Abstract

Empirical evidence show that the world distribution of output per worker has changed during the past decades and now has a twin peaked shape. The underlying reasons for this change is explored through the work of Beaudry et. al. (2005) and Feyrer (2003). The empirical evidence of twin peaks has lead to a huge theoretical literature on poverty traps and convergence clubs. A selection of explanations of poverty traps are presented, following Azariadis (1996).

In order to escape a poverty trap it is, according to the theory, necessary to pass a critical threshold. A discussion on how this can be achieved ends this paper, with focus on savings, FDI and aid.
**Introduction**

Empirics clearly show that there has been a change in the shape of the world distribution of output during the last decades - from being uni-modal in 1960 to having twin peaks in 1998. This indicates non-convergence and that some countries have been moving towards a lower steady state than where they started. Convergence clubs seems to be a reality and thus a large theoretical literature on poverty traps has been written.

If one accepts the theory that there exists poverty traps as such, then it is crucial to understand the emergence of a low income club in order to develop strategies to eliminate it.

The underlying mechanisms driving the change in the shape of the world distribution of output is examined in Beaudry et. al (2005) where a decomposition of the so-called twin-peak phenomenon is conducts. They find that the significance of population growth and the investment rate (or savings) has increased dramatically, and that this increase is what leads to the twin peaked shape of the distribution.

The classical theory on poverty traps and club convergence is presented, providing the theoretical framework to understand poverty traps. The next question is, how to pass the critical threshold and escape it? There are many approaches to this, but generally the notion that countries are stuck in a trap and need a big push to get on the right track, and in this way attain a sustainable high growth path, has been accepted. Since aid and investments can bring about the “big push” needed to break the vicious circle, aid makes sense. This brings us back to empirics. Easterly (2005) and Kraay et. al (2005) find that aid and a “big push”, not is the way out of a poverty trap.

Section 1 of this paper looks at two explanations of the forces behind the twin peak phenomenon. Section 2 presents the classical theory of how a history-dependent growth model explains the phenomenon of club convergence. Technology, demographics, impatience and globalisation can also account for a poverty trap, this is also presented. Section 3 is a discussion about how countries caught in a poverty trap can escape it. The focus is on saving, FDI and aid. Section 4 concludes.
1. The Twin Peak Phenomenon and the Underlying Driving Forces

In 1960 the shape of the distribution of output per worker across countries was uni-modal and close to log normal. This changed considerably over time and in 1998 a clear twin-peaked shape had emerged, with a cluster of rich countries and a cluster of poor countries.¹

![Figure 1: Across-Country Income Distribution: 1960-1998](image)

Note: The dashed lines indicate the upper and lower bounds delimiting the interquartile range.
Source: Beaudry et. al (2005)

This means that the world distribution of output per worker is moving toward a state where there is a significant group of poor countries and a group of wealthy countries with few countries in the middle. This is intriguing because of the downward movement of a group of countries away from the world mean. The upper and lower clusters of countries are commonly referred to as convergence clubs.

In more technical terms, what has happened is that the middle of the distribution has hollowed-out quite a lot, as mass moved away from the mean of the distribution and the interquartile range increased. The paper by Beaudry et. al (2005) addresses the issue of why some countries have done so much better over the past decades than others, by providing a decomposition of the change in the distribution of output per worker across countries over

¹ That the shape of the distribution of output per worker across countries has changed considerably is a well documented phenomenon and has been discussed by a number of authors such as Quah (1997) and Jones (1997)
the period 1960-98. They investigate when the process of a change in the shape of the world distribution began, and why.

Through systematic comparisons of the income distribution across years, Baudrey et. al find that the hollowing-out of the middle of the output per worker distribution began around 1978. It therefore seems logical to split the period from 1960-98 into two sub-periods, that is 1960-78 and 1978-98. Comparing these two periods they find that the importance of traditional accumulation forces has increased, and can account for the changes in the shape of the world distribution of output per worker. There has been an increase in the impact on a country’s output per worker of the rate of 1) investment in physical capital (or the savings rate) and 2) of the rate of population growth. It turns out that the coefficients associated with these factors in standard growth regressions increased three times from the first sub-period to the following.

In other words – Beaudrey et al. find that most of the change in the shape of the world distribution of income between 1960-98 can be accounted for by a change in the form of the process (coefficients) and not from a modification in the distribution of these forces.

The conclusions in Beaudry et al. are however not uncontested and Feyrer (2003) finds that the technological residual is moving toward a twin peaked distribution like the one found in per capita output, and that it appears to be productivity differences that are driving the twin peaked result.

The results in Feyrer (2003) are that the low peak in productivity may be a transitory phenomenon, which is as he states "potentially hopeful".

