Theme 7 - The Political Economy of Tomorrow: ethics, development and heterodox theories

THE INVENTION OF CAPITAL IN COMPARATIVE ADVANTAGE THEORY

Abstract

There is growing evidence of the limits of mainstream economics to explain the world's actuality. One particular aspect where this has been widely evidenced is modern neoclassical trade theory, notably in the context of comparative advantage theory. Originally based on concepts David Ricardo developed, it was later modified to fit the general equilibrium model characteristic of neoclassical economics. The later versions of comparative advantage theory have been widely used to support and encourage open trade through the liberalization of trade barriers, maintaining and reinforcing the differences that developed and developing economies have. This article seeks to illustrate through an analysis of the assumptions underlying the concept of 'capital' in these theories, particularly following the results of the Cambridge Controversies, that comparative advantage theory seems to be built on very tenuous assumptions and that nuanced adaptations can lead to entirely different theoretical and empirical conclusions. The article analyzes first the theoretical inconsistencies in the conceptualization of 'capital' in early neoclassical trade theories like the Heckscher-Ohlin (HO) model and the Heckscher-Ohlin-Samuelson (HOS) model, but turns to the way in which 'capital' has been treated in later versions of the theory engaging with the arguments advanced by modern economists like Paul Krugman and Anne Krueger. The second idea this article looks into is the countless number of policy recommendations that can be made in the name of comparative advantage based on vague and ambiguous conceptualizations of 'capital' using as examples multi-cone models, Global Trade Analysis Project (GTAP), and the views of international organizations like the World Bank. This will allow the reader to see the myriad implications of the policy recommendations derived from this theory particularly in the context of developing economies where it has most frequently been advised. The overall argument emphasizes the need for developing economies to approach trade theory from a new perspective that moves beyond the assumptions of modern neoclassical trade theory.

Introduction

The classical theory of comparative advantage is often drawn back to David Ricardo. Using labor as the single input of production, Ricardo favored free trade arguing solely on the basis of productivity of workers in different countries. All other factors of production were seen as perfectly immobile making the exchange of finalized goods the only form of operative international trade. In this context, 'capital' was completely disregarded since the only input that accounted for differences among various countries was labor and thus, it alone provided the basis for international trade. 'Capital' in the

later theories, such as the Heckscher-Ohlin (HO) model and its later version the Heckscher-Ohlin-Samuelson (HOS) model, was not a void category. These trade models, and the many successors that have arisen in mainstream economics, are particularly relevant to developing economies, since they have been widely used to dictate policy recommendations that completely modify a country's trading system not always for the betterment of its societies. This paper starts with a historical background on the conceptualization of capital in the HO and HOS models followed by a brief recount of the Cambridge capital controversies and its aftermath on Samuelson's original trade model. This will walk us through current conceptualizations of capital within mainstream views of international trade, specifically in comparative advantage theory because of its relevance in the construction of economic theory and policy advising in the context of developing countries. The paper ends by looking at the conceptualization of capital in three specific cases of policy-advising derived from comparative advantage arguments that aim to define trade patterns in less developed economies. The general argument of the paper should allow the reader to visualize the ambiguity and vagueness the concept of capital has in mainstream economics and what the effects of it can be both theoretically and in practice.

Looking back

Since labor is not the only factor of production, for many economists Ricardo's model was incomplete and could not explain the causes of productivity differentials; thus they felt a new perspective was necessary (Krugman and Obstfeld 2003). What emerged, the 'factor-proportions theory', was primarily based on the need to include what mainstream economists have called 'a country's factor endowments' into the equation. The idea was originally developed in 1919 and 1933 by two Swedish economists, Eli Heckscher and Bertil Ohlin, after whom the Heckscher-Ohlin theory of trade takes its name. In their model, productivity differences were not traced to labor alone but to initial endowments of individual factors of production. However as their idea was to create an analysis of trade based on a general equilibrium model, Heckscher and Ohlin's analysis of international trade had to bear many of the common assumptions in that tradition, thus their theory was restricted to a two-country, two-factor, two-commodity scenario, where perfect competition and constant returns to scale prevail; there are no transfer costs between factors or differences in technology for production, tastes are the same in these countries, and each of them has a different but fixed endowed quantity of either capital or labor –*two homogeneous factors of production*, which are fully employed (Jones 1979). Since Heckscher and Ohlin assumed identical production functions in the two regions, it is precisely the conceptualization of capital as a homogeneous category what allowed them to develop a theory that explained price differentials based on different 'proportions' of each of these factor endowments (R. Robinson 1975: 6). A country was assumed to have an unchanging amount of something called 'capital' (or labor) which allowed it to produce 'capital-intensive' (or 'labor-intensive') products depending on the original share of each factor that it 'naturally' had.

