

# Shifting Economic Power<sup>1</sup>

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## Abstract

Here, I discuss both alternative meanings of shifting economic power and possible metrics which may be used to capture its quantitative dimensions. The third sense of power is very difficult to quantify. That economic power is shifting away from the OECD to rapidly growing low wage economies seems to be a consensus view. How to conceptualize and measure it is the task addressed here, although shifts in relative terms may not be occurring in the same way as in absolute terms. I focus on economic power both in its retaliatory and bargaining senses, as well as soft power in terms of intellectual climate and reputation.

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## 1. Introduction

The pre- crisis prospect of continuing high GDP growth rates in and accelerating growth rates of exports from the large population economies of China and India combined with elevated growth in ASEAN, Russia, Brazil and South Africa (despite the recent global financial crisis) has led to speculation that over the next few decades global economic power will progressively shift from the Organisation for Economic Co-operation and Development (OECD) (specifically the US and the EU) to the non-OECD, and mainly to a group of large population rapidly growing economies which include Brazil, Russia, India, China, South Africa, ASEAN, Turkey, Egypt and Nigeria.<sup>2</sup> With this shift in power, the conjecture is that the global economy will undergo a major regime shift as global architecture and rules, trade patterns, and foreign direct investment (FDI) flows all adapt and change. As Hoge (2004) puts it: “major shifts of power between states, not to mention regions, occur infrequently... this time the populous states of Asia are the aspirants; ...the transformation of the international system will be even bigger and will require the assimilation of dramatically different political and cultural traditions”.

This paper discusses conceptually what is meant by the term ‘shifting economic power’ and traces through some of its possible dimensions and implications. It also sets out alternative approaches that might be used to develop quantitative metrics of economic power shifts. Shifting power involves both influencing access to markets at home and abroad, influence over bargaining, and also intellectual influence over policy debate. The third of these is, however hard to quantify. How and to what extent power is shifting or may shift in the future is a current policy concern, and both economic growth performance and the expectation of future growth enter centrally.

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<sup>2</sup> See the earlier Goldman-Sachs projections of growth performance for BRICs and their global implications (Brazil, Russia India, and China) in Wilson D., Purushothaman R. (2003)

## 2. Economic Power and How It Shifts

Economists have written relatively little both on concepts of power [see Cooper (2003)], and metrics which can be used to capture the size of power shifts. They typically treat power as an area reserved for political scientists. However, power, even before one gets to economic power, is an elusive concept. In natural sciences, power is often equated with force and so in its economic manifestation seemingly implies compulsion; the ability to force or persuade others to comply with the wishes of communities exercising power. Precisely what it is in an economic context is hard to define, as it involves more than size of economies and can be exercised indirectly as well as directly. Whether economic power is now aggressively sought by non-OECD countries and will be assertively used globally in the future, or whether it will merely passively accrue to these more rapidly growing entities is also unclear. And whatever power is involved, it almost certainly has more potential impact if exercised collectively by groups of countries rather than individually and alone.

Prior to discussing these elements of shifting global economic power in more detail along with their implications for global structure, some discussion of power itself is also called for, as well as the specific forms it takes in the exercise of economic power. Previous writers in various disciplines have pointed to the inadequacy both of various definitions of power and to weaknesses in the conceptual underpinnings of the term power itself. In the physical sciences, power is usually equated with force, as illustrated by electrical current or horse power as measures of force exerted. In the social sciences, however, many problems arise with a simple transfer of the notion of force to social interactions. Social power as force seemingly relates to the ability of one individual (or group of individuals) to influence or coerce others. But there is no agreement over whether this term refers to the sum of individual power or more than its sum, the use of power through social mechanisms (socially established instruments such as conventions, rules, or threats), or the exercise of power through persuasion. Thus, the meaning of social power (unlike physical power) is elusive.

For instance, what is implied in discussing the power of, say, the Chairman of the

Federal Reserve Board to influence financial markets? Does this power stem from the office he occupies, his personal abilities while in the office, and the way he uses them once in office, the expectation markets have formed over his influence and abilities, or other factors? Probably all are involved, but the notion of power implied when making such a statement remains elusive. Equally, when an event occurs it is often difficult to ascertain exactly how power might have been involved. Does the American dollar fall because China decides to redeploy foreign reserves, or does a Chinese decision on reserve management follow a downward move in the dollar? The simultaneity between power, its exercise, and observed events makes it difficult (even impossible) to separate out the power component.

White (1972) argues that rather than discussing power in its social context, one has instead to discuss the exercise of power. And, the exercise of power may be intended and even deliberate to achieve a specified effect, or merely a byproduct of an action taken with other intent. White quotes Bertrand Russell (1960) who suggested that “Power may be defined as the production of intended effects” and emphasizes that not only is intention hard to ascertain but such a definition makes a proposition such as “the US President has power” hard to interpret. Collective and coalitional activity are also central to the social exercise of power. If, say, Brazil decides to contest a trade action by the US and is able to harness active support from the European Union (EU), Japan, Canada, China, India and others, Brazil may well prevail, while individually it may not.

The elusiveness of a general all purpose definition of power when talking of global economic power and how it may be shifting towards the non-OECD implies that a discussion of such power needs to take place using concepts of power applied to the particular discussion at hand. Under this view, the context for any discussion of power will change from case to case, a position taken by Simon (1953) and Dahl (1957).

In its shifting global economic dimensions, economic power can be thought of as consisting of several key elements which are themselves interlinked and mutually reinforcing. One involves the current and prospective relative size of economies and is power that can be unilaterally exercised largely on the basis of market size. It is the

ability of individual countries, groups of countries, or even groups within countries to either compel or persuade other countries to act (or at least contemplate acting) as they otherwise would not by the threat or actual use of penalties or inducements of various forms. Examples include a threatened denial of market access via a threat of an increased trade barrier, a harsher policy towards inward foreign investment already located in the territory, or other such actions often grouped under the heading of retaliatory power.

This element is thus the power to inflict penalties on rival countries either as part of an economic conflict (such as a trade war) or unilaterally. There may be a greater need to comply with the threat if the exercise of power is narrowly focused on individual countries more so than on groups of countries. But the perceived severity of the threat is a function of the number of countries making the threat and their size, since the threatened countries can simply switch economic activity to non-threatening countries. Power in this dimension is also a reflection of the degree of economic interdependence (or integration) between countries as, if trade is only small, a threat to restrict trade is only a limited penalty. With accelerated globalisation, the conjecture is that the power of individual countries (or groups of countries) in this sense has grown, and will likely continue to grow. Thus, any shift in the power of the non-OECD in this sense is a function of the depth of integration with the OECD. It is worth noting that retaliatory power reflects the ability to impose penalties and is thus more than the withdrawal of cooperation.

A second element of economic power is reflected in the willingness of individual countries (or groups of countries) to act cooperatively either in international negotiations on jointly agreed arrangements (rules for want of a better term) or through other jointly agreed actions. This is manifest in bargaining power more so than in retaliatory power, and reflects the marginal value of countries to various sub-global coalitions. Power in this sense not only reflects the current size of economies but also their expected future size through growth. This notion of power is at the heart of the Shapley (1953) Coleman (1971), and Banzhaf (1966) value concepts sometimes used for measuring power in cooperative non-zero sum game settings. In its simplest formulation, Shapley value and related concepts deal with a one good world and the sharing of a pie (transferable utility)

and thus do not capture gains from trade directly, but if an underlying structural model is appended to generate utility possibilities such considerations can enter.

Thus, in global negotiations, rules set today establish the framework for future interaction, and provide the international legal basis for both ongoing and prospective country interaction. Influencing how global rule regimes emerge shapes the rules of the game in the future, and affects countries (or groups of countries) that can exert power based on expected future size in negotiating these rules. Equally, agreeing to act jointly in some way through agreed rules and strategies applying only to a sub-group of countries can be an exercise of power. Joint strategies in the deployment of foreign reserves, policy towards inward foreign investment and in other areas serve as examples. But economic power in these dimensions is also linked to power to coerce, and expectations of future growth again come into play in assessing the size of force this implies. As with retaliatory power, coalitional activity between groups of countries also enhances power in these bargaining or cooperative senses.

A third dimension of shifting global economic power reflects underlying intellectual, reputational, or other so called soft power considerations and embodies the use of persuasion and philosophical argument to influence rivals so as to persuade them that the actions sought from them are also in their own interest. For want of a better term it is the legitimacy which typically underlies most exercise of power. If rivals can be persuaded to accept the intellectual arguments made by proponents as to what is in their self-interest, this can lead to compliant action independent of the application of penalties for violation of rules. In its global context, power in this sense rests on the acceptance by others of agreed intellectual underpinnings to cross border collective arrangements.

A central element in power in this sense is the now generally accepted desirability of market process over centralized decision making by most countries, and along with this a general belief that free trade, openness and integration into the global economy are the mark of successful development strategies. These beliefs stand in sharp contrast to the widely accepted arguments made in the non-OECD up to the mid 1980s in favour of import substitution policies and development based on insulation from the global

economy.

