to be aware of it, except for the observation that there is less of it in poor countries. In a world where most growth is catch-up growth – convergence, as predicted by the Solow neoclassical growth model – one would expect capital to be generated largely in those economies that are catching up. The Lucas conception is static, whereas the Solow model implies a dynamic process of convergence. Of course, it could be that capital generation in catch-up growth economies is merely incremental, adding gradually to that country’s stock of capital. What the data show is that beyond a certain level of export-led growth, the quantity of the generated surplus exceeds the amount that can be profitably reinvested in the domestic economy. Alternatively, the need to ask where capital comes from should be evident from the elementary observation that the economy can be represented by a series of circular flows, in which everything that exists must have an origin, and also a destination.

There is a further sense in which the pathways depicted in figure 4 panel (b) are not new discoveries – indeed, that “everybody knows” this. Informed commentators on the international economic scene are certainly familiar with these ideas, and they occur regularly in descriptions of current events. To take just two examples, from a single issue of *The Economist*, a high-quality publication that is generally well disposed to orthodox economics (with my emphasis):

“China’s financial repression ... has contributed to China’s remarkably high rate of saving, which reached over 50% of GDP in 2012. **This is more than China can invest at home, obliging it to export some of its savings** (typically 2-3% of GDP) abroad. This incurs the wrath of its trading partners.”

The Economist, 29 March 2014, p65

“... the real interest ... rate ... has been dragged down by long-term structural trends. A global savings glut is partly to blame: **export powerhouses like the OPEC countries and China buy vast quantities of rich-world debt**, depressing borrowing costs in the process.”
The Economist, 29 March 2014, p75

Existing explanations of the Lucas puzzle

Much of the literature that has explored these issues has followed Lucas' own ideas on the likely explanation for the puzzle. Alfaro et al (2008) found that institutions, in the form of government stability, bureaucratic quality, non-corruption, and law and order, are the major factor. Similarly, Papaioannou (2009) accentuates property rights, low corruption, bureaucratic and legal efficiency, and contractual institutions that guard against expropriation.

The role of international capital frictions is subject to conflicting evidence. Caselli & Feyrer (2007) showed that the marginal productivity of capital is similar across countries, implying that international credit frictions are unlikely to explain the Lucas puzzle. Rather, the major factors are endowments of complementary factors and efficiency – i.e. lower productivity for reasons other than lack of capital. On the other hand, Kalemli-Ozcan et al (2010) examined capital flows between the states of the USA, and found that they accord with theory, in the sense that “capital flows to fast growing states from slow growing states and as a result high growth states pay capital income to other states”. This leads them to suggest that the Lucas puzzle is due to frictions associated with national borders – i.e. that international capital markets are de facto incomplete.

More nuanced analyses separate out the different types of capital flow, or different economies' degree of financial openness. Alfaro et al (2014) found that net *private* flows (including FDI but also portfolio investment) go to growing countries, even if these countries are net exporters of *total* capital. As they say, this highlights the need to explain the puzzling direction of public capital flows; they note that East/Southeast Asia is atypical – their central banks buy reserves in developed countries, hence the outflow of capital (cf. Krishnamurthy and Vissing-Jorgensen (2012); Reinhart and Tashiro (2013)) – although they do not mention the *ability* of these central banks to do this. In other regions, the private sector conforms with theory in its direction – although the paper provides no quantitative estimate of the magnitude of such flows, to see whether they are comparable to theoretical predictions as Lucas did in his original paper.

In a similar manner, Reinhardt et al (2013) demonstrate that in financially open economies the Lucas puzzle is not seen, and also that there is no systematic relationship in countries with a closed capital account – “the ‘failure’ of the neoclassical model to predict international capital flows can also be explained by a violation of one of the model's key underlying assumptions: capital can flow freely across countries”. Unfortunately, they do not record which economies during which periods are included in the categories open or closed. They note that capital account restrictions have been gradually lifted in most countries over the course of the past three decades – but do not consider this observation alongside the evidence that poor-to-rich country flows have become large during the second half of that period. Their conclusion is that as financial openness spreads over time, the paradox will disappear.