This conceptualization of capital was not unique to these economists, in the later version of the HO model, Paul Samuelson (1948) retook these ideas and adapted them to

a new set of conditions arguing that factor price equalization is not only probable but in many cases inevitable (a discussion beyond the scope of this article). His model of international trade started with a design that only contemplated production in terms of land and labor. His conceptualization of capital was a *homogeneous category* perfectly replaceable in the model for any of the other factors of production. He claimed that under the neoclassical assumption of 'optimal production-possibility curve' the marginal rate of factor substitution should be equal in the two industries he analyzed –food and clothing. At this 'optimum point' not only would the ratio of labor's marginal productivity in both industries be equal, but "to what [would] be the same thing […] to the corresponding ratio of the marginal physical productivities of capital" (Samuelson 1948: 175). Samuelson effectively 'computed' a marginal productivity of 'capital' showing an understanding of it as a homogeneous category indifferent from land or labor. This conceptualization of capital was a common perspective prior to the 1950's and 60's; as Turan Subasat (2003) explains, "capital [was] treated as a nonproduced input and as externally given to the economy. Since it is not produced, it can be treated as an endowment, like land, natural resources, and population" (Subasat 2003: 156). This view of 'capital' was particularly criticized during a period commonly known as the 'Cambridge Capital Controversies', which many orthodox economists purposely ignore as it represents a theoretical defeat over neoclassical economics, but it embodies a threshold in economic theory and a crucial point in this paper.

The debates took place in Cambridge, UK and Cambridge, USA (MIT) and the conceptualization of capital was one of the main points in debate. The critique, from the UK side was on the impossibility of reducing heterogeneous physical goods to a single homogeneous category called 'capital' that could seemingly accumulate and measure them regardless of their individual characteristics and modes of production, particularly the arguments advanced by Joan Robinson (1953-1954) evidenced this dilemma. Furthermore the debates showed the problematic consequences of measuring these heterogeneous goods in their individual relative prices lumping them together in a given sum-value independent of the relationships between capital, labor and the rates of return to capital; Piero Sraffa (1960) is probably the most representative figure behind this assertion[1]. Paul Samuelson, on the other hand, was one of the proponents on the American side and as part of his response to these controversies he attempted to put forward a modified version of the comparative advantage theory. In the post-Cambridge environment, he preserved the two-country, two-good model but tried to account for the fact that commodities are "produced by labor inputs and also by the commodities themselves as needed inputs" (Samuelson 1975: 310). However in that model he also maintained the labor/land comparisons he had used in his first version (1948) and determined the differences among countries based on labor/land ratios to produce two goods –cloth and food. It is only in his mathematical appendix that Samuelson concurs with the warnings of his Sraffian and other critics against the use of "such aggregate capital magnitudes [money magnitudes of capital], which only work in certain Santa Claus cases (surrogate capital and worse)" (Samuelson 1975: 351-352). Samuelson's surrogate capital effectively collapsed all goods into a single-good model, falling again in the exact same old mistake of capital as a single all-encompassing category.

[1] For a complete recount of the Cambridge debates see Harcourt (1972).

