Why does capital flow from poor to rich countries? – The real puzzle

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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 – the Lucas puzzle (or paradox). Subsequently, abundant capital has flowed from certain low-income countries to rich ones, notably China to the USA. More generally, empirical research has shown that fast-growing developing countries rely less on foreign capital; and, international capital flows towards countries with lower productivity growth and lower investment – the "allocation puzzle". This paper considers post-reform China, finding that massive outflows are a *consequence* of growth that is readily understandable, and widely understood (except by some economists). Similar experiences also occurred in previous dynamic Asian economies. *The causal direction is different from what Lucas assumed*.

The academic literature seeks to explain the discrepancy from standard theory – not the phenomenon itself – by invoking financial-sector weakness or under-development and its impact on borrowing or saving, or accumulation of foreign reserves that affects the exchange rate. Mainstream economic accounts rely on what they see as "typical" behavior, which accords with standard theory. However, the empirical analyses strongly suggest that East Asia has a different dynamic, with different causal processes. This is not a minor exception, given these countries' population size, contribution to world economic growth in the past half-century, and influence over global capital imbalances. Their strong growth performance suggests that invoking financial "weakness" is misplaced. Rather, a better analysis is needed of the impact of these countries' channeling of capital for strategic purposes, and how this brings about a distinct pattern of causal processes.

JEL codes F21, F41, G20, O16

Key words Lucas puzzle, Lucas paradox, international capital flows, China capital outflow, allocation puzzle, financial-sector weakness

1. 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."

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. If that were the dominant reality, Lucas could be regarded as having fulfilled his objective – he did not set out to account for the presence of poor-to-rich country capital exports. But as is well known, large-scale flows subsequently occurred, 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 realized 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 corollary – more reliable institutions in the rich world – could well be part of the explanation for poor countries' decisions on where to place their money.

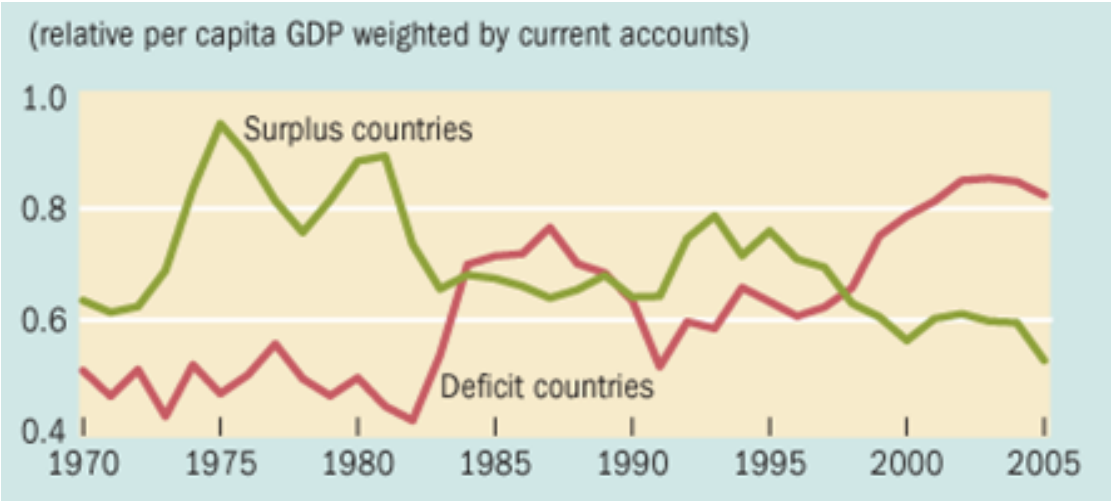
2. The Lucas puzzle – evidence

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. uphill flows 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 and Jeanne call the allocation puzzle (see below). A focus on fast-growing countries should bypass what Prasad et al. 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.