Sophisticated interpretations have also been proposed, focusing on the financial system within the capital-exporting country. Prasad et al (2007), who we relied on above when presenting the evidence on the issue, do actually ask whether fast-growing countries may *need* less foreign capital, because higher growth generates higher domestic savings. But they reject this idea, because “typically, as countries grow (that is, when they experience a positive productivity shock), they should want to consume more (because they are richer, in line with the permanent-income hypothesis) and invest more (because of the investment opportunities)”. Their response to this conundrum is that it results from a weak financial system.

One result is that entrepreneurs are “forced” to rely on self-financing, because incomplete financial markets mean that they are unable to borrow. This idea is shared by other authors (e.g. Sandri 2010; Alfaro et al 2014). Nevertheless it is odd, because there is abundant evidence that firms in a wide variety of different circumstances routinely rely on retained profits for their continued investment (e.g. O'Sullivan 2007) – there is no need to invoke financial restrictions to make entrepreneurs do this, and in a high-profit economy such as post-reform China it would be even less necessary.

Another consequence of a weak financial system is that consumers could not borrow in anticipation of higher future income, as expected by neoclassical theory. However, it is much more plausible that in the context of an expanding economy, where those who are participating in it receive rising incomes, their consumption pattern would increase in parallel with increasing wages – or be influenced by past habits – rather than by future-orientated conjectural possibilities. The importance of past habits would accord with the formal non-stochastic *AK* growth model, with perfect foresight, proposed by Carroll et al (2000).

Prasad et al (2007) also state that a weak financial system might also not be good at intermediating foreign capital, leading them to wonder, in that case “where are the productivity gains coming from?”. Although not an easy question to answer in a causal sense, it is clear descriptively that the sequence of East Asian economic miracles has had at its root a competitive advantage based on low unit cost – i.e. low wages for the level of productivity.

Relevant here is a further suggestion of Prasad et al (2007): that excess foreign capital can lead to currency appreciation, and so avoiding that would be good for export-oriented manufacturing. This appears to be true, albeit in mirror image –the export of capital leading to currency depreciation may well have reinforced the competitive advantage based on low unit cost.

Sandri (2010) also suggests that the high investment risk leads entrepreneurs to undertake excess (precautionary) saving. There would then be an excess of saving over investment, which would lead to the export of capital. Such a process “can explain why growth accelerations in developing countries tend to be associated with current account improvements”. This interpretation, if applied to China, would imply that its capital exports are due to a relative lack of investment, which would be strange given that China’s investment levels are famously high.

A related analysis is that of Buera and Shin (2011), who postulate that in countries that have undergone reforms which remove distortions but leave financial frictions intact, allocation improves, and consequently TFP increases. Saving rises immediately as a permanent-income effect, but investment only later, leading to a surplus of saving over investment, and therefore to capital exports during this period. The transient nature of this phenomenon would only be relevant to temporary outward capital flows, not to the longer-term ones seen in China and comparable countries.

Financial repression is also invoked by Gourinchas and Jeanne (2013), who consider what they term the “allocation puzzle”, which is related to that of Lucas. Rather than focusing on the quantity of capital, they consider the rate of growth: one would expect fast-growing economies to suck in capital to invest in successful enterprises. They demonstrate that by contrast, high-growth non-OECD countries have exported rather than imported capital during 1980-2000. The results are similar for financially open and closed countries. The authors introduce a saving wedge that needs to be strongly negatively correlated with productivity growth. They state that productivity catch-up countries (Asia) “subsidize” savings, which could reflect domestic financial repression that prevents residents from borrowing against their future income, with Latin America and Africa “taxing” savings.

Caballero et al (2008) approach financial issues from the viewpoint not of the potential borrower, but rather of the supply of store-of-value financial instruments. They attribute the sustained rise in the US current account deficit to the lack of capacity of other regions of the world to generate financial assets from real investments.