He continued to try to define a model in which he could aggregate heterogeneous goods in monetary values (and do so independently of their individual profit rates) only to conclude that there is one example where he thinks this is possible "not so much congenial to a neoclassical apologist as to one who hopes to use a Marxian aggregated two-department model" (Samuelson 1975: 352). Beyond Samuelson's idea of a so-called 'Marxian aggregated two-department model', his research confirmed the impossibility of aggregating heterogeneous goods in a neoclassical setting in monetary values or in any other way that could collapse all goods into an all encompassing category. The harm done by the Post-Keynesian economists was deeply felt not only by economists in Cambridge, Massachusetts but in the whole of mainstream economics where various schools of thought within this tradition had to move away from a conceptualization of capital as a homogeneous entity and revise the theoretical flaws with former conceptualizations of 'capital'. However only a few decades later, mainstream economics appears to be oblivious to the Cambridge debates and their results, nonetheless this has not dissuaded them from prescribing policies on areas such as international trade, based on theories like that of comparative advantage, where 'capital' is treated in a purely voluntaristic manner and, where policies have more often than not negatively influenced international trade patterns in less developed economies.

Current approaches

In more recent debates comparative advantage theory can be seen widely used by prominent economists in order to explain the apparently increasing benefits of free trade. The surprising aspect is that the arguments used in favor of free trade policies have mirrored most of the beliefs of earlier mainstream theorists and have only minimally, if at all, modified the neoclassical model, particularly concepts such as the conceptualization of capital, which had already been heavily questioned during the Cambridge debates era. Krugman and Obstfeld (2003) for example, present an introductory textbook to international trade where they argue in favor of comparative advantage as the underlying logic to international trade, "*Trade between two countries can benefit both countries if each country exports the goods in which it has a comparative advantage*" (2003: 12). In explaining a universal model of international trade, they touch upon multiple theories like the Ricardian model, factor and income distribution, and the Heckscher-Ohlin model in order to explain how differences in countries give rise to mutually beneficial interchanges. In building a model where more than one 'factor' is used, they go back to the model created by Samuelson where there are three factors of production labor, land and capital; they assume that manufacturing goods are produced by capital and labor alone while food only needs land and labor. These empty assumptions are never relaxed and become the basis for an entire study on international trade theory. Capital, as an individual category, is never explained and is simply treated as a non-produced, externally given 'factor of production' that is readily available for us to use. The authors further illustrate the production function for manufactured goods, which can tell us the quantity of goods that can be produced in a region with given inputs of capital and labor (2003: 39) as,

$$Q_M = Q_M (K, L_M) \qquad [1]$$

Where Q_M is the economy's output of manufactures, K is the economy's capital stock, and L_M is the labor force employed. The fact that this simplified model can so bluntly attempt to explain the logic of international trade and can go unquestioned in an entry level textbook as Krugman and Obstfeld move on to different topics within international trade theory and policy, is exactly what Joan Robinson was criticizing during the Cambridge debates,

> "the production function has been a powerful instrument of miseducation. The student of economic theory is taught to write O = f (L, C) where L is a quantity of labour, C a quantity of capital and O a rate of output of commodities. He is instructed to assume all workers alike, and to measure L in man-hours of labour; he is told something about the index-number problem involved in choosing a unit of output; and then he is hurried on to the next question in the hope that he will forget to ask in what units C is measured" (J. Robinson 1953-1954: 81).

Thus it is uncertain that the arguments advanced by Krugman and Obstfeld on the benefits of free trade and the logic of international trade (capital vs. labor intensive productions), can be said to relay convincing evidence of favorable patterns of trade particularly in the context of less developed economies. If an underpinning concept in the theory of comparative advantage (and economics at large) can easily go unquestioned, even when earlier economists had clearly pointed it out as problematic, the results that derive from it must be challenged if they are to present us with real 'evidence' of its benefits. Nonetheless the persistent and continued use of the concept of capital in theories that ignore the results of the Cambridge debates, has allowed for a proliferation of multiple interpretations of the conceptualization of capital that have rendered the concept not only vague and ambiguous but mainly ideological.