The acceptance of openness as consistent with self-interest has lead many poorer to middle income non-OECD countries away from inward focused import substitution development strategies towards pursuit of outward oriented strategies for export and FDI led growth. Along with this has also come increased dependency on global interaction and inevitably heightened potential exercise of power against them. Their growth and openness has increased not only their own power due to their own market size but also the power of the OECD against them because of increased trade and capital flows.

In the case of China, the large trade imbalances imply relatively more power to the OECD to restrict Chinese exports than power to China to restrict imports. Against this is the heightened power accruing to China from exercise of reserve policies. These beliefs in market process, decentralisation, and individual liberty have deep roots in Western philosophical traditions. But with shifting global economic power come different developmental models in the non-OECD which challenge to some degree the accepted philosophical underpinnings of the pre-shift global structure. This will especially be the case as their strong economic performance is seen to rest on differing and more communally centred philosophical value systems, as with China.

In discussing shifting economic power as it applies to global economic activity, it is also important to emphasize power as the ability of subgroups of economic actors (countries or groups of countries) to influence the economic behaviour of other subgroups (other countries). This can occur through their own actions which influence the outcome of markets (prices and quantities) in ways that significantly affect others, their use of various interventions to control the economic activity of others so as to deny or grant opportunities to others to engage in economic activity, and influence they may have over the legal or social framework within which global economic activity jointly occurs. It may be that by threat of action, or persuasion (or a combination) that desired actions are seen as mutually desirable. Joint or coalitional activity by subgroups of actors can also enhance the power of individual members of subgroups. Similarly, the more interdependent actors are in their ongoing economic interactions the more power other

agents have to threaten, disrupt, deny, or reward actions.

Also, in discussing shifting economic power, the focus is on the economic power of nations, even though in reality economic power is also exercised by subgroups within countries. This exercise of power typically reflects the interests of the subgroup rather than the national interest. In simple terms, nations which are large can influence markets as their own economic activity changes. This can involve goods, factors, and asset markets. The ways in which groups both within countries or countries themselves allow or deny access to goods and factor markets or move the assets they control between markets or asset categories also affects the opportunities available to other countries. Simultaneous actions by groups of countries enhances such power, and in ways which are typically nonlinear rather than linear.

Economic power will also shift as both economic and non-economic circumstances change. Demographic change affects the relative size of countries, and its markets. Economic growth has similar effects. Increasing interdependence affects state power as trade growth (typically more rapid than economic growth) changes the ability to disrupt or deny access. This ability may reflect not only access but also increased complexity of production and distribution processes, such as just in time inventory management, and also more rapid (electronic) financial transactions. Expectations of future growth will further affect the ability of countries to exercise power, and so power today can emanate in part from growth expected tomorrow. Combined with the changing intellectual climate, and how this can be influenced by the economic success or failure of individual countries, economic power will shift globally as change occurs.

It has yet to be fully ascertained how major a regime and power shift is now under way globally and how much power is shifting from the OECD to the non-OECD, and whether this power shift will accelerate in the future. But the impact of expectations and rapid change suggests that global economic power as discussed here is being rapidly acquired by non-OECD countries. China's foreign reserves, for example, have grown to US\$2 trillion today from around US\$70 billion in 1995, and can now finance major foreign acquisitions abroad [see Antkiewicz and Whalley (2006)]. The non-OECD

countries, while being active single entities, are also beginning to explore collective activities such as the recent discussions between Brazil, India and South Africa on a new trilateral commission (IBSA). And (pre-crisis) with the expectation of future elevated growth, more power gravitates to the non-OECD.

The leaves the issue of the impact of the financial crisis on OECD – non-OECD power shifts. Given that the size of trade has fallen sharply, along with expectations of its continued growth, then power of both the OECD and non-OECD in a retaliatory sense would seem to have fallen. But as OECD growth rates have fallen further than non-OECD growth rates (especially China), and so the differential in growth rates has risen in relative terms, power may shift to the non-OECD

### **3. Retaliatory and Bargaining Elements in Shifting Global Economic Power**

Above, I argue that shifting economic power in its global form embodies retaliatory, bargaining and intellectual (persuasion) elements. Here I briefly discuss the first two of these for which there are formalizations which exist in the literature. The third component I return to later.

#### *Retaliatory Power*

There has been a long-standing discussion in the international trade literature of retaliatory power exercised in tariff games. This is associated with Bickerdike (1906), Scitovsky (1940), Johnson (1953), Gorman (1957), Hamilton & Whalley (1983) and others. In this literature, non-small economies can influence the terms at which they trade by restricting trade volumes through an import tariff. They forgo some of the gains from trade achieved at free trade, but are able to lower prices of imports. The trade off between these two effects establishes the basis for country optimal tariffs. If countries retaliate against each other, the outcome will typically be a Nash equilibrium in the two (or multi) country tariff game. Scitovsky originally suggested that in a tariff war all trade would necessarily disappear, a position which Johnson later corrected by showing the existence of a Nash equilibrium with positive tariffs. There are many variants on a Johnson-Nash tariff game in the literature.

One is a recent paper by Whalley, Yu & Zhang (2008). They discuss how trade retaliation in monetary trade models where trade surpluses and deficits are endogenous differs from trade retaliation in classical goods-only models. This is highly relevant to today's world where some countries have large trade surpluses (China) and others large deficits (US). It also relates to the power embodied in the potential use of reserves.

They present a simple multi-good trade model which captures trade both through

space and time in the form of inside money as extensively used in macro literature on one good overlapping generations models [see Azariadis (1993)]. Trade through time and space can be thought of as comparable, and inside money (debt) issued by one country will in equilibrium offset inside money (debt) acquired by the other. The equilibrium price of debt will determine an interest factor, which along with the commodity terms of trade can be changed by trade policy interventions. Optimal trade policy for single countries will therefore differ from that in a conventional goods-only trade model with balanced trade in goods, and outcomes of Nash tariff games will be similarly affected.

Models in which trade takes place geographically across countries and through time in financial assets simultaneously are little explored in the literature. Traditional trade models impose a classical separation between real and monetary sides, while models of inter-temporal exchange usually limit themselves to one good. This is inherently unsatisfactory, however, if one is considering trade policy responses in economies such as the US with a large trade deficit, or China with a large trade surplus. If trade interventions affect both the amount and price of inter-temporal exchange, optimal policy needs to be appropriately modified. Countries which run large deficits in goods trade will have more retaliatory power compared to balanced trade, and countries running surpluses less. Outcomes of Nash tariff games will thus be affected.

They construct a monetary trade model for the two country two good case, and, for simplicity, consider a simple pure exchange case. Such a model has no closed form solution, but it can be used for numerical analysis. Model solutions using parametric specifications from a calibration to a 2005 Chinese/Rest-of-World (ROW) data are first used to analyse individual country optimal policy in this framework assuming no strategic response from the other country. Results indicate the additional impacts of considering inside money effects which depend upon both country differences in rates of time preference, and the relative size of commodity and inter-temporal trade. The additional effects involved are substantial. Since China runs a trade surplus, their no response optimal tariff is significantly lowered. Comparing results to trade retaliation within the same framework thus allows us to assess Nash equilibria in tariffs between the

two countries both with and without the added element of inter-temporal trade. Once again, the added effects from inter-temporal trade are substantial and depend upon similar considerations to the no retaliation case.

The conclusion they offer is that in today's world of current account surpluses and deficits across large trading entities (US, China, for example) using conventional balanced trade (or exogenous trade imbalance) models will typically be misleading as a way to analyse optimal trade policy interventions. Trade deficit countries will typically have higher optimal tariffs and trade surplus countries have lower optimal tariffs than balanced trade models suggest. While models with endogenous trade imbalances may not yield analytical closed form solutions, in numerical simulation work there seems little reason not to use models with such monetary trade interactions. This is especially so when evaluating trade policy options and outcomes of Nash tariff games.

More concretely, they consider a two country ( $i = 1, 2$ ) and two good ( $l = 1, 2$ ) pure exchange general equilibrium model in which claims on future consumption enter preferences and are traded between countries. In this, each country has a single representative consumer, with endowments of the two goods ( $E_{il}; i = 1, 2, l = 1, 2$ ) and can either issue or buy claims on future consumption using current period income. For simplicity, they use Cobb-Douglas utility functions

$$U_1(X_{11}, X_{12}, Y_1) = X_{11}^{\alpha_{11}} X_{12}^{\alpha_{12}} Y_1^{\alpha_{13}}, \quad \alpha_{11} + \alpha_{12} + \alpha_{13} = 1 \quad (3.1)$$

$$U_2(X_{21}, X_{22}, Y_2) = X_{21}^{\alpha_{21}} X_{22}^{\alpha_{22}} [Y^0 - Y_2]^{\alpha_{23}}, \quad \alpha_{21} + \alpha_{22} + \alpha_{23} = 1 \quad (3.2)$$

where  $X_{il}$  denotes the consumption of good  $l$  for country  $i$  and  $\alpha_{il}$  is the share parameter for good  $l$  for country  $i$ .  $Y_i$  denotes the inside money for country  $i$ ; in equilibrium  $\sum_{i=1}^2 y_i = 0$ .  $y_i > 0$  indicates issuance of inside money, i.e. the granting of credit to the other country;  $y_i < 0$  denotes the use of credit which must be repaid from future

consumption.  $Y^0$  is a term which can be interpreted as endowments of future consumption for the country that issues credit. They assume  $Y^0$  is such that  $Y^0 - y_2$  is always positive so that the term is positive in the utility function.

This treatment implicitly assumes that the direction of intertemporal trade is given (country 2 is the issuer of credit and country 1 is the purchaser). This allows for the issuance of inside money by country 2. This treatment is analogous to assuming the direction of trade in regional trade models, an assumption commonly used in customs union literature [see Abrego, Riezman and Whalley (2003)].

Thus, in this structure, Country 1 has a standard Cobb-Douglas utility function and a budget constraint, and the utility maximization problem is as follows.

$$\begin{aligned} \max \quad & U_1(X_{11}, X_{12}, Y_1) = X_{11}^{\alpha_{11}} X_{12}^{\alpha_{12}} Y_1^{\alpha_{13}} \\ \text{s.t.} \quad & P_{11}X_{11} + P_{12}X_{12} + P_0Y_1 = I_1 \end{aligned} \quad (3.3)$$

Demands by Country 1 (including future consumption) are

$$X_{11} = \frac{\alpha_{11}I_1}{P_{11}}, \quad X_{12} = \frac{\alpha_{12}I_1}{P_{12}}, \quad Y_1 = \frac{\alpha_{13}I_1}{P_0}. \quad (3.4)$$

For Country 2, the utility function is decreasing in inside money since they are the issuers. The utility maximization problem in this case is

$$\begin{aligned} \max \quad & U_2(X_{21}, X_{22}, Y_2) = X_{21}^{\alpha_{21}} X_{22}^{\alpha_{22}} [Y^0 - Y_2]^{\alpha_{23}} \\ \text{s.t.} \quad & P_{21}X_{21} + P_{22}X_{22} - P_0Y_2 = I_2 \end{aligned} \quad (3.5)$$

(3.5) cannot be solved directly, but if the transformation  $y_2 = Y^0 - Y_2$  is used, then the budget constraint is changed to  $P_{21}X_{21} + P_{22}X_{22} - P_0[Y^0 - y_2] = I_2$ , or

$$(3.6)$$

$$P_{21}X_{21} + P_{22}X_{22} + P_0y_2 = I_2 + P_0Y^0 \equiv I'_2$$

They use the structure set out above to numerically investigate optimal trade policies in a series of model specifications each involving calibration to a base year data set. Given the size of the trade imbalances in the Chinese case, they focus on China and use a two country (China and ROW) formulation. They use 2005 data and first calibrate the model to observed trade flows and trade imbalances for China. The numerical investigations they report on involve computing both own country optimal policy assuming no retaliation from trading partners, as well as cases where retaliatory interplay between countries occurs taking the two country economies to a Nash equilibrium. They compare outcomes between similar structures with and without the added element of inside money to assess the impact on optimal trade policies of adding monetary structure. They employ GAMS solution software in computing alternative model solutions.

### Shapley-Coleman-Banzhaf Values

Notions of power reflecting bargaining power and its influence on cooperative behaviour rely centrally on the notions of the Shapley Value for cooperative non-zero games and the related indices of power used by Coleman (1976) and Banzhaf (1971) . The Shapley Value was proposed by Lloyd Shapley as part of his 1953 PhD dissertation, but since its development in the 1950's, it has been applied widely to problems in a number of disciplines including economics and political science.

Basically, the Shapley Value derives from games in which there is transferable utility, such that the utility of one player can be transferred to another. Such games are usually represented in characteristic or reduced form, meaning that the payoffs for players are associated with alternative joint strategies which they can pursue. In strategy-space, there are utility payoffs to the players which are functions of all the combined

strategies of the players. In the literature on Shapley values underlying structural models which generate the utility payoffs are not specified and so elements underlying utility contributions, such as the gains from trade, are not directly captured.

The Shapley Value is then the worth or value of one of the players of the game in terms of the amount of the surplus from the game which they can potentially claim or extract by joining or offering to join various coalitions. The Shapley Value, in effect, is the marginal contribution of a player to the collective outcome calculated as an average of the marginal contribution a player can receive from the player's contribution to a series of potential coalitions. The value of a player is given by a relatively simple functional form which can be computed, and this is the Shapley Value. For a discussion of shifting power, the interest is in how Shapley Values, as a measure of power, may change with growth and relative country size (or expected growth and size).

To develop the Shapley Value, Shapley proposed a series of key axioms which now are taken to underlie the Shapley Value concept. One was that the payoffs accruing to the various players of the game must add up to the solution of the characteristic function for the grand coalition of all players, meaning that the total surplus from participation in the game has to be fully allocated to the players. He also required that symmetry holds, so that if two players are substitutes for each other because they contribute the same amount to each coalition, a solution in terms of the Shapley Value would treat them equally. He also imposed a restriction that there be additivity, in that the solution to the sum of two transferable utility games must be the sum of what is awarded to each of the two games for the players. And equally, if a player contributes nothing to a coalition then the solution in terms of the Shapley Value should be zero.

Shapley established the result that there was a unique single valued solution (the Shapley Value) to transferable utility games satisfying these axioms and that is what, today, is used as the Shapley Value. The Shapley Value is a measure of power in the sense that it represents, on average, what contribution a particular player (or country in the case of shifting economic power) could make to the joint outcome through offers to join a series of coalitions. As economic power shifts then, the intuition is that the Shapley

Value of more rapidly growing countries would increase, although there is little literature on the numerical behaviour of the Shapley Value under power shifts; whether or not its behaviour is linear or non-linear or even monotonic in country size, for instance. Importantly, as power shifts both OECD and non-OECD countries would experience an increase in power through a larger Sharply valve, so in relative terms the Shapley value for the OECD countries could rise more that for the non OECD countries. Relative and absolute shifts in power are therefore different.

There have been subsequent developments in ongoing Shapley Value literature including by Young (1985), where Young develops a dual to the Shapley Value in the sense that the marginal contribution of players to coalitions is computed and the additivity properties in terms of the solution of the sum of two transferable utility gains equalling the sum of what is implied by each of the two gains are then derived as the central result.

In discussing shifting economic power, the Shapley Value provides an operational construct for the notion of bargaining power and how shifting power affects it. As a country's size and bargaining power increases, its Shapley Value should increase. The Shapley Value can then be computed as reflecting bargaining power over cooperative agreements including multilateral trade policy and other outcomes in a global economy characterised by trade and production.

The closely related indices of power due to Coleman (1971) and Banzhaf (1966) differ from the Shapley value in terms of their voting interpretation. If joining a voting coalition provides a winning coalition, the Coleman index give the proportion of permutations of members in which member  $i$ 's defection is critical, and the Banzhaf index give member  $i$ 's proportion of critical defections. There indices are closely related but behave differently.

## **4. Shifts in Non-OECD Power and the Global Economy**

Economic power in the dimensions I set out above rests on three pillars: countries' abilities to either singly or jointly force change by restricting (or threatening to restrict) the economic opportunities of others, country influence over possible collectively bargained actions such as in negotiations in the setting of global rules for country conduct or deployment of assets (foreign reserves), and the influence countries (or residents of countries) may exercise over the intellectual climate which lend legitimacy to joint global arrangements.

In assessing the first of these elements of power several factors enter. One is the size of country economies and the markets to which access can be granted, denied or limited in some capacity. In a structural model of trade it is important to note that more than country size enters since trade elasticities also affect the ability of countries to inflict trade penalties on others. One also needs to consider the size of a country's trade. The size of country reserves reflects the ability to influence global financial markets through the ways reserves are deployed. The size of FDI inflows into and stocks in a country indicates the potential to affect foreign investors through changing taxes and domestic regulatory arrangements. Economies that are more autarchic and less trade dependent have less potential for truncation of trade by other countries to disrupt their economic activity.

Additional factors also enter. One is the nature of production and trade. If domestic production involves a large array of imported components, or uses just in time inventory management, it can be more easily disrupted by foreign actions than if processing trade is absent. In this sense, foreign investors can have increased ability to affect production processes as these mechanisms become more internationally interdependent.

The current focus on shifts in the global economy focuses on developments beginning in the early 1990's. Some characterise the shift as being associated with the emergence of a group of lower income countries in which China in particular and to a

lesser degree India played a key role. Their growth is then associated with growing global imbalances, heightened volatility, and a marginalization of poor countries, especially in Africa.

What one takes as the discontinuity occurring in the early 1990's and whether or not it is a largely China/India phenomenon is central as to how this shift is interpreted. I see the change in the early 1990's as a policy change in the two largest population economies of the world from largely autarkic development to development based on global integration, with the aim of achieving major poverty alleviation. Changes in India followed the 1989 balance of payments crisis and resort to IMF assistance and over two years large reductions in tariffs, licensing (both import and industrial), and regulation followed. In China, after the 1976 adoption of the responsible system, changes in legal structure and new tax preferences in 1991-1994 generated a surge of inward FDI and trade growth. Effectively, 40% of the world's population were added to global labour pool, but with restrictions on labour migration to the OECD and elsewhere in the South in place. The incentive was to arbitrage these wage differentials through goods trade, in word FDI flows, outsourcing, and flows of new ideas, innovation, and new products.

I see this as the beginning of what will arguably turn out to be the greatest transformation, in the sense characterised by Polanyi (1944). Polanyi documented the changes over 200 years in Europe that defined the industrial revolution. The changes in China and India, however, occur in much more compressed time; perhaps 30 years and even shorter than the other Asian Transformation in Japan, Korea, and Taiwan. And so it is the speed and size of change concentrated in China and India which is the issue. As a result, it is no longer low income countries growing and joining the OECD; it is instead a merging of the OECD and large population Asia.

Beginning with relative country size, Table 1 sets out the absolute and relative sizes both of individual non-OECD countries and these countries as a group for the 3 years 1995, 2000 and 2007. GDP data using both current prices and official (market) exchange rates and also purchasing power parity calculations, as reported by the World Bank and the IMF, are used. The latter adjust estimates of country GDP for differences in

the prices of goods and services across countries not reflected in current exchange rates. These adjustments are critical to measures of country relative size for India and China, with smaller but still significant adjustments for other countries.

**Table 1. The Relative GDP Size of Non-OECD Countries**

| <i>Billions US\$</i>                | GDP current prices and official<br>(market) exchange rates |              |              | GDP at PPP rates |              |              |
|-------------------------------------|--|--------------|--------------|------------------|--------------|--------------|
|                                     | 1995   | 2000         | 2007         | 1995             | 2000         | 2007         |
| <b>Brazil</b>                       | 703.96   | 599.81       | 1,314.17     | 1,037.12         | 1,257.34     | 1,833.60     |
| <b>Russia</b>                       | 313.45   | 259.70       | 1,291.01     | 896.85           | 1,054.15     | 2,088.21     |
| <b>India</b>                        | 352.85   | 458.42       | 1,170.97     | 1,671.46         | 2,437.02     | 3,092.13     |
| <b>China</b>                        | 700.22   | 1,080.74     | 3,280.05     | 3,023.01         | 4,882.80     | 7,055.08     |
| <b>South Africa</b>                 | 151.12   | 132.96       | 277.58       | 336.21           | 415.90       | 463.33       |
| <b>ASEAN</b>                        | 673.58   | 595.99       | 1,275.24     | 1,524.74         | 1,871.37     | 2,566.25     |
| <b>All listed non-OECD</b>          | 2,895.18   | 3,127.62     | 8,609.02     | 8,489.39         | 11,918.58    | 17,098.60    |
| <b>World</b>                        | 29,184.97  | 31,455.18    | 54,347.04    | 34,185.95        | 44,728.69    | 65,435.07    |
| <b>Large non-OECD as % of World</b> | <b>9.9%</b>  | <b>9.9%</b>  | <b>15.8%</b> | <b>24.8%</b>     | <b>26.6%</b> | <b>26.1%</b> |
| <b>OECD</b>                         | 21,124.10  | 25,797.10    | 30,083.40    | 21,124.10        | 25,797.10    | 30,083.40    |
| <b>Large non-OECD as % of OECD</b>  | <b>13.7%</b>   | <b>12.1%</b> | <b>28.6%</b> | <b>40.2%</b>     | <b>46.2%</b> | <b>56.8%</b> |

Sources:

OECD 1995 data - OECD Economic Factbook 2005

OECD 2000 & 2007 data - OECD National Accounts Database, 2008

International Monetary Fund, World Economic Outlook Database, April 2005

World Bank Statistics, October 2008

Thus, at official exchange rates, the GDP of the large non-OECD countries in 1995 was around US\$3 trillion and had grown to US\$9.5 trillion by 2007. Comparatively, this is 10.9 per cent of Gross World Product in 1995 and 17.5 per cent in 2007. Of non-OECD GDP in 2007, China accounted for 34 per cent and India roughly 12 per cent. The relative size of the non-OECD is approximately 31.6 per cent of that of the OECD in 2007. Using purchasing power parity rates, however, this relative size increases substantially. Non-OECD product is US\$9.1 trillion in 1995 growing to US\$18.4 trillion in 2007; approximately 28 per cent of world product, and 61 per cent of the size of the OECD. China accounts for just over 38 per cent of non-OECD GDP, and India nearly

17 per cent.

However, it is with projections of continued growth over the next few decades that the relative size of the non-OECD takes on new dimensions ([as stressed also by Wilson and Purushothaman (2003)]. If we assume that 2007 rates levels of growth in India and China are sustained for a number of decades, and that the non-OECD as an entity grows at significantly above OECD growth rates then the non-OECD begins to dwarf the OECD quite rapidly.

For the purposes of illustrating the speed of possible non-OECD global ascendancy, I use two alternative assumptions of annual growth rate differentials between the non-OECD and OECD of 5 per cent and 6 per cent respectively. These may be relatively high; however assuming a low European growth rate of roughly 1 per cent and a North American or Japanese growth rate of 3 per cent gives approximately an OECD growth rate of 2 per cent. Implicitly, the assumption is that Chinese and Indian growth will continue at 7-8 per cent and that these growth trajectories will be matched by the rest of the non-OECD countries (admittedly a strong assumption).

Under such assumptions, one can calculate the date at which the large non-OECD will be bigger than the OECD. The dates are dependent on the assumed growth differentials and the valuation basis (official exchange rates or PPP). These calculations are reported in Table 2, with accompanying plots presented in Chart 1. Under the most optimistic assumptions for the non-OECD of a 6 per cent growth differential and using PPP GDP data as the valuation basis (and with PPP differentials assumed to persist) the large non-OECD exceeds the OECD in size by 2016. Under the less optimistic scenario

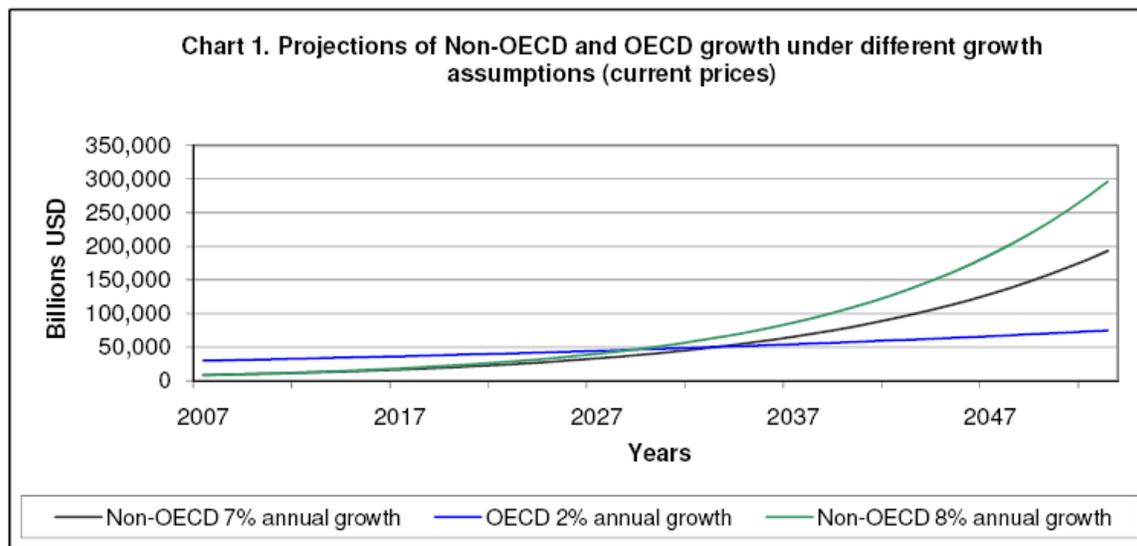
of a 5 per cent growth differential and using official exchange rates, the large non-OECD exceeds the OECD in size by the year 2031. Using a 5 per cent growth differential and PPP exchange rates, the large non-OECD is five times larger than the OECD by the year 2050.

The sustainability of non-OECD growth is central to such calculations, and there has been much discussion of whether Chinese annual growth rates of 8-9 per cent can be sustained for several more decades. Pessimists point to large non-performing loans in the banking sector, increasing inequality and political constraints on growth. Another consideration is the dependence in recent years of Chinese growth on inward platform FDI for export which currently accounts for over a half of exports and may plateau. Optimists emphasise the assumed continuation of this when predicting 15 or more years of sustained growth. Debates on sustainability of growth performance elsewhere (such as in India) are less well developed, in part because higher growth has occurred for shorter periods.

**Table 2. Projections of Relative Size of the Non-OECD Under Various Growth Scenarios**

| Years | Assumed Annual growth differential between Non-OECD and OECD % |      |                   |      |
|-------|--|------|-------------------|------|
|       | Non-OECD/OECD current prices                                   |      | Non-OECD/OECD PPP |      |
|       | 5%   | 6%   | 5%                | 6%   |
| 2007  | 0.29   | 0.29 | 0.57              | 0.57 |
| 2008  | 0.30   | 0.30 | 0.60              | 0.60 |
| 2009  | 0.32   | 0.32 | 0.63              | 0.64 |
| 2010  | 0.33   | 0.34 | 0.66              | 0.68 |
| 2015  | 0.42   | 0.46 | 0.84              | 0.91 |
| 2017  | 0.47   | 0.51 | 0.93              | 1.02 |
| 2019  | 0.51   | 0.58 | 1.02              | 1.14 |
| 2020  | 0.54   | 0.61 | 1.07              | 1.21 |
| 2025  | 0.69   | 0.82 | 1.37              | 1.62 |
| 2029  | 0.84   | 1.03 | 1.66              | 2.05 |
| 2030  | 0.88   | 1.09 | 1.75              | 2.17 |
| 2033  | 1.02   | 1.30 | 2.02              | 2.59 |
| 2035  | 1.12   | 1.46 | 2.23              | 2.91 |
| 2040  | 1.43   | 1.96 | 2.84              | 3.89 |
| 2045  | 1.83   | 2.62 | 3.63              | 5.20 |
| 2050  | 2.33   | 3.51 | 4.63              | 6.96 |

Projections based on data in Table 1.



Similar projections can be made for trade and specifically exports. Due to the much higher growth in non-OECD trade than product, the overtaking times become even shorter. Table 3 reports OECD/ non-OECD exports and imports along, in Table 4, with overtaking times under alternative assumptions of growth differentials of exports for the large non-OECD relative to the OECD. Non-OECD exports in 2004 were approximately 20 per cent of world exports or 35 per cent of those of the OECD. China is the dominant country, with roughly one third of non-OECD exports. In recent years, these have been growing steadily at 30 per cent a year. Under a high assumption of a 20 per cent annual growth differential for exports of the non-OECD relative to those of the OECD, by 2010 non-OECD exports exceed those of the OECD. Under a more pessimistic 5 per cent assumption this occurs in 2026.

**Table 3. Trade of Non-OECD and OECD (US\$ billions)**

| <b>IMPORTS</b>                |               |               |                 |                 |
|-------------------------------|---------------|---------------|-----------------|-----------------|
|                               | <b>1995</b>   | <b>2000</b>   | <b>2003</b>     | <b>2004</b>     |
| Brazil                        | 53.78         | 58.631        | 50.697          | 65.904          |
| Russia                        | 60.95         | 44.659        | 74.231          | 94.834          |
| India                         | 34.71         | 51.523        | 71.238          | 95.156          |
| China                         | 132.08        | 225.094       | 412.836         | 561.423         |
| South Africa                  | 30.55         | 29.695        | 41.084          | 55.2            |
| ASEAN                         | 355.33        | 370.585       | 391.091         | 491.279         |
| <b>Non-OECD Imports</b>       | <b>667.39</b> | <b>780.19</b> | <b>1,041.18</b> | <b>1,363.80</b> |
| OECD Imports                  | 3,419.50      | 4,777.00      | 5,020.00        | 5,478.70        |
| World Imports                 | 5,279.10      | 6,705.87      | 7,818.46        | 9,458.27        |
| <i>Non-OECD Im % OECD Im</i>  | <i>20%</i>    | <i>16%</i>    | <i>21%</i>      | <i>25%</i>      |
| <b>Non-OECD Im % World Im</b> | <b>12.6%</b>  | <b>11.6%</b>  | <b>13.3%</b>    | <b>14.4%</b>    |

| <b>EXPORTS</b>                |               |               |                 |                 |
|-------------------------------|---------------|---------------|-----------------|-----------------|
|                               | <b>1995</b>   | <b>2000</b>   | <b>2003</b>     | <b>2004</b>     |
| Brazil                        | 46.51         | 55.09         | 73.08           | 96.47           |
| Russia                        | 81.10         | 105.57        | 135.93          | 183.19          |
| India                         | 30.63         | 42.38         | 57.09           | 72.53           |
| China                         | 148.78        | 249.20        | 438.37          | 593.37          |
| South Africa                  | 27.85         | 29.98         | 36.48           | 45.93           |
| ASEAN                         | 321.42        | 428.70        | 456.80          | 549.73          |
| <b>Non-OECD Exports</b>       | <b>656.28</b> | <b>910.92</b> | <b>1,197.75</b> | <b>1,541.22</b> |
| OECD Exports                  | 3,395.85      | 4,435.00      | 4,619.60        | 4,981.10        |
| World Exports                 | 5,161.60      | 6,446.61      | 7,546.23        | 9,123.52        |
| <i>Non-OECD Ex % OECD Ex</i>  | <i>19%</i>    | <i>21%</i>    | <i>26%</i>      | <i>31%</i>      |
| <b>Non-OECD Ex % World Ex</b> | <b>12.7%</b>  | <b>14.1%</b>  | <b>15.9%</b>    | <b>16.9%</b>    |

Sources:

OECD data for 1995 - OECD Historical Statistics 1960-1997

OECD data for 2000 - OECD in Figures 2002 edition

OECD data for 2003 and 2004 - Main Economic Indicators September 2005

Non-OECD and World data - WTO Statistics

**Table 4. Projections of the Relative Size of Non-OECD to OECD Exports Under Alternative Growth Assumptions**

|              | Annual growth %     |                 |                 |                 |
|--------------|---------------------|-----------------|-----------------|-----------------|
|              | Non-OECD Ex/OECD Ex |                 |                 |                 |
| <i>Years</i> | <i>5%</i>           | <i>10%</i>      | <i>15%</i>      | <i>20%</i>      |
| <b>2009</b>  | 0.394899            | 0.498313        | 0.622341        | 0.76992         |
| <b>2010</b>  | 0.414644            | 0.548145        | 0.715692        | 0.923903        |
| <b>2011</b>  | 0.435376            | 0.602959        | 0.823046        | <b>1.108684</b> |
| <b>2013</b>  | 0.480002            | 0.729581        | <b>1.088478</b> | 1.596505        |
| <b>2015</b>  | 0.529202            | 0.882792        | 1.439512        | 2.298967        |
| <b>2017</b>  | 0.583445            | <b>1.068179</b> | 1.903755        | 3.310513        |
| <b>2020</b>  | 0.675411            | 1.421746        | 2.895373        | 5.720566        |
| <b>2025</b>  | 0.862014            | 2.289736        | 5.82363         | 14.2346         |
| <b>2029</b>  | <b>1.047784</b>     | 3.352403        | 10.18556        | 29.51687        |
| <b>2030</b>  | 1.100173            | 3.687643        | 11.7134         | 35.42024        |

Projections based on data in Table 3.

Tables 5 and 6 report data on both FDI inflows into non-OECD countries and their stock of FDI. These present a somewhat different picture of more modest shifting power towards the non-OECD than in GDP or trade, in large part due to restraints on financing from the OECD. Non-OECD inward FDI grew from US\$85 billion in 1995 to US\$100 billion in 2003. But there has also been both major country reallocation of this FDI (sharply towards China and away from Brazil), and volatility in the year by year data (see Brazil). Thus, if non-OECD growth is viewed as FDI dependent, these data suggest more caution on assumed continued high growth trajectories for the non-OECD and perhaps slower power shifts.

**Table 5. FDI Flows into the Large Non-OECD (US\$billion)**

|                       | 1995          | 2000          | 2002          | 2003          |
|-----------------------|---------------|---------------|---------------|---------------|
| <b>Brazil</b>         | 4.405         | 32.78         | 16.59         | 10.14         |
| <b>Russia</b>         | 2.065         | 2.71          | 3.46          | 1.14          |
| <b>India</b>          | 2.151         | 2.32          | 3.45          | 4.27          |
| <b>China</b>          | 37.521        | 40.72         | 52.74         | 53.51         |
| <b>South Africa</b>   | 1.241         | 0.89          | 0.76          | 0.76          |
| <b>ASEAN*</b>         | 28.231        | 23.38         | 13.73         | 20.30         |
| <b>Total</b>          | <b>75.61</b>  | <b>102.79</b> | <b>90.73</b>  | <b>90.13</b>  |
| <b>World</b>          | 335.734       | 1387.95       | 678.75        | 559.58        |
| <b>Non-OECD/World</b> | <b>22.52%</b> | <b>7.41%</b>  | <b>13.37%</b> | <b>16.11%</b> |

\*ASEAN Data: ASEAN Statistical Yearbook 2004

Source:

UNCTAD FDI Database [www.unctad.org/fdistatistics](http://www.unctad.org/fdistatistics)

**Table 6. FDI Inward Stocks in Large Non-OECD Countries (US\$billion)**

|                        | 1990           | 1995           | 2000           | 2003            |
|------------------------|----------------|----------------|----------------|-----------------|
| <b>Brazil</b>          | 37.143         | 41.696         | 103.015        | 128.425         |
| <b>Russia</b>          | ..             | 5.465          | 25.226         | 52.518          |
| <b>India</b>           | 1.657          | 5.641          | 17.517         | 30.827          |
| <b>China</b>           | 20.694         | 134.869        | 348.346        | 501.471         |
| <b>South Africa</b>    | 9.221          | 15.016         | 43.462         | 30.376          |
| <b>ASEAN</b>           | 91.794         | 176.908        | 293.316        | 344.789         |
| <b>Total</b>           | <b>160.509</b> | <b>379.595</b> | <b>830.882</b> | <b>1088.406</b> |
| <b>World</b>           | 1950.303       | 2992.068       | 6089.884       | 8245.074        |
| <b>Non-OECD /World</b> | <b>8.23%</b>   | <b>12.69%</b>  | <b>13.64%</b>  | <b>13.20%</b>   |

Source:

UNCTAD FDI Database [www.unctad.org/fdistatistics](http://www.unctad.org/fdistatistics)

Table 7 reports data on the foreign reserves of the non-OECD. These have increased from nearly US\$320 billion in 1995 to close to US\$3000 billion in 2007. Chinese foreign reserves have increased in the last few years to over US\$2.5 trillion as of the end of 2008 (representing over a 2000 per cent increase over 1995). Currently, China

has reserves which account for almost half of total non-OECD foreign reserves. This reflects both the large trade surplus that China has been running in recent years and inward FDI. The ASEAN, India and Russia follow, with South Africa being the outlier.

**Table 7. Foreign Reserves of Large Non-OECD Countries (US\$ billions)**

|                     | 1995  | 2000  | 2002  | 2004   | 2007   |
|---------------------|-------|-------|-------|--------|--------|
| <b>Brazil</b>       | 49.7  | 32.5  | 37.4  | 52.7   | 179.4  |
| <b>Russia</b>       | 14.3  | 24.3  | 44.1  | 120.8  | 465.9  |
| <b>India</b>        | 17.5  | 37.3  | 67.0  | 125.2  | 267.0  |
| <b>China</b>        | 73.6  | 165.6 | 286.4 | 609.9  | 1528.2 |
| <b>South Africa</b> | 2.8   | 5.8   | 5.6   | 12.8   | 29.6   |
| <b>ASEAN-5*</b>     | 146.3 | 181.5 | 196.6 | 273.1  | 434.2  |
| <b>Total</b>        | 304.2 | 446.9 | 637.1 | 1194.5 | 2904.3 |

\*ASEAN-5: Indonesia, Malaysia, Philippines, Singapore, Thailand

Source:

International Monetary Fund, International Financial Statistics, October 2008

## 5. Some Calculations of Shifting Power

As of yet, there are no calculations in the literature of Shapley, Coleman or Banzhoff values for actual shifts of power occurring between the OECD and non OECD in the global economy, nor how, numerically, these values behave under changes in relative country size and country endowments. One challenge is to assess this numerical behaviour; how rapidly the values changes and whether the behaviour of values is monotonic, and close to linear or non-linear, in country size. As mentioned above, the relative behaviour of these indices under changing country size is also key as this could imply a relative power shift away from China as China grows.

I have made some initial calculations using a data set constructed by Tian and Whalley (2009) for global modelling work on climate change. For simplicity, I assume a utility of GDP function given by GDP itself. In their data set, they report GDP in US\$ for 2006 for 8 regional groupings in the global economy (US, EU, Japan, Brazil, China, India, Russia, Rest of World) as well as the discounted present value of projected cumulative GDP over the periods 2006-2036 and 2006-2056 based on 2006 growth rates continuing over the period.

It is then a relatively easy matter to apply the formula for the Shapley value to this data, using GDP as the pay off for each sub coalition. In this GDP is used differently from the previous discussion of relative country size to reflect utility pay offs from cooperation. The Shapley value is given by

$$S_i = \sum_s \left[ \frac{(n-s)!(s-1)!}{n!} \right] [v(S) - v(s - \{i\})] \quad (4.1)$$

where  $S_i$  is the Shapley value for region  $i$ ,  $n$  is the total number of countries,  $s$  is the subset of countries involved in the calculation,  $V(S)$  is GDP of the subset, and  $v(S - \{i\})$  is GDP of the subset  $S$  less  $i$ .

The Shapley value depends not only on the levels of GDP by country but also on the assumed coalitional opportunities. I have made alternative calculations based on differing assumptions that the US, the EU, Japan and rest of world are effectively an OECD coalition and that China, India, Brazil and Russia are a non-OECD coalition. I assume that coalitional participation by countries remains unchanged over the two periods 2006-2036 and 2006-2056 and compute the relative Shapely values over time. The Shapley values of power for individual countries is significantly influenced by the choice of other countries with whom they can join in coalitions. For China, India, Russia and Brazil I consider three alternative coalitional structures for relative Shapley values over time in a BRIC coalition, with the country joining the OECD coalition on their own, and with the world as a single coalition.

Table 8 reports the relative Shapley values across regions that these calculations imply. These calculations show shifting relative power to fast growing regions and especially to China and India, and by large order of magnitude. The calculations also indicate acceleration of shift between 2036-2056 relative to between 2006 and 2036.

Table8  
Relative Shapley Values across major global regions

| <u>Shapley Value for China relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|---|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                     | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>relative to BRIC's</u>                         | 0.471                 | 0.584                 | 0.647                 | 0.613                                | 0.650                                |  |
| <u>relative to OECD's</u>                         | 0.086                 | 0.299                 | 0.538                 | 0.420                                | 0.543                                |  |
| <u>relative to World</u>                          | 0.055                 | 0.171                 | 0.309                 | 0.267                                | 0.349                                |  |

| <u>Shapley Value for India relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|---|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                     | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>relative to BRIC's</u>                         | 0.163                 | 0.152                 | 0.139                 | 0.147                                | 0.138                                |  |
| <u>relative to OECD's</u>                         | 0.031                 | 0.100                 | 0.200                 | 0.148                                | 0.202                                |  |
| <u>relative to World</u>                          | 0.019                 | 0.045                 | 0.067                 | 0.064                                | 0.074                                |  |

| <u>Shapley Value for Russia relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|--|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                      | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>relative to BRIC's</u>                          | 0.176                 | 0.164                 | 0.151                 | 0.156                                | 0.147                                |  |
| <u>relative to OECD's</u>                          | 0.034                 | 0.107                 | 0.213                 | 0.156                                | 0.212                                |  |
| <u>relative to World</u>                           | 0.020                 | 0.048                 | 0.072                 | 0.068                                | 0.079                                |  |

| <u>Shapley Value for Brazil relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|--|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                      | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>relative to BRIC's</u>                          | 0.190                 | 0.100                 | 0.063                 | 0.084                                | 0.064                                |  |
| <u>relative to OECD's</u>                          | 0.036                 | 0.068                 | 0.102                 | 0.091                                | 0.105                                |  |
| <u>relative to World</u>                           | 0.022                 | 0.029                 | 0.030                 | 0.037                                | 0.034                                |  |

| <u>Shapley Value for US relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|--|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                  | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>Relative to OECD</u>                        | 0.467                 | 0.504                 | 0.529                 | 0.523                                | 0.516                                |  |
| <u>Relative to World</u>                       | 0.272                 | 0.203                 | 0.141                 | 0.193                                | 0.151                                |  |
| <u>Relative to China+India</u>                 | 0.787                 | 0.485                 | 0.272                 | 0.368                                | 0.263                                |  |

| <u>Shapley Value for Japan relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|---|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                     | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>Relative to OECD</u>                           | 0.155                 | 0.144                 | 0.137                 | 0.144                                | 0.153                                |  |
| <u>Relative to World</u>                          | 0.090                 | 0.058                 | 0.037                 | 0.053                                | 0.045                                |  |
| <u>Relative to China+India</u>                    | 0.551                 | 0.212                 | 0.089                 | 0.138                                | 0.096                                |  |

| <u>Shapley Value for EU relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|--|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                  | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>Relative to OECD</u>                        | 0.378                 | 0.352                 | 0.334                 | 0.333                                | 0.332                                |  |
| <u>Relative to World</u>                       | 0.219                 | 0.142                 | 0.089                 | 0.122                                | 0.097                                |  |
| <u>Relative to China+India</u>                 | 0.749                 | 0.396                 | 0.191                 | 0.270                                | 0.187                                |  |

| <u>Shapley Value for Row relative to Region</u> |                       |                       |                       |                                      |                                      |  |
|---|-----------------------|-----------------------|-----------------------|--------------------------------------|--------------------------------------|--|
| <u>Region</u>                                   | <u>ratio for 2006</u> | <u>ratio for 2036</u> | <u>ratio for 2056</u> | <u>ratio for</u><br><u>2006-2036</u> | <u>ratio for</u><br><u>2006-2056</u> |  |
| <u>Relative to OECD</u>                         | 0.521                 | 0.753                 | 0.960                 | 0.532                                | 0.582                                |  |
| <u>Relative to World</u>                        | 0.303                 | 0.303                 | 0.256                 | 0.196                                | 0.171                                |  |
| <u>Relative to China+India</u>                  | 0.805                 | 0.584                 | 0.405                 | 0.372                                | 0.287                                |  |

I also report some calculations of post retaliation Nash equilibrium tariffs from Whalley, Yu and Zhang (2009). Computing Nash tariffs in high dimensional space is computationally demanding, and Whalley, Yu and Zhang instead consider the two region case of China and the rest of the world. They calibrate their model to 2005 data on consumption, production, and trade with assumed key elasticity parameters. They also incorporate the large Chinese trade surplus which changes in their model as retaliatory tariff episodes occur. For reference purposes they also consider a complex conventional model structure in which trade imbalances do not appear.

