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One Small Step for Man: Paul Krugman, the 2008 Nobel Laureate in Economics

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ABSTRACT *Paul Krugman was awarded the 2008 Nobel Prize in Economics 'for his analysis of trade patterns and location of economic activity' (http://nobelprize.org). This article assesses the importance of Krugman's contributions to both the state of our knowledge and methodology as a profession. The focus of the article is on Krugman's contributions to trade theory beginning with Krugman (1979a). This article had a major direct impact on the direction of research on international trade while also containing the seeds of his work 12 years later on economic geography.*

1. Introduction

The 2008 Nobel Prize in Economics was awarded to Paul Krugman for the following: 'By having integrated economies of scale into explicit general equilibrium models, Paul Krugman has deepened our understanding of the determinants of trade and the location of economic activity' (Prize Committee, 2008). Krugman was a quick learner, earning his BA from Yale in 1974 and his PhD from MIT just three years later. After teaching for several years at Yale and then MIT, he moved to Stanford for a short west coast stint before returning to MIT. He is currently at Princeton, where he is a Professor of Economics and International Affairs. He also holds the title of Centenary Professor at the London School of Economics. Since 2002, Krugman has written for the Opinion Page of the *New York Times*. To date he has written over 750 columns. Always prolific, he has also written a near-daily blog for many years and written columns for *Slate*, *Fortune*, the *Harvard Business Review*, and *Foreign Policy* among other well-known outlets. While his more popular work is discussed briefly, this essay focuses on the accomplishments outlined by the Nobel Committee as well as the importance of Krugman's work in trade theory and economic geography more generally.

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Paul Krugman is perhaps the best known Nobel Laureate to date. In my own department, it must be confessed, several awardees of the past left us in the hallways asking 'who?' and quickly going back to our offices looking up names on *Econlit*. Not so in 2008. Krugman made a name for himself throughout the academic world due to his breadth of subject matter as well as his combative and generally entertaining communication style. Now, of course, the world knows him as a columnist for the *New York Times*.

Most of this article will be devoted to Krugman's work in trade theory. This seminal work (Krugman, 1979a, 1980) reformed and reframed a subject in a paradigm-shifting sense that is unique and truly worthy of a Nobel Prize. Thus, while his work on economic geography is extremely influential and transformational in its own right, it can be viewed an addendum in the sense of the presentation of the award.

2. New Trade Theory: Intra-Industry Trade

I'm sure that this story will feel familiar to many readers who have studied trade. The first time I read Paul Krugman's (1979a) important article was in the spring of 1986. I was in graduate school taking a second course in international trade theory. I had recently completed my sequence in microeconomic theory and passed my exams. My first thought upon completing the paper was—'well, I could have done that'. After successfully completing a year-long sequence in micro theory, who couldn't? The paper is beyond simple in that it takes the Dixit & Stiglitz (1977) model and simply assumes that the firms can exist in two separate countries. In fact, nearly half of the 10 pages of text are devoted to the closed economy model. Almost nothing could be simpler.

After reading more and more of Krugman's work this became a reoccurring theme; my reaction was usually—I could have done that. Therein lay the subtle genius of Paul Krugman. He has a gift of seeing the essence of whatever problem he is grappling with and pinpointing the exact model and set of assumptions that solves the problem in the absolute simplest manner. From the beginning of his career he has taken Occams's Razor seriously and without apology. In trying to describe Krugman's style and his goals as a theorist I can do no better than to quote from another brilliant example of Krugman's method. At the end of Helpman & Krugman (1989, pp. 187–188) the authors state: 'It is the mark of really good theory that it offers insights that are startling at first yet seem obvious once fully absorbed'. This is a precise description of my reaction to Krugman's work. Once he has pointed to the fundamental issue and provided the logic, the answer to the question being addressed appears obvious.