Case studies

Looking closer into the applicability of the theory of comparative advantage there is a large body of literature that argues in favor of free trade, we focus here in three distinct cases where the conceptualization of capital has been largely manipulated at the will of the authors. A first approach to the idea of comparative advantage is found in Anne Krueger (1997); she advocates that the theory, when rightly applied, is a "pillar" to trade policy. She explains how new knowledge on trade during the 1970's demonstrated old falsities on previous trade theories (like Import Substitution Industrialization –ISI policies) and asserts that previous versions of trade models did not recognize the need to include the 'three' factors of production (land, labor, and capital). Krueger herself was involved in the development of those trade models in which three factors of production are included, and where the 'distinctive' feature is that "each good requires only two factors of production as inputs: one factor is specific to each sector and one factor is mobile between the two sectors… labor is regarded as mobile… land is treated as the factor employed only in agricultural production, and capital is the factor specific to

manufacturing" (Krueger 1977: 12). These ideas must sound very similar to the reader as those advanced in the above paragraphs by Samuelson or by Krugman and Obstfeld. It should be obvious that there is no actual unification of three different factors into one model since they are still assumed specific to each industry and available for some regions and unavailable to others. More importantly, for Krueger capital continues to be a homogeneous, non-produced input that can determine 'capital-intensive' forms of production; even if the construction or acquisition of 'capital' by different countries is never actually explained. It can be treated as if it were the same as land or labor, cumulative and readily available to the economy. However the lack of a concrete conceptualization of capital in the original model does not stop her from making important policy recommendations explaining that,

> "As the three-factor models demonstrated, comparative advantage lies within manufacturing and within agriculture, and not between them. Thus, poor unskilled, labor-abundant countries have a comparative advantage in labor-intensive agricultural and unskilled labor-intensive manufactured commodities, while countries with a much higher land-labor ratio have a comparative advantage in more land-using agricultural commodities and their comparative advantage in manufacturing lies more in goods with higher capital-unskilled labor ratios. In these models, the overall trade balance in manufactures is a function of the size of the manufacturing sector, itself a function of past capital accumulation and the land-man ratio" (Krueger 1997: 11).

There are few people who can claim a more influential path in development economics and policy advising than Anne Krueger. She has served as First Deputy Managing Director of the International Monetary Fund, Vice President for Economics and Research at the World Bank, held teaching positions in the Department of Economics at Stanford University, the University of Minnesota and Duke University, and she is a founding Director of Stanford's Center for Research on Economic Development and Policy Reform[2]; she has certainly had an extensive and decisive leadership in international trade policy recommendation. The fact that she can rely upon a theory where the conceptualization of a central concept (i.e. capital) can remain a vague and ambiguous statement and be completely oblivious of previous criticisms, makes it not only highly problematic at the theoretical level but highly unrealistic that policies driven from such interpretations can truly depict improved international patterns of trade and specialization in less advanced economies. Arguing that the natural way in international trade is to take advantage of poor unskilled labor –be it in agriculture of manufacturing does not seem like a highly beneficial recommendation for the development of either the agricultural or the manufacturing sector in southern nations. In Krueger's model capital is assumed a self-explanatory category relevant only to highly industrialized regions making this conceptualization only a vague and misleading statement.

A second approach to the literature leads into a significantly different direction, here it becomes particularly difficult to navigate through sophisticated mathematical expressions and econometric models. In keeping with the argument of this article the focus will be mostly on the conceptualization of capital in various models rather than on their individual rationale. The conceptualization of capital on these models can actually

[2] See: http://www.imf.org/external/np/omd/bios/ak.htm (accessed May 6th 2010)

be anything from databases, to income flows, to assemblages of intermediate inputs. Interestingly enough, regardless of the manner in which capital is conceptualized, different authors freely derive trade patters based on countries' capital endowments (or labor endowments) that help define how countries should develop. The lack of a straightforward conceptualization of capital actually becomes unimportant because regardless of the way in which capital is defined, the end result is always the same mainstream 'trade recipe' of increased openness and specialization.