This follows since he links the twin peaked shape of the distribution to the productivity differences amongst countries. He find that in the long run, countries with high human capital end up in the upper peak of productivity and countries with low levels of human capital cluster in the low productivity peak. The interaction between human capital and productivity may be causing the lower peak in productivity. The low peak in productivity will disappear as the number of low human countries diminish. The distribution of human capital indicates a movement out of the low human capital ranges.

The extensive literature on poverty traps potentially explain the evolvement of the distinct income gap between rich and poor.
2. Poverty Traps

Globalisation is often equated with increased resource mobility and faster diffusion of technology. Given the past decades of profound globalisation, one should expect that the poor countries were able to catch up with the rich and narrow the existing gaps in per capita GDP, providing convergence. Growth theory and related descriptions of the development process also support this expectation. So it is rather contra-intuitive that non-convergence and poverty traps however are a reality. The twin-peaked shape of the world distribution of income indicates existence of club convergence, which means that countries in bundles follow growth paths leading to bundle-specific steady states.

Figure 2 illustrates how a history-dependent growth model explains the phenomenon of club convergence. Memberships to these international clubs, one for the poor and one for the rich, is defined by reference to the threshold level $^\wedge k_2$ of initial capital, which serves as an admission ticket for the club of wealthy nations. A country’s development path qualify for membership to the rich club if and only if it start above $^\wedge k_2$.

Figur 2: History driven poverty trap. Club convergence

Hence, persistent income inequality can be explained in a distinct manner. This approach is put forward in Azariadis (1996), and is one of many that contribute to our understanding of why nations continue to differ in income levels or growth rates. Following it is presented how technology, demographics, impatience and globalisation also can account for a poverty trap.
Technology Poverty Trap
Azaradis extends his analysis further. Intuitively, it is clear that R&D only will be conducted if the returns to profit outweigh the costs of R&D. Azaradis show that the initial level of technology is critical for economic growth. In other words, if a country to begin with satisfies this threshold level of technology, it will obtain economic growth. However, if the country’s technology level is too low, there will be no R&D and the economy will remain in a poverty trap of zero growth.

International diffusion of technology is often thought of as a mechanism through which the underdeveloped countries can catch up. Azariadis (1996) argue that this technological spill-over might actually set up a poverty trap for the followers. The argument is that innovations in the leading countries put the following countries in a situation where they are using both old and new technology. Switching to the new technology leads to a growth takeoff in the lead country while the follower, never quite ridding itself of traditional modes of production, remains behind in perpetuity. The poverty trap here is entirely due to the innovation and would not occur if the technology did not advance.

Demographic Poverty Trap
In Azariadis (1996) it is shown, that the steady state with the lowest capital-per-worker ratio and highest fertility rate is a traditional poverty trap.

The opportunity cost of having children has increased. As capital accumulates and wages rise, the opportunity cost of parenting also rise; significant increases in marginal costs may cause the large drops in fertility, which we have come to know as demographic transition. Demographic transitions are associated with increased labour market participation by childbearing-age women; they result in rapid deceleration of population growth which, in turn, improves output per worker in the steady state.

Another explanation of the demographic transition is that the traditional family and community bonds have been dissolving during the past 50 years. It used to be normal for the community to share the cost of having children with the parents while the decision to have them was left up to the parents. Having children involved a social subsidy so to speak, so that
the parents’ private costs were smaller. Typically this subsidy per child rose as the number of
the family grew. The fertility decision is thus influenced by an externality.

**Impatience Poverty Trap**

Impatience traps are basically about the lack of savings. When the savings rate in a country is
sensitive to changes in income at low levels of consumption, the country can get stuck in a so
called impatience trap. The notion is that consumption early in life reduces the degree of
impatience for subsequent consumption. A poverty trap will exist if the fraction of
subsistence consumption in GNP is sufficiently sensitive to past income whenever that
income is within a critical range. The trap prevents sustained growth because, as income
expands inside that range, the young adjust sharply upward their old-age subsistence
consumption and saving increases only a little.

**Globalisation Poverty Trap**

Globalisation means that countries become more open and that international trade expands.
In Azariadis (1996) it is argued that the more open an economy is, the less likely it is to get
stuck in a development trap. Measures of foreign trade openness can thus help to explain the
clustering of middle-income economies into high-growth and low-growth groups. Final
output is regarded as the output of combining two intermediate inputs. These two
intermediate inputs are tradable. They are produced by combining two primary input, capital
and labour, which cannot be traded.

Through some mathematical computation it is shown that small open economies exchange, at
fixed terms of trade, relatively capital-intensive intermediate goods against relatively labour-
intensive ones and, therefore, are less prone to fall into development traps.