In 1979, what needed to be explained? Empirical analysis had long shown the importance of intra-industry trade (Grubel & Lloyd, 1975). However, the theory of such trade was not connected to a single approach. While many authors had made significant contributions (e.g., Gray, 1973; Grubel, 1970; Linder, 1961), we were still left without a unifying approach. This meant that economic theory had little understanding of the broader stylized facts of trade between the advanced industrialized countries in the post-Second World War era. The workhorse of trade

theory was, of course, Heckscher-Ohlin-Samuelson (HOS). This theory explains inter-industry trade between countries based on their relative factor endowments. In a two-by-two-by-two model, the theory posits that each country will export the good that uses its relatively abundant factor intensively and import the other good.

Broadly, the HOS model has three implications. First, trade flows are positively related to differences in relative factor endowments, so that countries that are more different from each other have higher trade volumes. Second, and related to the first point, trade flows are determined by comparative advantage. Third, via the Stolper-Samuelson theorem, changes in trade patterns should be accompanied by significant changes in the distribution of income within each country. As Krugman (1981a) points out, the broad facts of the post Second World War experience pointed in another direction. During this period, most of the growth in international trade was between countries with similar endowments, the trade seemed to be in similar products, and the increased trade seemed to have few implications for the distribution of incomes in the trading countries. Krugman filled a gaping hole in the trade literature that gave economists the tools necessary to begin to answer these facts in a manner that could ultimately be linked with the HOS model of inter-industry trade.

2.1. Krugman (1979a)

Abstraction is a wonderful thing. Imagine a world where goods are all slight variations of one another and where people love having a variety of such goods available. Further assume that the production of these goods is costly to start but the goods are produced rather cheaply at the margin, and that these costs are the same for anyone who wants to produce a variety of the good. Now imagine that these goods are produced across different areas of the world, call them 'countries'. What do we get if these countries are allowed to trade with one another? We have Krugman's (1979a) article.

The article assumes that utility (U) is additive such that U increases with additional varieties:

$$U = \sum_{i=1}^{n} v(c_i) \text{ where } v' > 0 \text{ and } v'' < 0 \tag{1}$$

and c is the consumption of the ith variety and $i=1, \ldots, n$ is an index of goods $1-n$. Also note that the function v is not indexed, indicating that it is constant and equal across varieties.

Each consumer receives an income (y) so that Ly is national income where capital is assumed away. Thus, $y = \sum_{i=1}^{n} p_i c_i$ where p_i is the price of the ith variety. Consumers maximize utility by equalizing marginal utility across varieties so that:

$$v'(c_i) = \lambda p_i \tag{2}$$

where λ is the marginal utility of income.

With λ constant, Krugman defines the elasticity of demand ε as:

$$\varepsilon_i = -\frac{v'}{v'' c_i} \tag{3}$$

where $\partial \varepsilon_i / \partial c < 0$.

The production function is simple such that $y_i = f(L_i)$ and $L_i = \alpha + \beta x_i$ where α is a fixed labor input and β is the marginal labor input. This function generates total costs (C) for each variety of $C = wL_i = w(\alpha + \beta x_i)$. The function exhibits increasing returns since average cost falls as output increases with a constant marginal cost.

Firms maximize profit Π generating the familiar price equation where price depends on the elasticity of demand and marginal cost:

$$\frac{p_i}{w} = \frac{\varepsilon}{\varepsilon - 1}\beta \tag{4}$$

Now, given the assumption of monopolistic competition, price is set equal to average cost, $p = (\alpha w / x_i) + w\beta$ generating:

$$\frac{p_i}{w} = \frac{\alpha}{cL_i} + \beta \tag{5}$$

Equations (4) and (5) generate the equilibrium *per capita* consumption of each variety (c) and the price relative to the wage (p/w). This allows for the determination of the number of varieties (n) produced. Assuming full employment we have:

$$n = \frac{L}{\alpha + \beta x} \tag{6}$$

Manipulating equation (6) a bit allows us to see more clearly the relations important to the model. Recall that $x = Lc$. Substituting this into equation (6) and dividing the numerator and denominator by $(1/L)$ generates:

$$n = \frac{1}{\frac{\alpha}{L} + \beta c} \tag{7}$$

Thus, the number of varieties is positively related to population size (L) and negatively related to *per capita* consumption of each variety. These relations are used by Krugman to analyze the effects of growth in the labor force, factor mobility between countries and, of course, international trade. We will focus on trade.

To analyze the effects of trade based solely on differential varieties, Krugman allows for two countries, assumes that the residents of each country have identical tastes, and assumes that producers have identical technologies so that no trade can be Ricardian. Heckscher-Ohlin trade has already been assumed away since labor is the only factor. Opening will generate both trade and gains from trade.

What is there to trade? The answer simply is different varieties of the good. By equation (1), consumers value increased variety; so, as countries open to trade, a natural demand is generated by each country's residents for the other country's varieties. Thus, all trade is intra-industry. This trade is beneficial to the residents of each country in two ways. First, the increase in varieties increases utility via equation (1). Second, and also important given that no comparative advantage exists, prices fall due to the increased competition between firms. From equation (7) we see that an increase in the number of firms decreases consumption *per capita*. Also recall that $\partial\varepsilon_i/\partial c < 0$; thus, as *per capita* consumption falls and ε increases, prices relative to the wage also fall via equation (4). The intuition here is that as demand becomes more elastic, the monopoly power of the firm decreases, decreasing the mark-up over marginal cost.

One final result important to the development of trade theory is that relative country size is established as an independent determinant of trade volume. Given his model, the value of imports (M) can be given by the following (where, a * above a variable indicates the foreign country):

$$M = \frac{wLL^*}{(L + L^*)} = M^* \tag{8}$$

Assume that $L + L^*$ is constant, let L^* increase from 0 to $L = L^*$, and then allow that $L^* > L$. Imports as a fraction of world income increases from both sides as size equalizes.

This simple model produced a number of interesting results. First, how does the model help us better understand those stylized facts of trade in the post Second World War era? The Krugman model predicts that as countries open to trade, the volume of trade will increase the fastest between countries that are more similar. This is proxied by country size (L) in equation (8). Moreover, this trade will be intra-industry. Since this trade is not based on comparative advantage, relative prices do not change and there are no income distribution effects—i.e., no winners and losers. While this is true by definition within the model (due to the assumption of a single factor), the broader point is the delinkage of changes in trade patterns from changes in the distribution of income. When trade takes place on an intra-industry basis, and between similarly endowed countries, trade does not have clear winners and losers. As Dixit (1993) and many others have pointed out, this result seems correct given the behavior of various interest groups to trade initiatives. 'The U.S.-Canadian free trade agreement produced only minor local complaints of a distributive nature, whereas the expansion of that agreement to include Mexico is proving more controversial' (Dixit, 1993, p. 178).

Thus, one small step began a revolution in trade theory. The introduction of formal models into the determination of the role played by increasing returns to scale for both trade patterns and the gains from trade led to a great outflow of work. However, one of the lessons from the economic methodology literature (Blaug, 1980) is that revolutions have a difficult time getting off the ground due to the entrenched interests of those following the dominant paradigm. It is possible

that Krugman (1979a) may have encountered this problem. In Gans & Shepherd (1994), Krugman tells the story of how the paper received a less than favorable welcome by referees. Krugman first sent the paper to the *Quarterly Journal of Economics*, only to have it rejected by a referee who felt that the issue of trade based on increasing returns and formal modeling techniques should always remain separate. Next, he sent the paper to the then upstart *Journal of International Economics*, edited by his former professor at MIT, Jagdish Bhagwati. Bhagwati published the paper overruling two referees who recommended rejection. While Bhagwati is often linked to the older school of theory based on the assumption of perfect competition, he was also perhaps the earliest to recognize how much results can change with the introduction of imperfect competition when he demonstrated that tariffs and quotas have very different welfare implications in the presence of a domestic monopoly (Bhagwati, 1965). Without Bhagwati's support the revolution would surely have been delayed.

While Krugman (1979a) was clearly the main reason for the Nobel Prize, the prize committee (2008) also mentions the contribution of Krugman's (1980) follow up article. In this article, Krugman tries to answer the question about which varieties each country will export. To begin to address this issue, Krugman starts with a model very similar to the one outlined above, but allows for two different types of consumers. These consumers derive utility from two different classes of goods that he calls '*alpha*' and '*beta*'. If *alpha* lovers and *beta* lovers are distributed across the countries equally, the results are basically the same as above. Krugman allows the populations in each country to be mirror images of one another, with one country having more *alpha* lovers and the other more *beta* lovers. He then shows that once trade is allowed the equilibrium will be where all *alpha* (*beta*) production, and hence exports, will occur in the country that has more *alpha* (*beta*) lovers. This result is extended to allow for incomplete specialization, with the main message remaining unchanged. Countries are likely to be net exporters for varieties of products where the initial home demand is large giving a natural logic to the 'home market' effect.

2.2. More on the 'New Trade Theory'

Shortly after publication of the first Krugman articles, questions arose regarding the link between this new theory focusing on intra-industry trade and the older models of comparative advantage and inter-industry trade. Lancaster (1980) and the textbook by Dixit & Norman (1980) were the first models to make such a linkage. This was followed up with efforts by Krugman (1981a) and a paper by Helpman (1981) that would make its own significant mark. This work established the full linkage through its many propositions between the old and the new theory. By combining a monopolistically competitive sector with a competitive one, the theories were found to be complementary. Relative endowments were still found to explain net trade between sectors, while scale provided an explanation for intra-industry trade. Finally, Helpman & Krugman (1985) provided the full textbook analysis via the diagrams of an integrated world economy.

The importance of the work on linkages cannot be over stressed. For the first time, trade theorists had a unified explanation of inter-industry trade and

intra-industry trade. The explanation was intuitively appealing and consistent with basic micro foundations. Moreover, through Helpman & Krugman (1985) it was easily teachable to graduate and advanced undergraduate students. Finally, it contained what appeared to be several empirically testable implications.[1]

Empirical testing for the determinants of intra-industry trade had been an ongoing project for years (see Aquino, 1978; Loertscher & Wolter, 1980). However, the first paper to explicitly test the predictions of the new trade theory was Helpman (1987). Helpman found support for three new trade predictions using OECD data from 1970 to 1981. First, as factor endowments become more similar, the ratio of intra-industry trade to total trade increases between countries. Second, as country sizes become more equal, trade as a percentage of GDP increases. Finally, in cross-country comparisons, countries with more equal relative factor endowments have higher ratios of intra-industry to total trade volume. While he did find support for these predictions, his results weaken significantly in the later years of the study.

No good results go unpunished for long. Hummels & Levinsohn (1995) used panel techniques with fixed and random effects and extended the analysis to non-OECD countries. One of their most damning results for the new theory was that most of the variation in the share of intra-industry trade was explained by pairwise dummies. In other words, most of the variation across countries was explained by things that are not specified by the theory. Of course, international trade theory has never been too interested in abandoning well-constructed theories merely because of poor empirical performance. The survival of HOS after 27 years of an assumed Leontief paradox attests to that. However, if the Leontief paradox taught us anything it is that these theories and their empirical implications take time to be fully absorbed. Many studies (produced from 1953 to 1980) attempted to solve the paradox, only to have Leamer (1980) show that the problem had been misspecified, and when properly specified Leontief's own data were found to be consistent with the theory. This, however, does not imply that the HOS-HOV approach was generally found to be consistent with the data. What it does show is that a great deal of care needs to be taken in interpreting any empirical result as implying that a theory needs to be discarded. In this regard, Evenett & Keller (2002) found that depending on the countries, and the type of trade, both increasing returns and relative endowments are important in explaining trade patterns. This result is broadly consistent with the generalized theory.

The influence of Krugman's original work continues to shape the development of trade theory and its related empirics. One implication of the Krugman model is that opening up to trade moves firms down their average cost curves as demand becomes more elastic, and prices fall. This necessitates the elimination of some firms as the output of other firms increase. The question of which firms

[1]Of course, this consistency with the HOS explanation of inter-industry trade came with a rather large cost. It meant that the new theory inherited the large track record of empirical difficulties of HOS and its generalized sister Heckscher-Ohlin-Vanek (HOV). See, for example, Trefler (1995) and the references therein.

exit and which remain was left open. Melitz (2003) fills this gap by assuming higher and lower productivity firms existing side by side in equilibrium. In the opening to trade the model predicts that the more productive firms expand and export while the lower productivity firms exit. This leads to new productivity gains from trade as market share moves toward more productive firms, increasing aggregate productivity without assuming any change in technology. This general approach was later extended in several directions relating to questions such as whether firms should export or engage in FDI (Helpman *et al.*, 2004) as well as other interesting issues such as the effects of trade on economic growth (Baldwin & Robert-Nicoud, 2008). As the new-new trade literature has begun to mature, many empirical tests have been developed (e.g., Helpman *et al.*, 2008); these developments will surely lead to further theoretical refinements. All this literature can be traced back to Krugman's (1979a, 1980) original work.

2.3. The Other New Trade Theory

It is not too much of an exaggeration to say that, throughout the 1980s, Paul Krugman was the face of international trade theory. All roads ran to and from his office. After trade theory successfully incorporated the idea that intra-industry trade can be determined within a monopolistically competitive framework, eyes turned to oligopoly. The first simple model was developed by Brander (1981). This was quickly followed by Brander & Krugman (1983), where the full welfare implications of trade based solely on an oligopolistic market structure were developed. In many ways, this article represents Krugman at his best. The assumptions of this model make it clear that, as a guide to understanding real trade flows between countries, it is a nonstarter. There is virtually no way that it could be relied on to explain any sizable share of trade volume. In fact, the beauty of the model is that it demonstrates that this is basically irrelevant.

To better see the idea I am developing let's start with the model's assumptions. In the base model there are two countries, each with a single firm. Both countries and firms are identical in every relevant way. Their consumers possess identical homothetic preferences, while their firms produce homogeneous products with identical costs structures. The markets are segmented, but when trade is allowed the firms play a basic Cournot game. What good could ever come out of such a model? There is obviously no room for comparative advantage or trade based on product differentiation. In fact, the opening to trade will result in each country exporting identical products to each other. If we add in the possibility of positive transportation costs associated with such trade, we have each country buying the other country's higher cost goods. In a comparative advantage sense, this implies that trade is even running in the wrong direction as each country buys from the higher cost producer. The stream is flowing up hill. The prices actually charged in each market must be the same due to the assumption of homogeneous products. Given transport costs, the freight-on-board (FOB) prices (price minus transport costs) differ. The size of the mark-up of price over marginal cost is lower in export markets for each firm. Thus, a form of reciprocal dumping occurs with each firm selling at a lower FOB price in foreign markets.

The power of the model is found in the welfare implications of this trade. The model highlights a gain that was found in the monopolistically competitive model, but was hidden from view. Trade provides a gain because it increases the intensity of competition between firms, decreasing their ability to monopoly price and decreasing the level of distortions associated with monopoly power. Economists often made the claim that the gains from trade were much greater than the terms of trade gains found in the traditional static comparative advantage models. This model forced us to look at trade in a new way—as a pro-competitive policy. In Krugman's hands, trade became an as yet unseen tool of the progressive movement helping to reduce the corrosive influence of monopoly power. Moreover, later empirical work on the relationship between openness to trade and mark-up prices found that trade liberation significantly reduces monopoly power (Levinsohn, 1993; Harrison, 1994). Recently, Krugman (2007, p. iiv) stated the following regarding the evaluation of economic theory: 'I place the highest value on economic theories that transform our perception of the world, so that once people become aware of these theories they see everything differently.' By this standard, Brander & Krugman (1983) represents one of the most significant achievements of the new trade theory.

2.4. Trade Policy

With several new gains from trade being highlighted, it is interesting and somewhat paradoxical that the policy implications of the new trade theory seemed to point in the direction of increased protection. I will discuss two of several important results, the first dealing with monopolistic competition and the second with oligopoly.

An often overlooked result of the older neoclassical trade literature is that the optimal tariff for a country with any ability to influence the terms of trade is always positive. The formal neoclassical case for free trade is extremely limited to the small country case owing to the theory of first best and no distortions owing to the theory of second best. Assuming no distortions, the optimal tariff can most easily be seen through the following equation:

$$\tau = \frac{1}{\varepsilon^* - 1} \tag{9}$$

where τ is the optimal tariff and ε^* is the foreign elasticity of demand. Thus, as the country becomes small and $\varepsilon^* \to \infty$, the optimal tariff goes to zero.