According to Schott (2003) one of the reasons behind the development of these complex econometric models is to modify earlier versions of the Heckscher-Ohlin model to allow countries to specialize according to their particular mix of endowments instead of assuming that all countries can produce all goods in identical ways. The idea is to consider a 'continuum of goods' in what various authors call a 'multi-cone factor model' where the word cone refers to a set of endowment vectors. (Deardorff 1998), (Bernhofen 2009), (Schott 2003). In general it assumes the case of *n* countries, all with similar technologies so they can all produce any good, where countries are ranked according to a relative 'capital abundance'; factor endowments are assumed 'sufficiently dissimilar' so that in equilibrium 'factor price ratios will reflect endowment ranking' (Bernhofen 2009: 17). Although an actual conceptualization of capital is not always included, authors make plenty of references to a country's ability to accumulate and produce different kinds of goods that are capital-intensive (or labor-intensive). Peter Schott for example, calls capital a 'productive factor just like labor' (Schott 2003: 4). It can be a 'stock' or it can be accumulated. In the mathematical conceptualization of his model it stands as,

$$\frac{Q_{ic}}{L_c} = \beta_{1i} + \beta_{2i}\frac{K_c}{L_c}\left(\frac{T_c}{L_c}\right) + \sum_{t=3}^{T+2}\beta_{it}\max\left\{\frac{k_c}{L_c} - \tau_{t-2}\left(\frac{T_c}{L_c}\right), 0\right\} \qquad [2]$$

Where K_c / L_c is a country's computable capital-labor ratio (the rest of the variables can be ignored for our purposes); to calculate that ratio he takes into consideration only "manufacturing capital endowments" and computes them from a series of databases like UNIDO's World Productivity Database (WPD)[3] or the Penn World Tables, both of which display information based on sets of "national accounts economic time series covering a large number of countries" (Summers and Heston 1991: 327). The idea behind the conceptualization of capital made in these databases is to use prices of goods to determine a 'monetary value' of capital. The main problem this creates is that it allows for an increasingly voluntaristic approach to the categories included in such databases. As they intend to portray many countries' realities, the categories that are included (or excluded) have a direct impact on the policies that are derived from them. Thus the conceptualization of capital in an analysis of this type becomes a crucial element directly affecting the results obtained and the recommendations made to developing countries. Schott for example claims that,

> "Evidence presented in [his] paper indicates that the US in 1990 was sufficiently capital abundant to insulate its workers from competition with labor abundant countries. If

[3] UNIDO stands for United Nations Industrial Development Organization. The principal data source for their analysis is Penn World Tables (PWT) (Isaksson 2009: 39).

> correct, these results cast doubt on the claim that further trade liberalization will adversely affect US income inequality" (Schott 2003: 23).

Or Bernhof's findings, which assert that,

> "A key result is that the pattern of specialization is determined by factor price information from all trading partners in the world economy" (Bernhofen 2009: 2).

From their conclusions, it is clear that the conceptualization of capital has a 'real world' effect and that the way in which it is conceptualized cannot be a vague and ambiguous theoretical conceptualization as it can significantly impact the results obtained.

Another example of an econometric model that simulates trade is the Global Trade Analysis Project (GTAP)[4]. The idea behind it is to track the circulation of flows of income -derived from the sales of 'endowment commodities', expenditure, production –a combination of income flows and intermediate goods, and finally of exports and imports. There "a unit of capital […] is created by assembling composite intermediate inputs in fixed proportions" (Hertel and Tsigas 1997: 58). Capital is assumed a producible homogenous category that can be used interchangeably with land or labor and is determined through the combination of various other inputs (however these are inexplicably not called capital). The GTAP attempts to provide a set of numerical information to assess 'real' world phenomena, but as it was mentioned earlier the arbitrariness with which these models can be built is highly questionable. Nonetheless they are commonly used to determine policy recommendations in developing countries.