Conclusion

There are thus two major types of interpretation. One is that financial under-development, weakness and/or repression can explain the Lucas puzzle. The other focuses on the level of productivity, for reasons other than lack of capital – a focus primarily on the real economy rather than the financial sector. This is the viewpoint suggested in this paper, as well as by Caselli & Feyrer (2007). Low unit costs lead to profitability, as well as to economic growth. Profitability in turn leads to an increase in corporate saving, and rising wages may also lead to increased household saving, so that large quantities of capital are generated. This can then lead to net capital outflow and a positive current account.

The evidence briefly reviewed in this paper gives support to the second view. But it is possible that the first also contains some degree of truth – at least in so far as the proposed causal processes are supported by the evidence, including on the direction of causation. The two interpretations may both be operating, which would not be surprising in a complicated multi-causal system like the economy. This possibility is reinforced by the statement of Attanasio et al (2000), that the growth-to-saving link is not very stable, is quite weak, and disappears once controls are introduced.

One possibility is that there are (at least) two patterns to the relationship between development and capital flows, perhaps relating to two distinct models of development – i.e. that the two interpretations correspond to the different experiences of different parts of the world. This could be connected with the observation made by, among others, Alfaro et al (2014) that East Asia is atypical. (Actually, to be more precise, the capital-exporting pattern associated with East Asia may have more recently started spreading to Southeast and even to South Asia (India), albeit with less dramatic success in terms of sustained growth.) Indeed the Lucas puzzle in its modern reversed form, of large capital flows from relatively poor to rich countries, does pick out these particular economies.

A clue here could be Reinhardt's (2013) evidence that the Lucas puzzle is not manifest in financially open economies. It is however unclear from that paper whether the successful Asian economies are among the excluded financially closed ones. If so, then this would suggest that there are two types of economy apart from static, statist countries (e.g. in the remnants of the Communist world or in parts of sub-Saharan Africa): "atypical" financially closed high-growth Asian countries that display a Lucas puzzle, and conventional ones that do not, e.g. in eastern Europe and Latin America. On the other hand, it should be recalled that the results of Gourinchas & Jeanne (2013) were similar in financially open and closed economies.

It is understandable to call this pattern atypical, not least because it does not conform well to standard theory – but this may be an inappropriate term, given that the area of the globe covered by these countries contains approximately half of the world's population. They are also responsible for many of the largest international capital flows, and therefore are central to the global imbalances that have built up in recent decades.

But there is a larger question that does not appear to have been addressed yet in this literature. If an atypical financial sector, characterized by under-development, weakness and/or repression, does indeed lead to capital exports and a large positive current account, what then is its relationship with economic growth? It is notable that the East Asian countries with the highest capital exports have also had strong records of growth in productivity and output.

There appear to be three possible patterns of causation. One is that the association between this atypical financial model and sustained growth is not directly causal – that it is coincidental or epiphenomenal (figure 5 panel (a)). Empirical research is needed to establish the direction of causal influences in this apparent three-way association between an atypical financial system, capital exports and growth.

If on the other hand there is a causal relationship, the immediate response would be that the atypical financial system must have been relatively inefficient – after all, it is characterized by financial under-development, weakness and/or repression. It must therefore have inhibited growth in productivity and output (figure 5 panel (b)). This would imply that the various economic miracles would have been even more miraculous if the financial systems had been brought up to standard earlier – in particular, Chinese growth would then have been even more stellar, which is hard to imagine.

Alternatively, it could be that an atypical financial system of this kind in fact promotes productivity and output growth (figure 5 panel (c)). This would suggest the rather radical conclusion that certain Asian economies have become rich and powerful because their financial systems are weak. According to the evidence we currently have, there is indeed a puzzle that needs explaining.