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



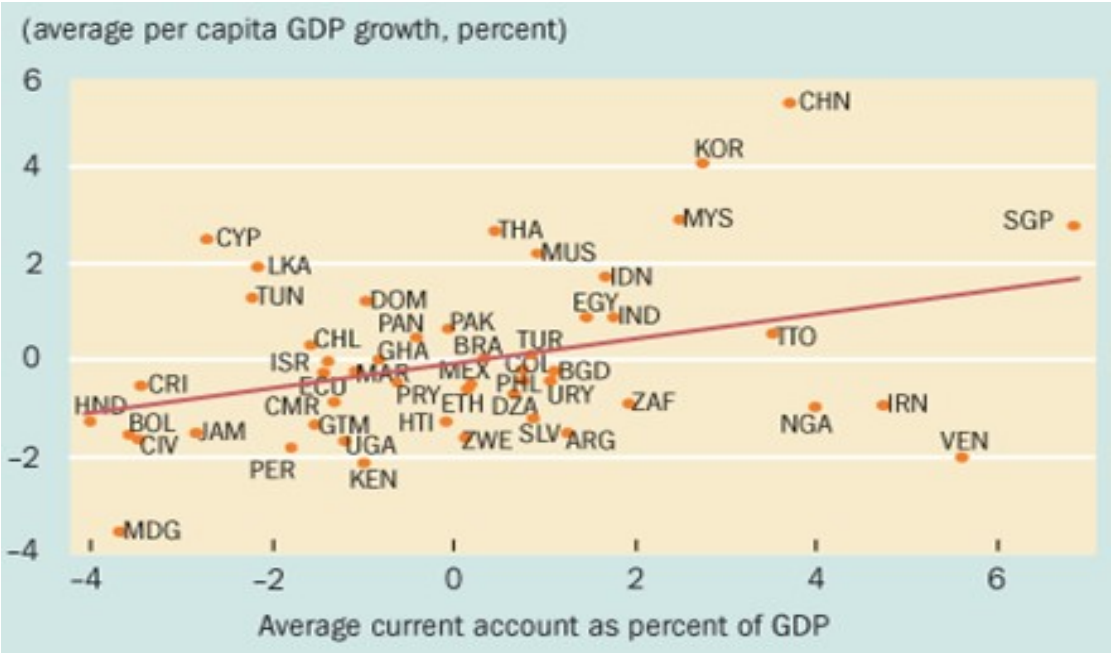
Taken with permission from Prasad E, Rajan R, Subramanian A. The paradox of capital. Finance & Development (IMF) 2007; 44(1), Chart 1. Available at http://www.imf.org/external/pubs/ft/fandd/2007/03/prasad.htm

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.

In addition, Prasad et al. (2007) 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.

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



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3. 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: (i) rural households were now allowed to keep their own surpluses (the "household-responsibility system"); (ii) Township and Village Enterprises were allowed to operate in a manner similar to capitalist firms; (iii) Special Economic Zones such as Shenzhen were set up, based on foreign capital and the export market; and (iv) 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, 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, especially Hong Kong and Taiwan.

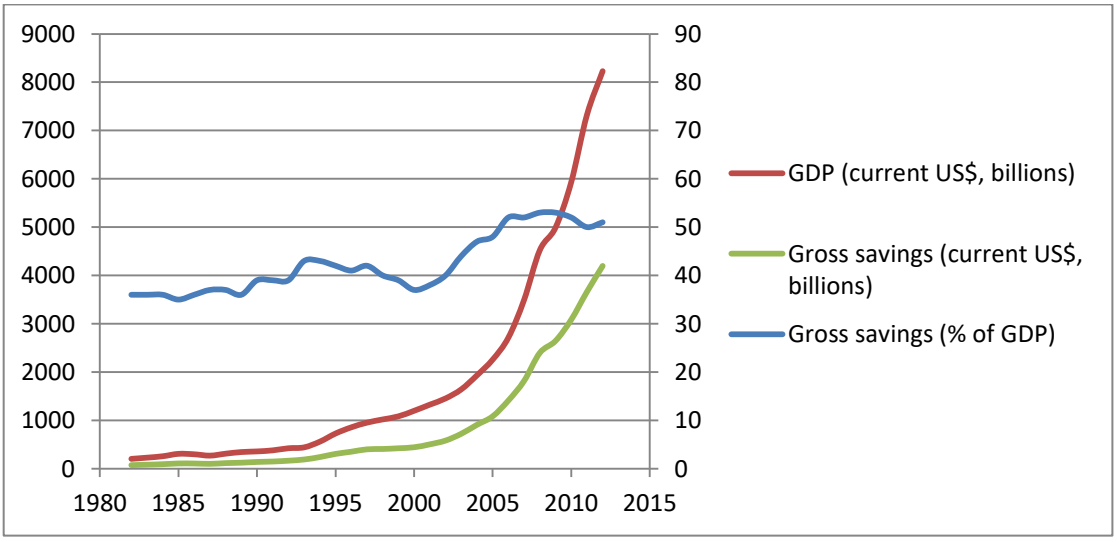
Replacement of Soviet-style centralized planning by organizations that operated more like capitalist firms had a dramatic impact on the economy. In particular, the manufacturing sector

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. This largely 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 channeled 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 2002-2006 (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 also of its employees, whose consumption level did not keep up with their increase in earnings.

Figure 3 Growth and savings in China, 1982-2012



Source: World Bank http://data.worldbank.org/indicator/

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 and 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, several years after the East Asian Crisis.

In summary, international capital flows involving China showed a persistently positive current account starting in the late 1990s. In other words, capital was 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 – especially as much of it was in hard currency, derived from exports.

4. 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 universal, phenomenon.

The East Asian economies that have previously experienced prolonged rapid growth have had highly profitable industry, and have also been major capital exporters at least for parts of their periods of growth. This was true of Japan, and later of the four smaller “tigers”, Taiwan, South Korea, Hong Kong and Singapore. Later, they were joined as capital exporters by Malaysia, Thailand, Indonesia and subsequently India (Alfaro et al., 2014). Most of these countries also showed a rise in corporate saving during this period (Bacchetta and Benhima 2015). 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 the 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 (James 2014). These findings confirm the idea that copious quantities of capital tend to lead to a strongly positive current account.

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	215	Algeria	12
Japan	60	Angola	14
South Korea	51	Azerbaijan	15
Macao, China	18	Iraq	30
Singapore	52	Kuwait	79
		Libya	24
European manufacturers		Malaysia	16
Denmark	19	Nigeria	17
Germany	249	Norway	64
Netherlands	90	Qatar	62
Sweden	32	Russian Federation	97
Switzerland	69	Saudi Arabia	165

Source: World Bank
http://databank.worldbank.org/data/reports.aspx?source=2&series=BN.CAB.XOKA.CD&country

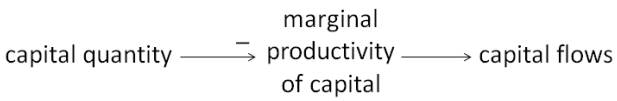
There is another parallel. Much of the poor-to-rich investment is done by sovereign wealth funds and central banks, both in the industrial and the oil/gas power houses. It puts a country in a strong position if it is able to "help" the rich world, e.g. by bailing out troubled financial institutions in a crisis, which can be useful in geopolitical terms. Furthermore, 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 *abundantly-generated capital creates pressure to find outlets, and this occurs through multiple pathways*.

5. Causal direction

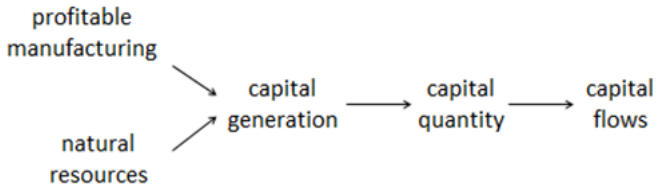
In figure 4, panel (a) shows the causal direction assumed by Lucas, and by more recent authors who have adopted the same theoretical framework. The starting point is the existing quantity of capital, which implies a certain marginal productivity of capital – given a negative sign in the diagram because 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*.

Figure 4 Comparison of causal directions

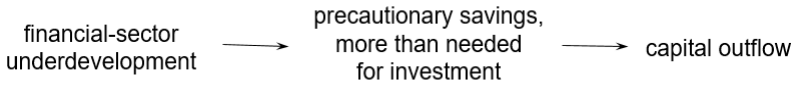
(a) causal direction assumed by Lucas (1990):



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



(c) causal direction assumed by Sandri (2010):



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 has the reverse sign 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 favors the former (Blomström et al., 1996; Carroll et al., 2000; Rodrik 2000; Attanasio et al., 2000).

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 the stock is lower 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.

There is a 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, p. 65).

> "… 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, p. 75).

6. Existing explanations

My discussion of the literature attempting to explain the Lucas puzzle, and its modern version of poor-to-rich countries flows, will focus specifically on the mainly middle income capital-exporting countries that were relatively poor until quite recently, notably China and certain other Asian countries.[1] The studies reviewed here are based on datasets covering a much wider range of countries. This means that their focus is far broader, often global, and also highly heterogeneous: a negative correlation between capital inflow and growth could apply equally to a dynamic economy that exports capital and to a shrinking economy that relies on capital imports. Furthermore, in many of these papers, different patterns of growth dynamics are not separated out, e.g. Mexico versus the state-directed strategy of South Korea. This is one reason that my interpretation may differ from that of the authors of each study. Another point to bear in mind is that many studies are unweighted, giving equal weight to all the participating countries – unlike Prasad et al. (2007), whose weighting meant that countries were influential in proportion to their contribution to international capital flows.

Lucas' puzzle: rich-to-poor country flows

Much of the literature that has explored these issues has followed Lucas' own ideas on the likely explanation for the puzzle about the relative lack of rich-to-poor country flows. Alfaro et al. (2008) found that institutions in the form of government stability, bureaucratic quality, non-corruption, and law and order are the major factors. Similarly, Papaioannou (2009) accentuated property rights, legal efficiency and contractual institutions that guard against expropriation; low corruption and bureaucratic efficiency were also found to be important specifically for FDI. In addition, Göktan (2015) demonstrated that the tendency for the very poorest countries (*per capita* GDP less than $12,000) to have the lowest inflows of cross-border bank lending could be explained by institutional quality. These institutional accounts go a long way to explaining Lucas' original puzzle.[2]

Other interpretations, that focus on the financial system within the capital-exporting country or on international capital frictions, have a much more uncertain role. Reinhardt et al. (2013) demonstrated that in financially open economies the Lucas puzzle is not seen for the period 1980-2006, and also that there is no systematic relationship in countries with a closed capital account – thus "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

[1] I use the shorthand of "poor" countries, following the common usage in this literature, stemming from Lucas' original paper. For brevity and clarity of presentation, I focus only on the contributions in this vast and rich literature that are most relevant to the central theme of the present paper. For a fuller treatment of this literature, see e.g. Chinn (2013) and Gourinchas and Rey (2014).
[2] Some poor-to-rich country flows could also occur for such reasons, e.g. because heads of government, rich households, etc. seek a safe haven for their money. However, the magnitude of these flows falls far short of the main phenomenon outlined above.

flow freely across countries". They did not address Lucas' observation that *all* investment should be in poor countries. They predicted that the paradox will disappear as financial openness spreads over time, noting that capital account restrictions have been gradually lifted in most countries over the course of the past three decades – but did not consider this observation alongside the evidence that poor-to-rich country flows became large during the last third of the period studied. And in contrast to Reinhardt et al., Göktan (2015) found that capital market imperfections were unimportant in explaining countries' capital inflows.

An alternative interpretation is that what Reinhardt et al. classify as lack of financial openness is in fact a different developmental model in East Asia. As Chinn and Ito (2008, p.489) say, "More open financial markets do not appear to have any impact on current account balances for this group of countries… If anything, arguments based on this thesis have inappropriately extended a characterization applicable to industrialized countries to less developed countries".

In principle, international capital frictions could reduce the magnitude of rich-to-poor country flows. Their role is subject to conflicting evidence. Caselli and 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 – although other interpretations are possible for the discrepancy between these findings and the international-flow context.

Poor-to-rich country flows

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. They are doubtless correct that US financial assets are seen as desirable, and that most parts of the world are unable to produce anything comparable. Again, the magnitude of the effect would be small compared to the observed international capital flows; (see also Mendoza et al., 2009).

More nuanced analyses of international capital flows separate out the different types of capital flow. Alfaro et al. (2014), for the period 1970-2007, found that net *private* flows (including FDI as well as portfolio investment) went to growing countries, even if these countries were net exporters of *total* capital, highlighting 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. also Krishnamurthy and Vissing-Jorgensen, 2012; Reinhart and Tashiro, 2013) – although they do not mention the *ability* of these central banks to do this, i.e. the source of the abundant capital. In other regions, the private sector conforms with theory in its direction – although the paper provides

no quantitative estimates of the magnitude of such flows, to see whether they are comparable with theoretical predictions, as Lucas did in his original paper.

A somewhat different pattern was found by MacDonald (2015) for 1980-2010: portfolio investment outflows, which are privately held, exceeded FDI inflows in high-growth countries. This was attributed to a desire for international portfolio diversification in liquid assets. The observed pattern was found to be greater with liberalized capital accounts. Again, the source of the funds was not explicitly traced to the high profit generation and rising incomes in these countries.

Hypotheses concerning the reason for these observations fall into three main groups: a focus on the weakness of the financial systems in capital-exporting countries, an excess of saving over investment (also resulting from financial under-development), and the effect on exchange rates of foreign reserve accumulation.

The hypothesis of a weak financial system

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) 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: "Corporate investment could be limited to the funds firms generate internally from past investment". This idea is shared by other authors (e.g. Sandri, 2010; Song et al., 2011; Alfaro et al., 2014). Nevertheless it is odd, because there is abundant evidence that firms in a wide variety of different circumstances have generally relied 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 predicted by the permanent-income hypothesis. 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 would increase more slowly than wages – possibly influenced by past habits – rather than by future-orientated conjectural possibilities. It is likely that this is what happened in China, as noted above. 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 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. There is no compelling reason why capital imports (other than FDI) should be essential to this.

There is another still more compelling reason to reject the hypothesis that capital exports from East Asian countries are due to their having a weak financial system. Many countries across the world have weak financial systems, especially in low- and middle-income economies. Most of these do not have a positive current account balance. Something else must be going on.

Excess saving over investment in poor countries

Another explanation focuses on investors' precautionary response to the risk they face, again with an emphasis on financial underdevelopment. Sandri (2010) suggests that the resulting high investment risk encourages entrepreneurs to undertake excess 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 have been due to a relative lack of investment, which would be strange given that China's investment levels have been famously high (Bai et al., 2006).

Sandri's focus is thus on the observation that the increase in savings rate in fast-growing developing countries is even stronger than the increase in investment rates. His response is to try and explain why excess savings would occur, as a *decision* made by entrepreneurs in response to financial underdevelopment (figure 4 panel (c)). In his view, they also "increase saving to finance the investment which triggers higher growth". This is in line with the conventional assumption that the causal direction is from savings to growth, whereas the evidence has been clear for some time now that the reverse is true, as noted above. The problem is that this evidence has not displaced standard theory and the habits of thought that go with it. If one instead follows the evidence, the obvious interpretation is that growth generates increased wealth, which in turn facilitates increased saving, manifest as corporate profits, household saving and likely increased tax receipts. It is a question of *flow* rather than primarily of decision making.

In any case, Sandri's emphasis on the causal importance of a weak financial system on saving is contradicted by the evidence of Chinn and Ito (2008), who studied 19 industrial and 69 developing countries during 1971-2004. As they concluded, "our empirical findings are *not* consistent with the argument that the more developed financial markets are, the less saving a country undertakes. **Especially for most of the East Asian emerging market countries, we find that more financial development leads to *higher* saving**" (pp. 480-81; italics in the original, bold emphasis added). This conclusion applies to all of emerging South, Southeast and East Asia, including China, except for Hong Kong and Singapore (Chinn and Ito, 2008, Figure 3). In China specifically, financial development has led to an even greater increase in investment than in savings (p. 489). They conclude, "we found evidence that the oft-cited effects of financial and legal development are only applicable to industrial countries" (p. 493).

A related analysis is that of Buera and Shin (2009), 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 short-lived 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.

Song et al. (2011) have a different interpretation: in China, the large trade surplus has resulted from high-productivity but financially-constrained private firms outgrowing low-productivity State-Owned Enterprises with good access to credit markets. "The downsizing of financially integrated firms forces domestic savings to be invested abroad, generating a foreign surplus." However, their theory predicts falling investment rates, whereas the evidence shows no such decline and a possible increase starting in the mid-1990s (Bai et al., 2006). Moreover, their notion that the private firms "must rely heavily on retained earnings to finance investment" needs to be considered in the light of the very high rates of return. According to Bai et al. (2006), the return to capital in China has been at least 20 percent since 1979, and this must have been considerably higher for the high-productivity firms that are alleged to have been starved of capital. In any case, private sector firms have in fact received substantial bank loans, especially during the firms' start-up period (Allen et al., 2005).

The hypotheses of Buera and Shin and of Song et al. have been tested empirically by Fan and Kalemli-Ozcan (2016). They used firm-level data for several Asian countries undergoing financial reforms during the period 2002-11. Firms that were previously credit constrained did decrease their savings more (or increase their savings less) than those that were not, as predicted. However, overall corporate savings rose after the reforms, rather than falling as predicted, and the national current account surplus was not significantly affected.

Broner and Ventura (2016) present an ingenious model of the interaction between domestic and foreign debts in which domestic debts support foreign debts. A ''financial depth'' effect allows the country to sustain more foreign borrowing than in the representative-agent benchmark, and more domestic borrowing than in autarky. Another possible consequence is a ''capital flight'' effect with low domestic and foreign borrowing. Clearly, neither of these applies to the experience of China or of other fast- growing capital exporting countries, with low foreign borrowing and high domestic saving.

Foreign reserve accumulation and exchange rates

A further suggestion of Prasad et al. (2007) is that excess foreign capital can lead to currency appreciation, so avoiding that would be good for export-oriented manufacturing. This appears to be true for capital-exporting countries, albeit in mirror image – the export of capital leading to currency depreciation will have reinforced the competitive advantage based on low unit cost (Rodrik, 2008; McMillan et al., 2014). It is likely to have been an important contributory factor in a country like China, but not the main driving force, because a decision to export capital will only have this effect if the economy is already highly competitive internationally, and is generating capital. A low-income country with inefficient industry and capital scarcity would not succeed with such a policy.

Accumulation of foreign reserves is taken as the primary causal factor in the model of Benigno and Fornaro (2012). It induces a real exchange rate depreciation and a reallocation of production towards the tradable sector that boosts growth. They compare the optimal reserve policy with a laissez-faire equilibrium, and find that it "entails a fast rate of reserve accumulation, as well as higher growth and larger current account surpluses compared to the economy with no policy intervention." However, it is implausible to attribute any sizable growth performance to this mechanism; they estimate the gain as a 1 percent permanent increase in consumption. Typical East Asian growth rates have been far higher during this period.

Similarly, Korinek and Servén (2016) focus on "neo-mercantilist" reserve accumulation, and find that it entails a static cost in the reduced consumption of tradables, but a dynamic gain due to an increase in growth. This model applies to countries with limited investment opportunities, not to China and similar countries.

The puzzle of productivity growth and lack of inflows

Gourinchas and Jeanne (2013) consider what they term the "allocation puzzle", which is related to that of Lucas. Rather than focusing on the pre-existing quantity of capital, they consider the rate of productivity growth: "the textbook neo-classical growth model … predicts that countries that enjoy higher productivity growth should receive more net capital inflows. We … find that this is not true. … The non-OECD countries that have grown at a higher rate over 1980-2000 have tended to export (not import) more capital." Contrary to expectations, the results are similar for financially open and closed countries. The findings reflect stagnant or contracting countries with capital inflows (e.g. Mozambique) as well as dynamic economies that exported capital (e.g. Taiwan).

The authors introduce a saving wedge that needs to be strongly negatively correlated with productivity growth – "the allocation puzzle is a *saving* puzzle".[3] Furthermore, they (like Sandri, 2010) note that "savings not only has to be positively correlated with productivity growth, but the correlation must be stronger than that between investment and productivity growth". In the context of China, their saving puzzle corresponds to the generation of copious savings – i.e. it indicates the need for theory to consider where the capital originates.

Further analysis shows that the negative correlation of capital inflows with productivity growth is due to the influence of six outliers, five from East Asia (China, Korea, Taiwan, Hong Kong and Singapore), together with Botswana; if these are excluded, the expected positive correlation is observed for the remaining 62 countries (Rothert, 2016).

Gourinchas and Jeanne conclude that the tendency for capital "to flow more toward countries with lower productivity growth and lower investment … is puzzling for neoclassical models of growth – in fact, this makes one wonder if the textbook neoclassical framework is the right model at all to think about the link between international financial integration and development." They then review some possible explanations:

(1) saving leads to growth, which would require a friction that prevents foreign savings substituting for domestic savings;
(2) growth leads to savings, as households' income rises faster than consumption, in accordance with Carroll et al. (2000) – but this only explains the allocation puzzle if savings rise faster than investment;
(3) domestic financial-sector frictions, because low financial development implies (a) less borrowing against future income, (b) less responsiveness of investment to productivity growth, and (c) possible precautionary savings, by households because they lack social insurance, and/or by governments to deal with the risk of crisis;
(4) productivity growth *in the tradeable sector* could lead to a surge in exports, and capital outflows.

[3] An exploration of this idea emphasizing age differences in borrowing has been presented by Coeurdacier et al. (2015).

Of these, (1) can be discarded (at least for China), because of the evidence of abundant domestic savings that would prevent competition from external finance, as well as of the evidence on causal direction. (2) is in accordance with the reality of East Asian growth, but greatly understates the case because it refers only to households, omitting the huge profitability of industry during the rapid growth phases in Japan, the "little tigers" and China. (3) would not apply to very rapidly-growing economies such as China, at least for variants (a) and (b), because of rapidly rising living standards and high investment levels from retained profits; (c) is very likely to have occurred, but is quantitatively insufficient on its own as an explanation of the massive capital flows that were outlined above. (4) is an accurate description of the East Asian experience, as depicted schematically in panel (b) of figure 4.

7. Interpretation

Of the various suggested explanations, the accumulation of foreign reserves and its consequences for the exchange rate is likely to have been a contributory factor in China and similar countries. There is also likely to have been a precautionary element in savings behavior. But what was the primary driving force?

There are two major types of interpretation. One is that financial weakness or under-development, either directly or via the balance between saving and investment, can explain the export of capital from countries like China. The other emphasizes the level of productivity – 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 and Feyrer (2007), and some of the possibilities put forward by Gourinchas and Jeanne (2013). Low unit costs lead to profitability, which 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 this second view for the historical experience of large parts of Asia.

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. As we have already seen, Chinn and Ito (2008) found that the traditional views about the consequences of a weak financial system and of financial openness, based on the experience of the industrial countries, do not apply to emerging Asia. This also could be connected with the observation made by Alfaro et al. (2014) that there are "typical emerging market countries" such as those of Eastern Europe which imported capital during their growth phase. And on the other hand, a pattern is seen in "a few Asian countries" that is "not typical of the average emerging market". These countries are China, South Korea, Malaysia, Singapore, and (less robustly) Indonesia, Thailand and India.[4] The Lucas puzzle in its modern reversed form, of large capital flows from relatively poor to rich countries, does in fact pick out these particular economies. It also picks out oil exporting countries, whose source of wealth is different but has similar consequences; these were however excluded by outlier tests in the main sample analyzed by Alfaro et al. (2014).

[4] This generalization is imperfect: e.g. South Korea received substantial foreign capital at key stages of its development (Studwell, 2014). In addition, Vietnam has been a high-growth country since 1990 (*The Economist*, 6 August 2016, pp.59-62) following the 1986 *doi moi* reforms, but had a negative current account until 2010 (World Bank Data).

This raises the question, on what grounds is a particular pattern judged to be "typical" or not? When Prasad et al. (2007) explained the reason for their rejection of the idea that fast-growing countries need less foreign capital, they started with the word "typically" – see the quotation above. Alfaro et al. (2014) also used "typical" in both the above-cited quotations. But this may be an inappropriate term, given that the area of the globe covered by these Asian countries contains approximately half of the world's population. They have also been responsible for many of the largest international capital flows, and therefore are central to the global imbalances that built up in recent decades. They are not small or marginal exceptions.

It could be that "typical" here means that the observed pattern conforms well to standard theory. If so, this would merely mean that the theory is limited to explaining the experience of e.g. Latin America and Eastern Europe, but has failed to comprehend this group of Asian countries. It would imply that another theory is required for this purpose – or better, a more inclusive theory that can encompass both models of development: their conditions of existence, and their successes and drawbacks. As the growth records of these Asian economies have been far superior to the "typical" countries, a revisionist theory along these lines could be very important.

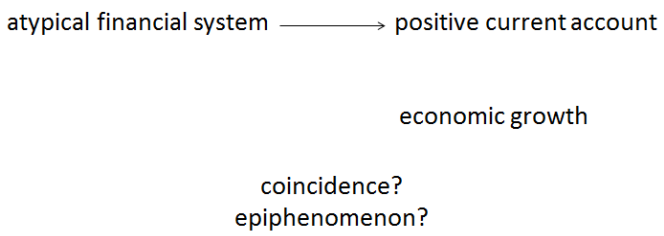
The question of economic growth

Indeed, this issue of economic growth raises an important question. If an atypical financial sector, characterized by weakness and/or under-development, does indeed lead to capital exports and a large positive current account, what then is its relationship with growth?

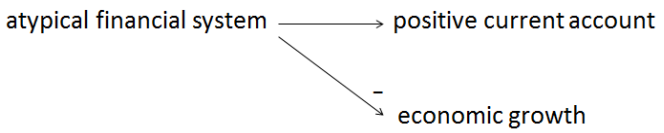
There are three possible patterns of causation in this apparent three-way association between an atypical financial system, capital exports and growth. Empirical research is needed to establish which best represents the real world. One is that the association between this atypical financial model and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

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

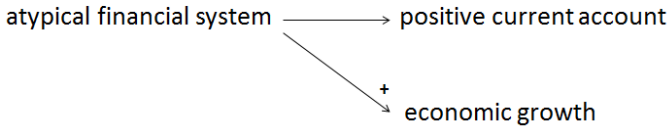
(a) no causal connection



(b) causal relationship with negative sign (standard theory)



(c) causal relationship with positive sign (suggested by the evidence)



On the other hand, if there is a causal relationship, the immediate response from the viewpoint of standard theory would be that the atypical financial system must have been relatively inefficient – after all, it is characterized by weakness and/or under-development. It must therefore have inhibited growth in productivity and output (figure 5 panel (b)).

Alternatively, it could be that an atypical financial system of this kind in fact promotes productivity and output growth (figure 5 panel (c)). If one interprets this atypicality as it is presented in the literature, equating it with weakness or under-development, this would suggest the rather radical conclusion that certain Asian economies have become rich and powerful because their financial systems are weak and/or under-developed!