In a paper that claims to focus on the potential impacts of Economic Partnership Agreements (EPAs) between the European Union (EU) and other regions, the following recommendations are derived after the GTAP model has been used,

> "assuming that most of the poor population falls in the category "unskilled workers", the results of our simulations seem to hint to a positive impact of [trade] liberalization on poverty" (Keck and Piermartini 2005: 26);

> "Due to the importance of the EU as a trading partner for many SADC [Southern African Development Community] economies, liberalization in the context of EPAs already goes a long way towards realizing such gains" (2005: 36)

In a second example, a study on the possible effects of Free Trade Agreements (FTA) in the Association of Southeast Asian Nations (ASEAN) claims that,

> "GTAP simulations indicate that an ASEAN + 3 FTA will generate welfare gains for all members from the highest of 12.5% of GDP for Thailand and 6.6% for Viet Nam to the lowest of 0.19% for Japan and 0.64% for the PRC [People's Republic of China]" (Kawai and Wignaraja 2007: 17).

[4] The GTAP defines itself as a large network of researchers and policy makers focused on quantitative analysis of international policy issues through the use of quantitative analysis tools that reproduce a global computable general equilibrium model. See: https://www.gtap.agecon.purdue.edu/default.asp (accessed 29th September 2009).

> "[the] consolidation of multiple and overlapping FTAs into a single East Asian FTA can help mitigate the harmful "noodle bowl" effects of different ROOs [Rules of Origin] and standards. This move will encourage the participation of low-income countries in freer trade arrangements, reduce trade-related business costs particularly for SMEs [Small and Medium Enterprises], and promote trade and investment" (2007: 24).

Both studies and their policies hint at the untapped benefits of free trade where countries will continue to gain from their comparative advantages and better compete in an open economy. However the wide use of a model based on an evidently ambiguous conceptualization of capital, where the choice of what constitutes capital and what does not is unbound, seems to leave a large amount of freedom in the determination of these public policies, which are based precisely in the 'amounts' of capital (and labor) that each country has or does not have.

The last instance of the literature on comparative advantage model and its effect on trade policies is the World Bank Growth Report of 2008. The report introduces various definitions of capital, making the use of this 'category' quiet voluntaristic in the approach to the theory of trade. Capital can actually be defined as investment rates -percentage of GDP (World Bank 2008: 150), it can include commercial bank lending, bonds, private credits, foreign direct investment (FDI) or portfolio equity investment (2008: 159), or it can be assets such as bonds or shares (2008: 167), or also assets such as plants and equipment (2008: 168). The problem with various conceptualizations of capital in this respect is not only at the theoretical level, but that the recommendations made are either meaningless or terribly dangerous as they could imply a series of drastically different measures when asserting for example that, "an economy's endowment of labor, natural resources, and capital dictates its comparative advantage" (2008: 25). What kind of capital would exactly identify the comparative advantage of one country versus another one in such a context? This illustrates the level of confusion that multiple conceptualizations of capital create and demonstrates the voluntaristic approaches that countries, international organizations, theorists, policy-makers, or mathematical models can make to the concept of capital. The validity of a theory that rests on 'capital' as some sort of 'endowment' to different countries is highly questionable to say the least.

Concluding remarks

This article has focused on the conceptualization of capital that has been used in theoretical and policy-related approaches within mainstream international trade theory, particularly with regards to comparative advantage theory. The Heckscher-Ohlin model and Heckscher-Ohlin-Samuelson addition were taken as points of departure. In these early models capital was used as a homogeneous category externally given and interchangeable with labor and land. However, after the Cambridge capital controversies Samuelson recognized the impossibility of using an all-encompassing category called 'capital' to account for various heterogeneous goods and inputs. Nonetheless other scholars have continued to rely on conceptualizations of capital that have been shown theoretically flawed. Krugman and Obstfeld's textbook brings back arguments that use a non-produced and externally given category that the authors call capital and of which