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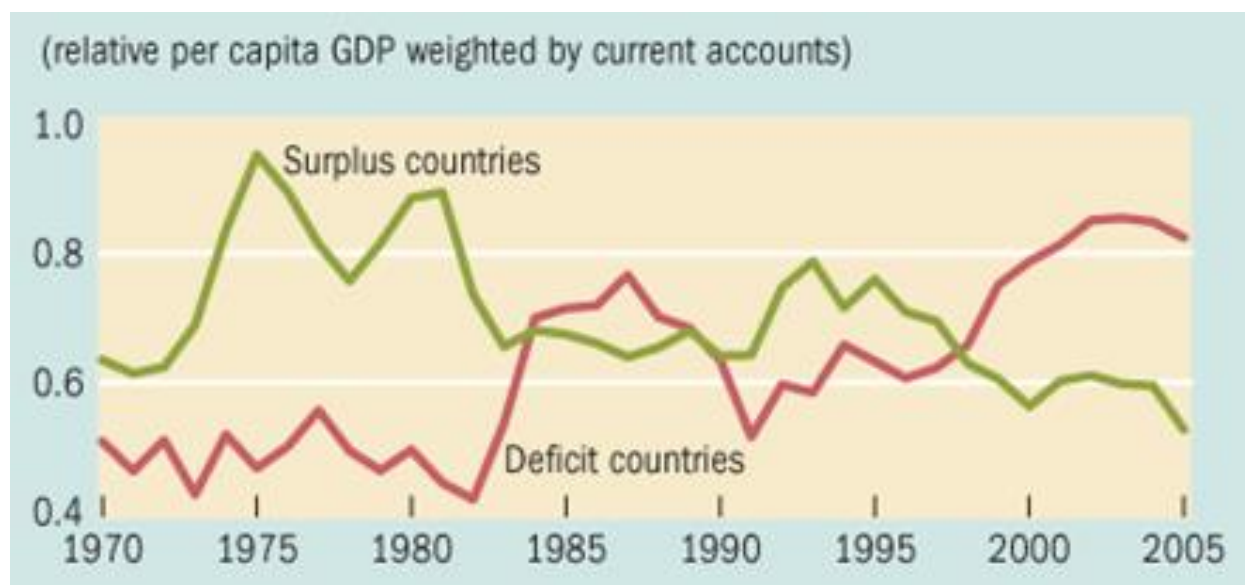
<http://data.worldbank.org/indicator/BN.CAB.XOKA.CD/countries> (accessed 30 December 2014).

Table 1. Countries that exported capital amounting to more than 10 billion US dollars in 2012.

East Asian manufacturers	billions of US\$	Oil and/or gas producers	billions of US\$
China	193	Algeria	12
Japan	61	Angola	14
South Korea	43	Iraq	30
Macao, China	19	Kuwait	79
Singapore	51	Libya	24
		Malaysia	19
European manufacturers		Nigeria	20
Denmark	19	Norway	73
Germany	241	Qatar	62
Netherlands	73	Russian Federation	72
Sweden	32	Saudi Arabia	165
Switzerland	54	Venezuela	11

Source: World Bank <http://data.worldbank.org/indicator/BN.CAB.XOKA.CD/countries> (accessed 30 December 2014).

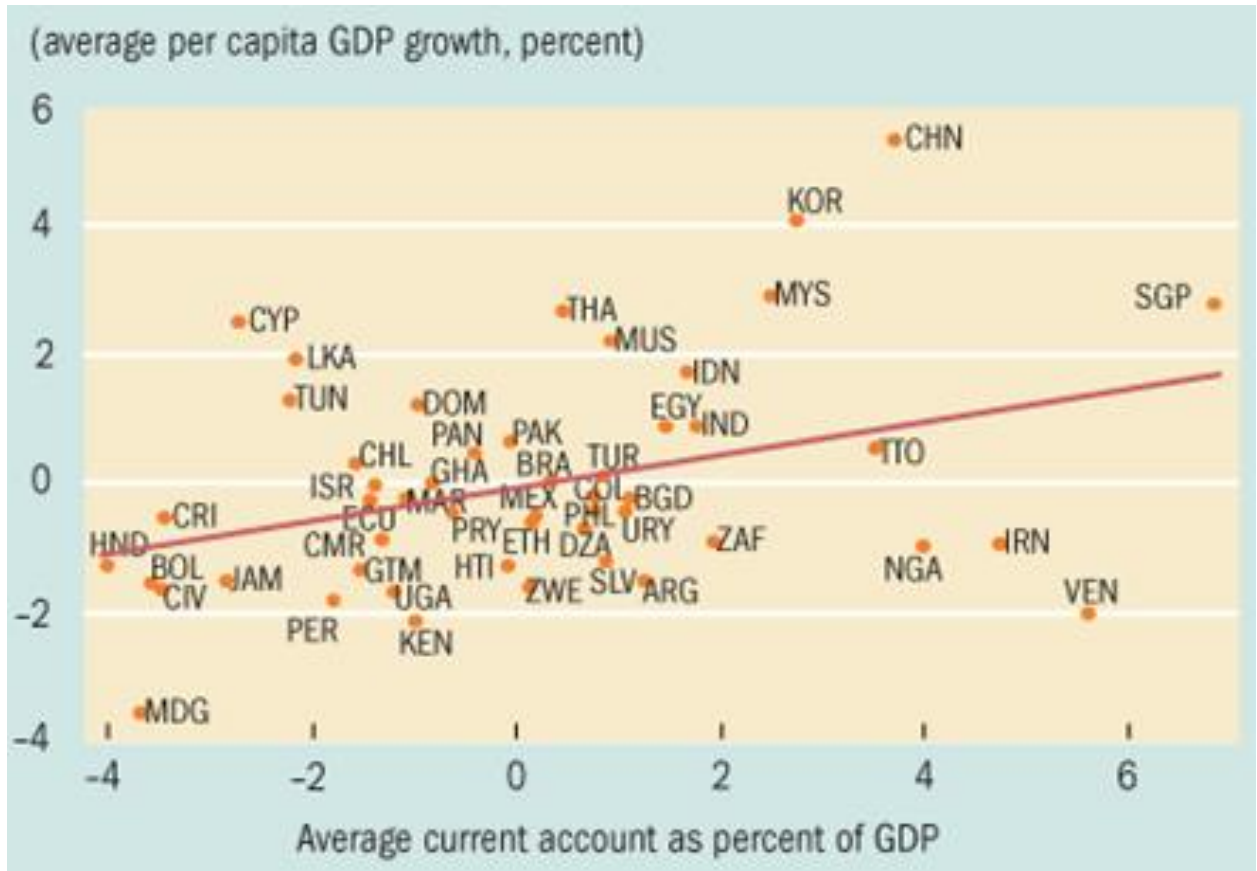
Figure 1. The relative income of capital surplus and deficit countries, 1970-2005.



Taken from Prasad E, Rajan R, Subramanian A. The paradox of capital. Finance & Development (IMF) 2007; 44(1), Chart 1. Available at <http://www.imf.org/external/pubs/ft/fandd/2007/03/prasad.htm> (accessed 30 December 2014).

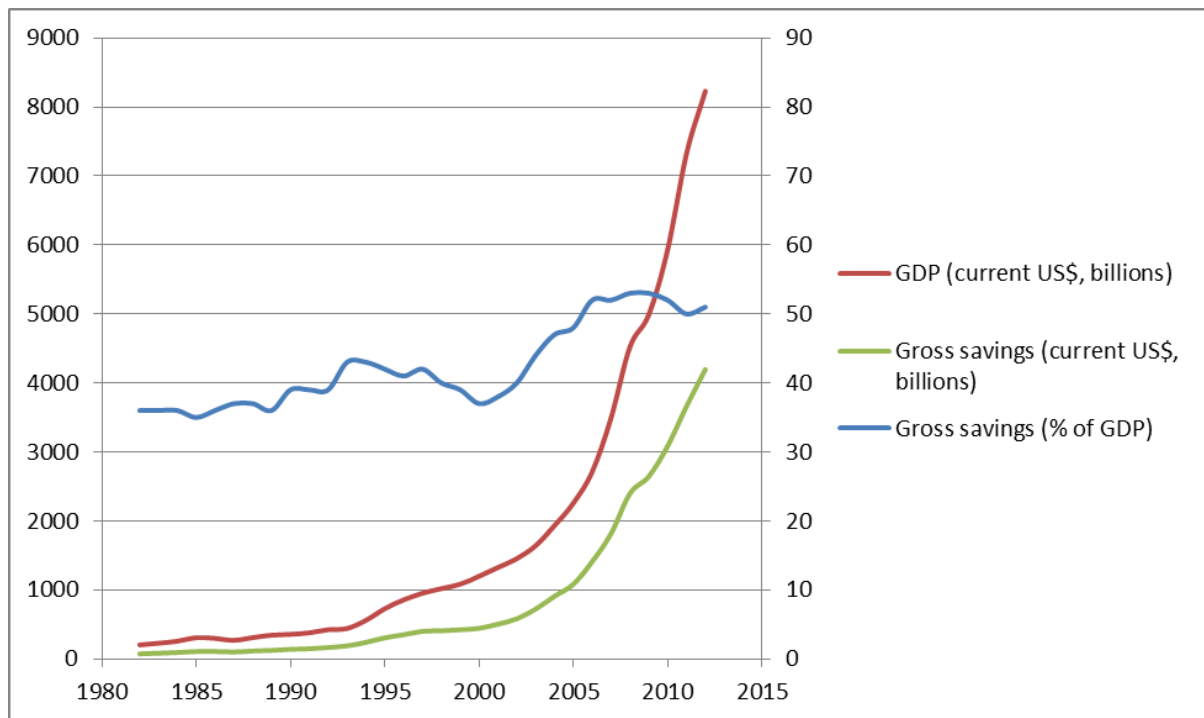
Note: their sample of countries was divided into two groups – those with current account surpluses and those with deficits in that year. They then computed a current account-weighted measure of the incomes of each group of countries, relative to that of the United States.

Figure 2. Cross-country growth rates and average current account, 1970-2004.



Taken from Prasad E, Rajan R, Subramanian A. The paradox of capital. Finance & Development (IMF) 2007; 44(1), Chart 4. Available at <http://www.imf.org/external/pubs/ft/fandd/2007/03/prasad.htm> (accessed 30 December 2014).

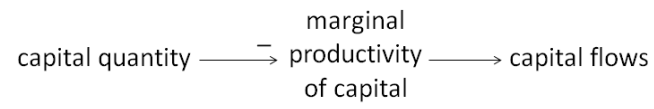
Figure 3. Growth and savings in China, 1982-2012.



Source: World Bank – <http://data.worldbank.org/indicator/> (accessed 30 December 2014).

Figure 4. Comparison of causal directions

(a) causal direction assumed by Lucas:



(b) causal direction suggested by the evidence on profit generation and capital flows:

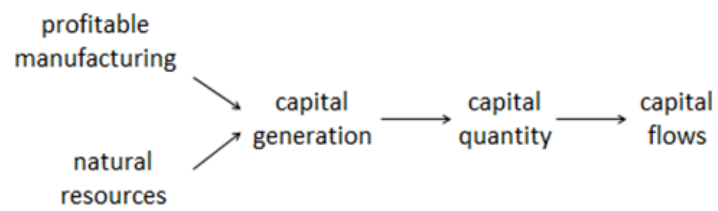
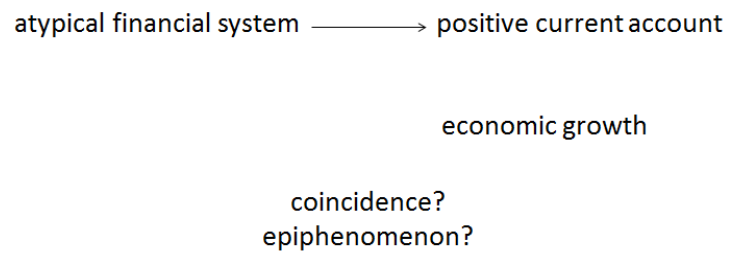
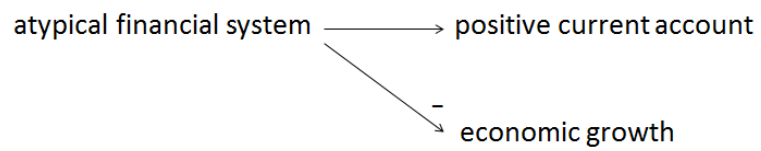


Figure 5. Possible causal relationships between atypical financial system, capital export, and growth

(a) no causal connection



(b) causal relationship with negative sign



(b) causal relationship with positive sign