In their use of data, they develop two different 2005 data sets; one based on market exchange rates and one on purchasing power rates. Between these two data sets China's size relative to Row differs by approximately a factor of 5. Their reported Nash tariffs do not refer to shifting power over time, but do provide insights as to how post retaliation tariffs for China may change as China's size changes.

Table 2 reports the tariff rates in these Nash equilibria. China's 2005 optimal tariff rates are small, but use of purchasing power parity rates increases them by a factor of 2. Since cumulative 10 per cent growth between 2000 and 2050 for China will increase GDP by a factor of around 30, these results suggest substantial growth in China's retaliatory power over time.

**Table 2**

**Whalley, Yu and Zhang's (2009) reported post retaliation (Nash) tariffs for the 2 region China-Row case**

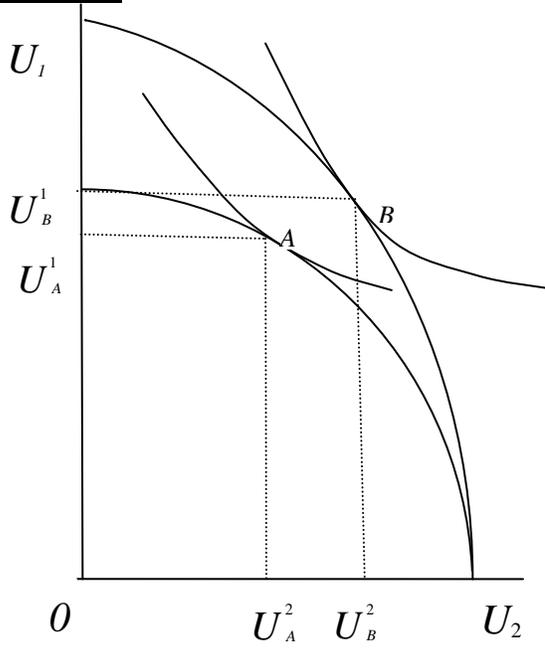
|                      | <u>Model with Monetary Structure</u>                      |  | <u>Model with No Monetary structure</u>                   |  |
|----------------------|---|--|---|--|
|                      | <u>2005</u><br><u>Market Exchange Rate</u><br><u>Data</u> | <u>2005 Purchasing</u><br><u>Power Parity Data</u> | <u>2005</u><br><u>Market Exchange</u><br><u>Rate Data</u> | <u>2005 Purchasing</u><br><u>Power Parity Data</u> |
| -                    |   |  |   |  |
| <u>China</u>         | 0.27%   | 0.52%  | 0.16%   | 0.28%  |
| <u>Rest of World</u> | 34.46%  | 15.95%   | 31.30%  | 30.10%   |

A further approach to analysing shifting power in a cooperative framework is to use Nash Bargaining, following Nash's 1951 paper. In this Nash suggested a bargaining solution for an economy given by the tangency of an assumed arbitrators Cobb–Douglas preference function with, in the two individual case, weights of  $\frac{1}{2}$  and  $\frac{1}{2}$  defined over the utilities of the two individuals to the utility possibilities frontier. He then provided axiomatic underpinnings for such an approach.

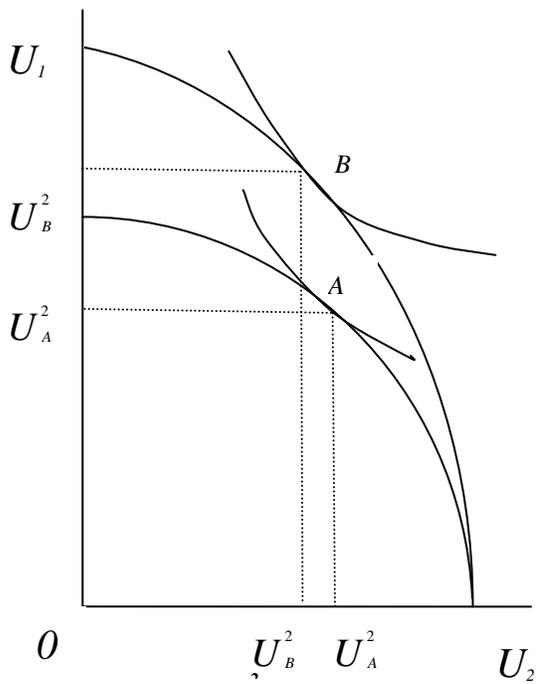
Figure 1 illustrates how in this case it is possible for comparative static analysis of how the Nash bargaining outcomes change under an asymmetric shift in the utility possibilities frontier. In one case both countries are made better off under the shift, and in the other one is worse off. This suggests that under Nash bargaining it is possible for OECD countries to be worse off under continued growth in India and China.

**Figure 1** Nash Bargaining and Regional Outcomes  
Under an "Asymmetric Shift in the Utilities Possibility Frontier"

**A. Both Gain**



**B. One Gains, One Loses**



## **6. The Collective Exercise of Non-OECD power in Cooperative Arrangements**

As emphasized above, economic power lies not only in the ability of countries to limit the economic opportunities available to citizens of other countries through direct interventions of various kinds in market related activities but also in the ability of countries to influence the evolution of international legal regimes that constrain national actions on policies. Economic power is further reflected in bargaining power over cooperative arrangements that emerge from these regions.

Cooperative arrangements are, for example, reflected in World Trade Organisation (WTO) commitments to jointly limit interventions affecting the flows of goods, services, capital and labour. Joint actions to deploy reserves or non-competition pacts for inward foreign investment are others. Economic power is then reflected in individual country bargaining ability to influence international negotiations, either through setting the negotiating agenda, or directly through their influence over the outcome. As with retaliatory power through direct intervention, collective or joint negotiating power asserted by groups of countries will exceed that of single states.

In the current global rule regime, issues with the exercise of this form of economic power have arisen largely in WTO negotiations, and specifically in individual negotiating rounds. In bodies such as the International Monetary Fund (IMF) and the World Bank negotiations are typically country to agency rather than jointly across countries and while issues have arisen with the voting structure coalitional negotiation has not occurred. In other spheres, such as global environmental negotiations, non-OECD countries in conjunction with poorer countries have generally adopted a strategy of non-participation leaving these issues to richer industrial countries and non-governmental organisations (NGOs).

However there are also signs of cooperative activity in other spheres. One is the recent wave of non-WTO regional trade agreements that large population, middle or

lower income countries have negotiated outside of the WTO<sup>3</sup>. Non-OECD countries could also become active in jointly agreeing non-competition pacts for attracting inward FDI, joint arrangements on the use of reserves, or joint pursuit of a global immigration policy negotiation. Because coalitional negotiating issues for the non-OECD have been largely limited to the WTO does not preclude future joint action and negotiations may not be so constrained.

International rule regimes pose special difficulties for economists<sup>4</sup>. Until recently, economists have shown limited interest in the evolution of global or national economic institutions and have viewed these as largely adhering to incentive structures<sup>5</sup>. The perception has been that it is the underlying incentive structures that are key to determining national actions concerning economic matters, not institutions per se, which merely follow and adapt to incentive structures. As such, trigger strategies or a country's ability to penalize other countries that depart from agreed-upon behaviour, not internationally agreed rules, should be the determining factors guiding actions.

Indeed, unless international rules are enforceable via trigger or penalty structures they would seem unable to affect country actions, and even the negotiation of international rules then appears futile. And if enforceable, it is only the trigger strategies that affect behaviour, and if unenforceable they are irrelevant. This reflects the well known Folk theorem<sup>6</sup> that any feasible allocation of resources is supportable by a set of trigger strategies.

Despite this, however, countries do mutually agree to constrain their economic behaviour through negotiated agreed treaties, and are generally reluctant to depart from cooperative agreements. One explanation is reputation, another is links to larger concerns with security and aid flows. Equally important are the links between economic and

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3 See Antkiewicz and Whalley (2005).

4 See Perroni and Whalley (1996)

5 But see the extensive recent literature on the new institutional economics associated with Douglas North. For example, North D.C. (1990); Henisz W.J. (2000); Pistor K. (1999); and Rodrik, Subramanian & Trebbi (2002).

6 See Rubinstein (1974)

security or military arrangements and the joint benefits cooperation confers on the signatories.

Since economic treaties are often used in part to underpin security agreements, it can be the fear of dissolution of the agreement or insecurity in arrangements that explains why economic treaties are adhered to even if supporting trigger strategies are not used. An additional incentive for poorer countries is aid flows and credit ratings. The fear may be that violating the terms of an economic treaty can lead to cuts in aid flows or adverse ratings on capital markets. Thus, one can argue that with linkage there is a belief that a violation in one area may lead to counter-actions in other, including military and security-related, and thus economic treaties once entered into are adhered to.

International economic treaties can thus be viewed as part of a category of wider arrangements (treaties) which are mutually agreed to have special status. Violations of economic treaties can potentially weaken agreed arrangements in other treaties, including strategic arrangements. Global economic treaties take on added significance, and as a result their negotiation become matters of great consequence and affect each states future economic conduct. It is thus anticipated that once jointly entered in this way, states will uphold treaties for some considerable time.

In existing theatres of global economic treaty negotiation the non-OECD countries' increased activity has been observed first in the GATT and later in the WTO. And in recent decades, the non-OECD appears inclined to act jointly through coalitional activity more so than in the past.

These countries were largely passive in early GATT rounds from 1947 onward, effectively not participating in early negotiating rounds, seeking non-reciprocity, and engaging initially in few tariff bindings or reductions. Later in the 1960s and 1970s, this led to calls for "Special and Differential Treatment"<sup>7</sup> for developing countries in the GATT, a form of non-reciprocity based on a perceived need for preferential access to

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7 See Whalley (1990) and Whalley (1999)

developed country markets and also a need for special rights to protect markets to pursue import substitution development policies. India and Brazil led other states in making such calls first in the United Nations Conference on Trade and Development (UNCTAD) (the G77) and later in the GATT. These countries were especially vocal during the Tokyo Round (1973-79) and voiced demands for a New International Economic Order (NIEO) to reflect their objectives.

In the 1980s countries such as Brazil and India became more active in joint intervention in GATT negotiations at the launch of the Uruguay Round. A reflection of this was their decision (supported by other countries) to attempt to block the launch of the then new GATT round unless items of central interest to them (textiles, voluntary export restraints) were dealt with at the same time that new issues such as services were discussed. In the 1990s, this coalition grew into multi-country opposition to the launch of a new Round in Seattle in 1999 and continued in the later stages of the Doha Round in collective calls for action on slowed implementation of the Uruguay Round decisions in such areas as intellectual property rights and heightened special and differential treatment for developing countries in the WTO.

In future, the non-OECD countries may explore not only joint coalitional negotiating activity within existing established theatres of negotiation such as the WTO but also outside this sphere. The activism of the non-OECD countries in the last few years in negotiation of new regional agreements covering both trade and wider economic cooperation outside the framework of the WTO is one such example.

Many possibilities exist, and the issues involved do not all fit under the current Bretton Woods architecture. An example is the joint interest in the terms extended to inward foreign direct investment which countries have been keen to attract as part of their developmental strategy. Non-competition pacts among the non-OECD may also be a possibility. Another is joint agreements on the combined deployment of foreign exchange reserves. Yet another may include joint initiatives in such areas as immigration policy

that do not fit well into the current WTO structure<sup>8</sup>.

At present, negotiating activities of the non-OECD countries on non-traditional fronts have increased. One example is the Trilateral Commission mentioned earlier linking India, Brazil and South Africa (the so-called IBSA Commission). The IBSA commission (also referred to as G3) was established in 2003 to create a forum for political consultation with the aim of increasing the bargaining power and strengthening the global voice of developing countries, as well as promoting closer cooperation and stronger trade links between these states. India, Brazil and South Africa have also agreed to work together towards reform of the United Nations Security Council, the Bretton Woods Institutions, and to cooperate in areas of mutual interest at the WTO. They have also committed to cooperation in health, energy, agriculture, culture, science and technology, information and communication technologies, and tourism sectors. IBSA also serves as a forum for discussion of a possible future trilateral free trade agreement.

Additionally, bilateral and regional negotiations have grown outside the WTO<sup>9</sup>. Currently, more than 800 regional trade agreements (RTAs), have been concluded or are in negotiation, between large non-OECD countries. The majority of the recently concluded agreements go beyond the WTO and into areas such as services trade, mutual recognition, intellectual property and competition policy and could be perceived as a newly forming global structure evolving in parallel with the multilaterally rule-based WTO system.

Activism in new areas of negotiation and pressure for new solutions reflect not only growth in economic size but also the willingness of the non-OECD countries to act jointly through coalitional activity. The expectation is that non-OECD country power both within existing negotiating fora and in new fora at the sub-global level will grow in the next few decades. And power in this dimension will be enhanced by the growing size of these economies and the threat that non-cooperative behaviour will exert power over

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8 See Ng & Whalley (2004)

9 As discussed in Antkiewicz & Whalley (2004) and Antkiewicz & Whalley (2005)

both global and regional cooperative arrangements involving the non-OECD.

## 7. Intellectual Legitimacy and Shifting Economic Power

Economic power like other forms of social power also rests on legitimacy as well as compulsion or threat. Legitimacy can be thought of as the acceptance by others of the intellectual arguments underpinning what is construed as both acceptable and desirable behaviour in the power structure within which decisions and actions occur. Importantly, as there is inevitable ambiguity over what is in the self-interest, the key here is what can be seen as consistent with self-interest. If intellectual argument can affect perceptions of self-interest, then it can play a central role in the exercise of power.

In the economic sphere, intellectual arguments in favour of open market based economic organisation versus more closed state directed structures have been a central element underlying global economic relations in recent decades. Acceptance of open market regimes grants more ability to foreign entities to potentially affect economic opportunities within other countries. Rules for country conduct become increasingly important the more integrated economies become. Acceptance of the intellectual rationale for economic integration among countries acts to enhance individual country power over others by enhancing opportunities for countries to influence others by threats to interrupt or terminate access. Integration into the world economy may offer the Ricardian benefits of specialisation, but at the same time it grants more power to other states to affect domestic economies through their ability to disrupt and impose adjustment costs.

This intellectual rationale rests heavily on Western philosophical traditions, and beliefs in individual freedom and rights. In the economic sphere, it is reflected in the two fundamental theorems of welfare economics<sup>10</sup> and in the Reagan-Thatcher 'magic of the marketplace' as well as the Smithian belief in the virtues of the invisible hand<sup>11</sup>. The influence of these traditions has been especially pronounced in recent decades through the educational process associated with (especially North American) graduate

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10 See Arrow (1953)

11 Although Adam Smith of the Theory of Moral Sentiments argued much economic conduct is motivated by concern for others.

programmes in economics, where the virtues of free trade and openness yielding the benefits of Ricardian comparative advantage have been carried by successive cohorts of graduate students returning to lower income countries to rise in local elites and decision making influencing policy.

There is, however, growing recognition that China's growth has been achieved using both a social and economic structure and a policy mix which differs from that of a typical OECD country. Bill Gates in a 2005 speech to the World Economic Forum made extensive reference to China's "new model of capitalism", which he suggested had superior elements to the conventional Western model<sup>12</sup>. With the expression of such views, the intellectual legitimacy of neoliberalism as a social structure may come under increasing question and with it the legitimacy underlying current OECD economic power.

It seems the non-OECD countries, for now, do not aggressively seek economic power or wish to exercise their seemingly collective will through joint assertive actions. The objectives of poverty alleviation and improved living standards of most citizens seem to drive policy decisions more so than the accumulation of power. This has led to seemingly successful growth oriented policies in the larger of these countries and the expectation of elevated growth in others. The initial shifts in economic power and its gravitation to the non-OECD is a positive result of these policies. Over the next 30-50 years, if growth rates in countries such as India and China are sustained, the world will change rapidly. Almost inevitably, major global change will occur both in economic structure and in the social arrangements that define its organisational form.

Intellectual legitimacy is also reputed to act with a lag; Keynes characterized all practical politicians as the slaves of some defunct economist. In China, economic organisation involves more collective identity of actors, a larger role for state-owned enterprises many of whom lose money, and banks with non performing loans; all elements inconsistent with the prescriptions of Western liberal thought. Current Chinese growth as generated by a social and economic structure which substantially differs from

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12 See News 24.com (2005)

that of the OECD countries, challenges the intellectual legitimacy of Western philosophical underpinnings and may well force a re-evaluation of the intellectual climate proving to be one element in future shifting global economic power.

Finally, the relative success of state-guided structures in these countries adds further weight to the argument that straightforward adherence to market guided process is not necessarily the best route to economic success. A more nuanced approach stressing country specific value systems and social arrangements, and the absence of a uniform all purpose developmental model could emerge. And with it, intellectual legitimacy and global economic power could shift further.

## 8. Concluding Remarks

This paper discusses both the interpretation of and concrete manifestations of shifting global economic power seemingly moving away from the OECD and towards the non-OECD. It argues that power is a concept little studied by economists, in part because of the vagueness of the term. In natural sciences power is equated with force, but a simple translation of this notion to economic power seems misplaced. Here, instead, notions of power are emphasized based on market size (including retaliatory power), bargaining power in cooperative arrangements between countries, and power which stems from legitimacy (or intellectual power). Country power is also greatly enhanced when used collectively with other countries.

Data on GDP, trade and other variables by country suggest that under growth rate projections using a substantial differential in non-OECD over OECD growth rates in absolute terms power will shift surprisingly quickly to the non-OECD over the next few decades. As such, the 21<sup>st</sup> century will witness the rise of the South. But whether or not, a shift in economic power in relative terms away from the North will occur remains unclear.

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