countries (usually only the industrialized ones) can dispose of. In the last section of this paper, we looked into policy perspectives ranging from Krueger's three-factor model to the World Bank Growth Report, to a series of econometric analyses that model world trade as well as databases that account for countries' 'actual capital'. In each case studied, the conceptualization of capital changed at the will of the authors, reinforcing the general argument of a lack of clarity and ambiguity with which the concept of capital is used. Either it was seen as a single homogeneous (input-output) category or it was portrayed as a monetary sum-value that included certain types of products –categories that also change from one author to the other. Finally some of these studies made use of a number of different conceptualizations of capital in an aleatory manner within the same study. Every scholar or policy advisor found a way to mould the category 'capital'. It is clear from this that the conceptualization of capital remains vague and ambiguous, that there is no consistency among mainstream authors, and that many of them simply overlook already demonstrated failures in its conceptualization. It comes as no surprise that the policies derived from these views can help convey any message mainstream ideology wishes to relate. From free trade, to specialization, to unbound international agreements that supposedly benefit less advanced economies, trade based on comparative advantage appears in a series of policies that recommend developing countries the best use they can give to the factors with which they have been 'endowed'. What is clear is that there is great liberty on what can be called 'capital' and the multiplicity, vagueness and ambiguity with which capital is conceptualized has been shown to have a direct impact on the kinds of policies and recommendations that are made to developing countries.

References

Bernhofen, D. (2009) 'Predicting the pattern of international trade in the neoclassical model: a synthesis', *Economic Theory* 41(1): 5-21.

Deardorff, A. (1998) 'Does growth encourage factor price equalization?' Ann Arbor, Michigan: The University of Michigan.

Harcourt, G.C. (1972) *Some Cambridge controversies in the theory of capital*. Cambridge: Cambridge University Press.

Hertel, T. and M. Tsigas (1997) 'Structure of GTAP', in T.W. Hertel (ed.), *Global trade analysis: modelling and applications* Cambridge University Press.

Isaksson, A. (2009) 'The UNIDO world productivity database: An overview', *International Productivity Monitor* 18 (Spring): 38-50.

Jones, R. (1979) *International trade: Essays in theory* (Vol. 4). Amsterdam: North-Holland Publishing Company.

Kawai, M.D. and G. Wignaraja (2007) *ASEAN+3 or ASEAN+6: Which way forward?* Paper presented at the conference 'Ten years after the crisis: Evolving East Asian financial system and challenges'.

Keck, A. and R. Piermartini (2005) 'The Economic Impact of EPAs in SADC Countries'. Geneva: World Trade Organization: Economic Research and Statistics Division.

Krueger, A.O. (1977) *Growth, distortions, and patterns of trade among many countries* (Vol. 40). Princeton studies in international finance: Princeton, NJ: Princeton University Press.

Krueger, A.O. (1997) 'Trade policy and economic development: How we learn', *The American Economic Review* 87(1): 1-22.

Krugman, P. and M. Obstfeld (2003) *International economics: Theory and policy* (6th International Edition ed.). Boston: Addison-Wesley.

Robinson, J. (1953-1954) 'The production function and the theory of capital', *The Review of Economic Studies* 21(2): 81-106.

Robinson, R. (1975) 'Factor proportions and comparative advantage', in R. Caves et al. (eds), *Readings in international economics*. London: George Allen and Unwin Ltd.

Samuelson, P.A. (1948) 'International trade and the equalisation of factor prices', *The Economic Journal* 58(230): 163-184.

Samuelson, P.A. (1975) 'Trade pattern reversals in time-phased Ricardian systems and intertemporal efficiency', *Journal of International Economics* 5(4): 309-363.

Schott, P.K. (2003) 'One size fits all? Heckscher-Ohlin specialization in global production', *The American Economic Review* 93(3): 686-708.

Sraffa, P. (1960) *Production of commodities by means of commodities: A prelude to a critique of economic theory*. Cambridge: Cambridge University Press.

Subasat, T. (2003) 'What does the Heckscher-Ohlin model contribute to international trade theory? A critical assessment', *Review of Radical Political Economics* 35(2): 148-165.

Summers, R. and A. Heston (1991) 'The Penn World Table (Mark 5): An expanded set of international comparisons, 1950-1988', *The Quarterly Journal of Economics* 106(2): 327-368.

World Bank (2008) 'The Growth Report: Strategies for sustained growth and inclusive development'. Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank.