



# GRESHAM COLLEGE

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## WHY DOESN'T CAPITAL FLOW FROM HIGH TO LOW?

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This is what I mean when I say I would like to swim against the stream of time: I would like to erase the consequences of certain events and restore an initial condition. But every moment of my life brings with it an accumulation of new facts, and each of these new facts bring with them consequences; so the more I seek to return to the zero moment from which I set out, the further I move away from it. . . .

Italo Calvino (1979), *If on a Winter's Night a Traveller*.

### 1. Introduction

Just like Italo Calvino, we would probably all like to erase the negative consequences of previous decisions - as well as any nightmares they may induce, these may also act as constraints on our future opportunities. Indeed, one of the dividing lines between youth and old age may well be that point at which consequences outweigh opportunities. It is the tension between young and old - this time in terms of nation states that are emerging or advanced - that we shall discuss (once again) this evening. We may be used to thinking about domestic risks to our (monetary and financial) stability and planning our work-consumption paths accordingly. But for an open economy, many domestic risks tend to be manifestations of global developments, which in the past couple of decades have very much involved the encroachment of new or emerging economies on the old world order. In this evening's lecture we shall consider how a puzzle that emerged from an arcane bit of algebra repeated in lecture halls around the world turned out to be the probable ultimate cause of the global financial crisis.

The basic story is that in any country, whether income is high or low, the main determinant of income is either or both capital employed per person and the level of technological efficiency. So if, as a result of relatively open trade, all countries have access to similar technologies, at least to some extent, it must be then be that the quantity of capital employed plays a major role in explaining large income differences. We tend to think that the marginal return on the quantity of capital employed tends to fall, as it becomes increasingly harder to find high return projects. So it follows that the marginal return on capital in countries where there is a lot of capital employed - high income countries - will be low compared to countries where there is significantly less capital employed *aka* low income countries. So, just like the wind, capital should flow from high to low income countries in order to exploit higher returns and this process should tend to raise global

rates of return. So if capital flows to and from countries in world economy followed something like this process, it ought to allow catch-up or convergence in the distributions of global income as capital flows to poorer countries and raises income accordingly.

Yet when we look at the basic facts they do not fit this prediction. Figure 1 shows the net investment position of the UK, that is the overseas assets held by UK PLC minus the claims on UK PLC. If we were building up claims on the rest of the world by sending capital overseas, as our high income-low return economy would suggest, this line should be heading north over this period, as we built up net assets in the period following capital account liberalisation in 1979. But it tends to have gone the other way, implying that we have mostly been building up net liabilities. The theory also implied that capital would be re-allocated from low return to high return economies, which would have tended to increase real interest rates but Figure 2 shows that they seem to have trended downwards. Oh dear. Perhaps I should have gone to medical school?

So for substantial parts of the period of financial liberalisation, capital has travelled from lower to higher income countries and this process has lowered rates of return as the marginal unit of capital has been used by countries with lower returns on capital borrowed from countries with very high propensities to save. In this lecture we shall try to understand this peculiar phenomenon and the implications for the global economy. Section 2 examines a simplified version of the 'arcane' algebra, Section 3 the impact on the macro economy, Section 4 on the possible explanations, and Section 5 concludes.

## 2. The Capital Flow Puzzle

In a famous calculation, Robert Lucas (Lucas 1990) showed that if a rich and poor country have equivalent production technologies, differences in income per head arise solely because the amount of capital employed in the poorer country will be less than in the richer country, and this implies that the marginal efficiency of capital ought to be higher in the poorer country and so attract capital. For example, let us consider a two-country world comprising China and the US alone. Chinese per capita income is around \$5,000 at the PPP exchange rate and the US is \$45,000, implying that the rate of return on capital in the US should be a small fraction, around 3-4%, of that in China. That should then mean that China runs a current account deficit financed by a US capital surplus. The reality has, of course, been the obverse, with the US recycling China's capital flows.

Let us for a minute look carefully at that calculation. We assume that output per unit of labour,  $y_t$ , is simply a function of overall level of technology,  $A_t$ , in the economy and the quantity of capital employed,  $k_t^\alpha$ , where  $\alpha$  represents the share of capital in the output production process, and  $t$  is imply a time subscript:

$$y_t = A_t k_t^\alpha,$$

in which case the marginal return on capital,  $r_t$ , is simply the derivative of output with respect to capital:

$$r_t = \alpha A_t k_t^{\alpha-1},$$

which if we substitute  $\left(\frac{y_t}{A_t}\right)^{\frac{1}{\alpha}} = k_t$ , we can re-write as:

$$r_t = \alpha A_t^{\frac{1}{\alpha}} y_t^{\frac{\alpha-1}{\alpha}}.$$

Given that the share of capital is somewhere between 0 and 1, the rate of interest **must** fall with the level of output in the economy. Figure 3 plots the resulting relationship between the ratio of output in high versus low countries and the reduction in the fractional rate of return. For a higher output level relative to low income country reference point, we observe just how quickly the relative rate of return should fall. By the time that the rich country has some 10 times the income per worker of the poor country then the rate of return on capital in that richer country should be less than  $\frac{1}{5}$  (and probably even smaller) of the rate of return in the poorer country and so capital should just be flying there.

In this simple framework there are naturally a number of reasons to temper our expectations of large differences in the rates of return. First we measured income in terms of income per worker but if we re-scaled by income per effective worker, which means by the output of every worker weighted by their productivity, we might find we need more developing country workers to add up to one advanced economy worker and this might reduce the ratio in outputs from 10 to something more like 2-5. But even then the implied interest rate differential ought to be gobbled up by those in search of higher returns. A second possibility is that the overall level of technology available is not the same, we can play with  $A_t$  or think of some other measure of technology such as human capital and argue that differences there explain difference in output rather than just physical capital. It is quite possible to use both these arguments to close the expected interest rate gap to a small number but these arguments also imply that the workers in the poorer countries do not get more productive or that improved human capital stays in the richer economies. It seems to me that globalisation implies precisely the opposite.

Let us put these production function arguments to one side and think about behaviour that might change as the constraints on that behaviour evolve or change. The neo-classical process of convergence implies that the poor countries would borrow capital today from the richer countries and their incomes would grow in line with that capital injection. Of course, once capital levels had converged there would be no further excess returns from capital flows but the first industrialised nations would then have built up financial claims on the productive capacity of the newly industrialised nations that would imply interest payments the other way in perpetuity. At this point the newly industrialised nations face a change in incentives, they might wish to avoid making these payments and renege to the nations that have financial claims on them - perhaps by 'nationalising' their key industries. In the language of economics, the newly industrialised nations may wish to behave in a time inconsistent manner. But that is not the final part of the argument. We shall assume that the first industrialised nations are not quite so trusting and can see this future change in behaviour looming. So because they can see today that future change in incentives we end up with the current tragedy - that the rich do not then lend today to these emerging economies and they stay poor.

There may even be another reason for the lack of capital flows as the result of another type of friction. The domestic producers in the poor country may benefit from high returns in uncompetitive economies where they exercise monopoly power and they may have no wish to see their practices upended by foreign capital that erodes their monopoly power. Furthermore, if these local firms are linked to the political power structure then they may be able to erect quite strong barriers to foreign investment. Such practices will of course increase the possibility that

different levels of knowledge across the world economy become entrenched rather than shared. But again it seems to me that there has been quite a lot of knowledge been shared as the world has become more globalised.

### 3. The Impact on Asset Prices and Debt

The real return on capital, or long term real rate of interest, can be expected to adjust to equilibrate the pool of savings and planned investment. So, as I have stressed, in a global economy, capital outflows should tend to go from wealthy-saver countries poorer-borrower countries with limited savings but abundant investment opportunities. Therefore, as already mentioned it is appropriate to wonder out loud whether the root causes of the financial crisis has been the unnatural sight of capital flowing 'uphill', which is from poor to wealthy countries.

Let us first consider two closed economies, which might represent on the one hand the set of advanced countries and on the other the set of emerging and developing countries (EDCs) in isolation, that is if they did not trade capital with the rest of the world. Planned savings in both sets of economies would equal planned investment at a unique but separate interest rate in segmented markets. Obviously there are lots of different type of investment vehicles which all must give different returns depending on their level of risk but let us suppose that risk adjusted returns are equalised at one interest rate, or there is a vector of interest rates in each economy, represented by one value. Figure 4 draws the equilibria for both autarchy (no trade) at points  $a$  and  $b$ .

If the advanced countries and the EDCs are both closed economies, in the debtor country -- on the left hand side of Figure 4 - real interest rates would clear the domestic market for saving at  $a$  and the equilibrium level for savings and investment would be determined accordingly; and this would represent the natural rate. Overseas in the EDCs, on the right-hand side of the Figure 4, the higher level of savings at any given interest rate and lower investment demand would imply, if there were no capital mobility from saver-nations to borrower nations, that the real rate there would be at the lower level of  $b$  with savings and investment clearing internally.

This explains why, in the absence of perfect capital flows, real interest rate differences may persist as real rates will depend on domestic savings and investment schedules alone. Indeed the calculation in the previous section, implies that the pool of savings in the advanced economies will be higher than the pool in the EDCs, at any given real rate, which would imply that we should expect  $a$  to be below  $b$ . But let us maintain some semblance of a story that fits with the facts. So when we open up to capital flows at initial interest rates,  $a$  and  $b$ , the debtors will expand investment demand in line with the supply of global savings and run a current account deficit (CAD) at some intermediate interest rate between  $a$  and  $b$ , let us say  $c$ , and the creditor nations will generate a current account surplus (CAS) to meet the debtors' demands.

The surplus (deficit) in each year adds (reduces) to net foreign assets in each year in the creditor (debtor) country and leads to an increasing stock of claims by the surplus nations on the debtor nations.<sup>1</sup> The counterpart of 'excess' savings in EDCs is 'excessive' (private and public) investment in the debtor nations. It is at this point that inflation targeting was supposed to provide the early warning because excessive demand should have led to inflation. But under a credible inflation targeting system, inflationary pressures may not emerge in the way of yore and

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<sup>1</sup> In principle, the exchange rate, which is the price of goods and services in currency defined in another, should then be 'jumping' so that both sets of countries lie on a path to clear the net foreign asset position and so the debtor nations ought to have depreciating currencies and the creditor nations appreciating currencies.

foreign capital may act to stimulate supply and complicate inference on the traditional inflation-output gap relationship.

Even then might reductions in debtor country demand (investment), for example by restricting access to finance, provide the answer? That policy may be part of any adjustment but not necessarily enough. Even if demand falls sufficiently with an inward shift in the investment demand function,  $I$ , to eliminate the debtor's current account deficit at stable world rates,  $c$ , then creditors would still have excess savings. This excess would drive rates down further from  $c$  and lead to the re-emergence of a current account deficit, albeit with even lower world rates and a lower level of global imbalances. Obviously large enough falls in debtor demand will achieve zero current account balances in both countries at very low  $R$  and low market clearing levels of debtor country savings and investment. Perhaps this is the outcome, as we stare at the risk of a prolonged global slowdown, to which we are actually heading?

There are two points to take from this model, which we have set out in a Metzler diagram. First, that global savings schedules may loosen domestic financial conditions by driving down market interest rates and this will help to elevate asset prices and support debt-financed demand. Other things being equal, these events may shift the neutral policy rate upwards. It might possibly have been the case that increasing policy rates in the advanced economies earlier in the economic cycle may have tended to act against the loosening of financial conditions but such a response would not have been very clearly justified from a standard inflation targeting framework. Secondly, the accrual of international debt today in the advanced economies suppresses future demand below where it would otherwise be and may also act to increase the volatility of asset prices as we try to uncover their appropriate path in the midst of these massive forces. And so policy models need both financial conditions to be articulated and choices on the optimal accrual of international claims to be formalised, or re-thought.

#### 4. Problems

Now let us examine the story from the perspective of the implications for the advanced economies from this global event. In a very helpful written 2006 note by BIS economists, Mohanty and Turner, from which I reproduce Table 1. We can see that in the five years following the turn of the millennium, the cumulative current account surplus from EDCs was just under US\$1.4Tn, which along with net capital inflows of some US\$120Bn, helped explain the extraordinary increase in foreign exchange reserves of over US\$1.5Tn. These holdings of foreign exchange reserves by EDCs represents a pool of savings re-cycled back to the advanced economies and typically held in US Treasuries or other government securities. For the EDCs themselves the expansion of the asset side of the central bank balance sheet leaves them with the problem of whether to sterilise the increase by selling domestic assets of the same quantity to mop up the increase in any monetary liabilities or to allow monetary liabilities to expand somewhat and effectively loosen domestic monetary policy. To the extent that there was some accommodation of the increase in assets, policy rates may have fallen in the creditor countries.

The resulting reduction in real rates globally raises asset prices. For example, a perpetuity is valued at simple  $c/r$ , and so for a given cash flow,  $c$ , the fall in real rates,  $r$ , from, say, 5% to 2%, alone can raise asset prices by 250%. If such a process of asset price inflation happens on a generalised scale, then the expected returns from all types of asset will fall and start to converge to that for the risk-free interest rate, which means that excess returns for risk-taking start to disappear. This overall increase in asset prices also provides the holders of capital more collateral against any future loans they may wish to borrow. At the same time, those without net worth are

left behind and initial conditions may be binding. At a stroke we have a process, that surprises us from first principles but which seems to be the root cause of many of our current maladies.

Fratzcher (2011) points out how after the financial crisis of 2007-8, significant capital flows for a sustained period headed towards EDCs. The extraordinary loose monetary policies in many parts of the advanced world coupled with fixed but flexible exchange rates in EDCs created a tremendous incentive to reverse capital flows. Indeed we touched upon aspects of these flows in the previous lecture on the Carry Trade. These reverse flows were strongest where there seems to have been good institutional quality, low levels of country risk together, strong macroeconomic fundamentals and 'orthodox' policies.

The net investment international positions - the cumulative change in current accounts plus any valuation effects in the stock of international assets and liabilities - are therefore and increasingly important conduit for the amplification of shocks. Figure 5, from the Bank of England's Financial Stability Report, gives us the final position at end-2014 for a host of advanced and emerging countries. The UK and the US are quite obvious international debtors on the international balance sheet and note that the Euro Area as a whole has a deficit of some 15% of GDP.<sup>2</sup> Lane (2015) suggests that for the UK, the return on overseas assets used to be significantly higher than the return required on liabilities to overseas, at 8% versus 5%, which if maintained today would imply that even with a net debt of some 20% of GDP, positive flows to the current account would still accrue. But as the returns have equalised these international investment positions have tended to make the exchange rate rather more sensitive to shocks, as we might expect it to jump (downwards) to clear the expected debt over the long-run.

Caballero et al. (2009) suggest that the impact on low real rates has been exacerbated by a shortage of risk-free assets in the world. This has meant that emerging country savings have tended to be re-cycled into an existing stock of assets appropriate for the demands of advanced economies alone but are insufficient to match the global growth in the demand for such assets, which has tended to place further upward pressure on the prices of safe or near-safe assets, and further reduce interest rates and stoke a series of asset price bubbles, starting with commodity prices and ending up in housing. We do not need to make a distinction between private (or household) and public sector demand for risk-free assets as they will both tend to raise the prices of advanced economy low-risk assets.

Gourinchas and Jeanne (2013) explore a further aspect of this phenomenon by noting that capital flows to low productivity nations, where the investment-output ratio already high, and this means that capital flows seem to be promoting convergence in a rather odd manner. They find that, in order to explain the puzzle, countries that are catching up in productivity terms must 'subsidise' savings and those whose productivity growth is falling behind must somehow be 'taxing' savings. They discuss a number of possibilities. First that domestic savings by EDCs somehow produces productivity catch-up in a way that foreign capital would not. Alternatively either as a result of cohort effects or habits, faster economic growth may raise savings by more than it does investment. In EDCs, low levels of financial development (or even repression) may limit the ability of households to borrow against future income or locate suitable savings vehicles. Finally, it might be that the conduit for productivity gains might be the traded sector which leads to the joint development of current account surpluses and productivity gains.

Ultimately, it is difficult to escape from the notion, expressed well by Bernanke (2005), that there has been a 'savings glut' in many emerging economies. Indeed either as a result of the increase in

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<sup>2</sup> Data reported by the Banque de France, pr-ecb-Euro-area-quarterly-balance-of-payments-international-investment-position-Q1-09-07-2015.pdf 1 / 6

foreign exchange reserves or by the simple observation that current account surpluses and real rates have fallen, it must be the case that to some extent, private and public choices on current savings in EDCs have shifted the supply of savings out to the right. Appropriate policies may help reverse this process over time: 'a more direct approach is to help and encourage developing countries to re-enter international capital markets in their more natural role as borrowers, rather than as lenders. For example, developing countries could improve their investment climates by continuing to increase macroeconomic stability, strengthen property rights, reduce corruption, and remove barriers to the free flow of financial capital. Providing assistance to developing countries in strengthening their financial institutions--for example, by improving bank regulation and supervision and by increasing financial transparency--could lessen the risk of financial crises and thus increase both the willingness of those countries to accept capital inflows and the willingness of foreigners to invest there.'

## 6. Concluding Remarks

It is a dangerous word to introduce but I shall mention it in summarising where we are in this debate: mercantilism. Seventeenth century mercantilism had the following thoughts behind it. Firstly that, in world before constantly increasing income per head, there was broadly-speaking a fixed or constant stock of wealth in the world. Secondly, that the only way to increase a country's own wealth was to increase exports so that more of this fixed stock of wealth was accrued. Thirdly, economic policy was thus directed in a manner to regulate international trade so that even spilt over into military conflict over commercial interests (Irwin, 1991). A modern and sympathetic analysis of an objective to maximise exports might emphasize the extent to which there may be strategic benefits to a country from subsidising or promoting exports as it might allow a higher level of output than might otherwise be attained. Though in a game where everyone pursues such policies, no country is better off, so if we take the public policy choices of EDCs as given the choice for advanced economies may become clearer.

First, it seems rather obvious to state that increasing levels of financial globalisation have made countries more vulnerable to global shocks. But it also then raises the gains to running domestic policy in way that insulates such countries from these shocks and that implies significant strengthening of institutional frameworks and the adoption of policies that increase macroeconomic robustness. For example, monetary and fiscal policies may have to develop the more and varied types of ammunition, and pay careful attention to the implications of possible shifts in global conditions.

Much of this lecture has dealt with a general equilibrium problem. A radical shift in one market has changed the market clearing price in that market but it has had direct and indirect implications in many other markets, in aggregate and at the level of the household. These kinds of links are one reason why many macroeconomists like to work in general equilibrium frameworks so we can trace the impact of one shock in a number of markets where the whole set of responses are mutually consistent. If the whole set of markets were represented by an equivalent number of balls in a confined space, then the position of each market in that space would always depend on the position of all the other balls.

If the 'physics-defying' move in capital from low to high, was a puzzle that had been well anticipated by the lecture halls in Universities, we had not arrived at a sufficiently convincing answer to allow policy makers to work out the best or second-best responses. If the EDCs want to save 'too much' or do not have sufficient domestic investment vehicles, then should advanced economies use those savings themselves in private intermediation, ration their usage of savings

with controls on credit or direct those savings to domestic infrastructure projects where social returns might be highest? We are still working out which, if any, is the right answer.

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