It is probably safe to assume that the association of an atypical financial system and a successful growth record is not merely a coincidence as in figure 5 panel (a). If the starting point is standard theory, and figure 5 panel (b) is correct, it 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 during the thirty years following the start of the reforms, which is hard to imagine. Conversely if figure 5 panel (c) is correct, and if atypicality implies weakness, it would be a "paradox of weakness puzzle": that something weak and/or under-developed is a source of strength.

The two views have different implications for the relationship between financial development and growth. Sandri (2010) argues in favour of the former:[5] "financial development can… improve welfare… risk-sharing instruments can considerably speed up the process of growth, limit the need for precautionary savings, and drastically change the implications for the current account by allowing for capital inflows… The welfare gains from financial development can be substantial". This position appears to be in clear contradiction with the observations: "typical" developing countries that import capital have a far inferior growth record compared with the capital exporters, as shown in the studies cited above – think Mexico vs. South Korea. It therefore proposes a course of action that is likely to have exactly the opposite effects from what is intended, in welfare terms.

7. Conclusion

The repeated empirical finding that certain emerging Asian economies behave differently from what is expected (or "typical") has two implications. First, a practical methodological one, that the mechanical application of econometric analysis to such heterogeneous samples may not always be a fruitful way to proceed – the implicit assumption of homogeneity in some of the empirical studies discussed above might not be justified.

[5] This passage is not present in Sandri (2014), which is otherwise similar.

Secondly, heterogeneity is a pervasive fact of economic life. Whilst many features are common to different economies, and persist over time, there is a limit to this homogeneity. The causal processes are not necessarily the same across space and across time. Economic theories need to take this into account, e.g. by an analysis of the way that institutions and culture impact the economy. Standard theory tends to treat different types of economy as if the same laws apply universally. But as we have seen, its mechanical application does not perform well in all situations.

A further general observation is on the nature of causation in economic life. Standard economic theory is generally framed in terms of the motivations and actions of agents – it is a form of decision theory. I have previously argued that the causal impact of flows should be given a more prominent place in economic theory; economic decisions are decisions about the destination and magnitude of flows (Joffe, 2017). In the present context, the causal direction in figure 4 (b) indicated the importance of identifying the *source* of the capital that has flowed copiously from China and other East Asian countries. Once one introduces flows, in the causal sense of something that has real-world effects, the Lucas puzzle and its associated problems disappear.

Related to this, as we have seen, in this literature there is a tendency to focus on the *decision* (Alfaro et al., 2014) or the *desire* (MacDonald, 2015) to export capital. The *ability* to do so, i.e. the presence of copious capital, has tended to be overlooked.

Many of the studies cited above propose a correction element, such as a weak financial system, that operates in addition to the process described by standard theory. The discrepancy between what is expected "typically" and the observed reality requires the authors to postulate a second process. The result is a two-stage interpretation comprised of (a) "what should happen" according to theory, and (b) the *deviation* from that assumed process. Neither of these actually takes place in the real world – in terms of the actual mechanisms by which things are brought about, it is a double error.

Substantively, the dynamic East Asian economies have not only exported capital. They also share the feature – despite significant differences in other policy respects – that they adopted policies of state channeling of capital for strategic purposes (Amsden, 1989; Wade, 1990; Studwell, 2014). This could well be relevant to their particular relationship between profitability, capital exports, the nature of the financial sector, and economic growth. State channeling of capital could produce a different set of causal relationships from those observed elsewhere, and assumed by neoclassical theory.[6] International capital flows and global imbalances cannot be fully understood unless this distinctiveness is given its due weight.

To conclude: the massive outflow of capital from China, and from similar countries, is not difficult to explain if we look at the evidence and draw the obvious conclusions. There is no puzzle – or at least, no puzzle about finding a good explanation for the real-life phenomena. A puzzle only arises if one starts from standard theory. This reinforces the suggestion of Gourinchas and Jeanne (2013), that the textbook neoclassical framework may not be the right model at all to think about the link between international financial integration and development. As Lucas said, "The assumptions … must be drastically wrong, but exactly

[6] For example, advanced financial systems increasingly show a preference for investing in existing assets rather than productive investment (Ryan-Collins et al., 2011).

what is wrong with them, and what assumptions should replace them? This is a central question for economic development." The remaining puzzle is the continuing reliance on a theory that is unable to explain the phenomenon, when its explanation is so obvious.

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