### 3. How to Pass the Critical Threshold?

If a country is caught in a poverty trap and therefore is not able to be on a sustainable high-
growth path, it is crucial to be able to attract foreign capital, either via FDI or aid. These are
the channels through which the country will be able to pass the critical threshold.
Savings and FDI

Saving is a result of a long line of factors in society, but when a developing country starts saving it sends two important signals to potential trading partners and investors: 1) The population has so much surplus relatively, that it is possible to save at all. There will of course still be substantial amounts of the population who are not able to save, but the mere fact that the savings rate rises indicates an economic surplus in the country. Otherwise the savings would float to more safe countries as Luxembourg or Switzerland, which has occurred in a lot of developing countries. This surplus will be channelled towards productive activities, since saving doesn’t give a sufficient pay. That means that savings bring along more firms with a healthy financial base. 2) When the people of a country saves, it indicates that they believe in their own future (that I will not die of hunger or war tomorrow), but also that the political system has reached a level of stability such that there is not the risk that money will not be worth anything because of unforeseen devaluations, political coups, or other things that might threaten the savings. As a trading partner or potential investor it can be difficult to evaluate to which extend a country’s leadership is stable and to which degree the population has faith in the political and financial institutions. This is why the citizens’ savings decisions is very valuable information to the market. In this context higher savings act as a positive signal to the market.

Trust and stability are crucial factors for attracting FDI and trade on the global market: If a firm wants to go through with one deal, one time, the prices will be higher since there is no intention to establish a long lasting trading relationship. One interaction doesn’t require a lot of trust. If you however strive to have continuous exchange of goods, you have to have trust in your trading partner (that they don’t go bankrupt tomorrow) and trust towards the country from where your trading partner operates.

It is safe to establish an ongoing relationship with a Swedish firm, but that is not necessarily the case with firms from the developing countries, where devaluation and political crises can delay or ruin the relationship.

In a global economy delivery on time is of high importance since keeping large stocks is not profitable, therefore you depend on having trading partners who can deliver on time and in the right quality.
In a globalised world where capital and brain power flow ever more freely and where researchers have a tendency to seek places where there are lots of researchers to interact with, the speed of innovation has increased dramatically over the past decades. Globalisation is making this joint forces of the rich and clever possible, leaving behind those not able to surf the globalisation wave and instead get crushed by it, widening the gab between leaders and followers.

Solving the poverty trap and passing the critical threshold through FDI has a lot of requirement, some are mentioned above. Countries that are unable to attract FDI have no choice but to rely on aid in order to overcome the poverty trap.

**Poverty Traps and Aid**

It is quite common to follow the rational, that poor countries are caught in a poverty trap and that they need a big push involving increased aid and investment which will lead to a takeoff in per capita income. This was originally the justification for foreign aid. During the 80s and 90s this point of view became less popular, but has made a big comeback in the new millennium as rationale for large foreign aid programs. Aid as a means to overcome poverty and set in motion a positive spiral leading to increased growth rates has so far however, not established an outcome in accordance with growth theory.

Easterly (2005) argues that evidence to support the point of view that a poor country receiving large sums of aid will experience a “takeoff” is scarce.

The notion of a takeoff is not supported in the data, and the only examples are the Asian success stories. Their takeoff was not even particularly associated with aid or investment, as the standard big push story would predict. Easterly concludes that he find scare justification for foreign aid in the actual experiences of economic development. He finds that the factors leading to slower growth in poor countries than in rich are associated with democratic institutions and economic freedom. He argues that development happens when many agents have the institutional environment that allows and motivates them to take small steps from the bottom, as opposed to development happening from a “big push” planner at the top.

Kraay et al. (2005) express the same concerns about expecting a scaling-up of aid to be the necessary condition for sharp and sustained increases in growth for poor countries. They do not find evidence for threshold effects making sufficiently high levels of aid necessary to “jump-start” a sustainable growth process. A large expansion of aid is thus not a necessary condition to improve the future for these countries.
4. Conclusions

It is evident that the shape of the distribution of output per worker across countries has changed from 1960 to 1998. There is however not an uncontested explanation on why this has happened. Beaudry et. al (2005) finds that it is a case of a change in the importance of two factors, the investment rate and the population growth rate. Feyrer (2003) finds that the technological residual is moving toward a twin peaked distribution like the one found in per capita output, and that it appears to be productivity differences that are driving the twin peaked result.

The notion that it be investment (savings) and population growth that drives the hollowing out, links very well to traditional growth theory. When understanding the possible dynamics of poverty traps, it is interesting to turn to solutions. According to theory, if enough aid is provided it should be possible to escape a poverty trap. This notion justifies aid programs, but is challenged in Easterly (2005) and Kraay et. al (2005) who both refer to empirics and stress that evidence to support the point of view that a poor country receiving large sums of aid will experience a “takeoff” is scarce.

Whether or not one believes in poverty traps it seems that poor countries adopting an open approach to trade and who have been able to attract FDI, have had a chance of escaping poverty. Aid has less so provided this opportunity.
References


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