The situation changes slightly when we move to the monopolistically competitive setting. Here, the optimal tariff can be shown as (Helpman & Krugman, 1989):

$$\tau = \frac{1}{s_F^*(\sigma - 1)} \tag{10}$$

where σ is the product elasticity of demand and s_F^* is the foreign expenditure share of world output. Now, as the country becomes small and $s_F^* \to 1$, the optimal tariff remains positive and dependent on the elasticity of demand. The main message of the older theory that the optimal tariff increases with country-level monopoly

power still holds but free trade is never proven optimal. The reason for this is found in the price mark-up mechanism. In equilibrium, price exceeds marginal cost so that marginal benefit exceeds marginal cost. A tariff can induce domestic consumers to buy more of the domestic varieties, reducing the basic consumption distortion. However, it needs to be pointed out that this result does not imply that a tariff is a first-best policy since the distortion is in consumption rather than trade. Thus, a first-best policy is a consumption subsidy. In this way the new theory can best be seen as complementing the older theory rather than supplanting it. Krugman originally failed to make this connection, causing him to overstate the differences between old and new theory in terms of policy implications in Krugman (1987a). This resulted in a public and rather famous scolding by Bhagwati (1989) in his Bernard Harms lecture.

When oligopoly was assumed, the trade policy term of the day became 'strategic,' and trade policy began to be viewed as part of the greater debate over the wisdom of activist industrial policy.[2] The connections were most pointedly made by Brander & Spencer (1983, 1985). These authors made it intellectually acceptable to more than whisper the idea that activist trade policies could be welfare improving. Making such statements in the halls and offices of the Littauer Center may have been considered intellectually open minded, but they were considered verboten in public. Specifically, Brander & Spencer (1985) showed that, under certain circumstances, profits could be shifted from foreign firms to domestic ones through the use of export subsidies. The policy implications of this analysis were clear. Economists were finally stepping out of their ivory towers to acknowledge what many had seen as obvious for years—government subsidies to key industries (following the Japanese) represents the path to success. Trade is a zero-sum game and those who refuse to play hard ball will be the proverbial losers.

Alas the devil is in the details. The case for strategic export policies was formed on a structure that proved to be extremely sensitive to the special assumptions of the model. Brander & Spencer (1985) assumed that firms play Cournot, that resources are unconstrained, that domestic entry is controlled, that domestic consumption is ignored and that foreign governments do not respond to the activist policies of domestic governments. Eaton & Grossman (1986) showed that each assumption of the model was vital to the results. Once again the wisdom of the older trade literature was demonstrated. When resources are scarce, the subsidy to one industry acts as an export tax for other industries, via Lerner's symmetry theorem, making the results on overall profits indeterminate. The results were further weakened when domestic consumers were considered. Moreover, when Bertrand behavior is assumed and foreign retaliation allowed, the optimal strategic policy became an export tax rather than a subsidy.

Krugman's role in this debate was largely as an educator, through the majestic guide Helpman & Krugman (1989), and as moderator through his edited

[2]The most well-known work deals with export promotion; however, important work on import protection and monopoly power for domestic firms also exists (Krishna, 1989).

volume Krugman (1986). Krugman made only one significant contribution to the strategic trade literature, with Krugman (1984). However, the cautious approach that he developed regarding the wisdom of activist government policies in matters of international trade was largely followed by the profession. This view is perhaps best summed up by Dixit (1986, p. 302): the 'basic insight of Adam Smith and Ricardo still stands and continues to govern the overwhelming majority of the volume of world trade ... Don't be too tempted by radical new designs, and conserve some of the beauty of the old ones.' Krugman seems to have maintained this cautious view regarding the lessons of activist trade policies even after his own work went well beyond the confines of the strategic trade policy literature to argue that the existence of dynamic scale economies presents a strong case for industrial targeting as done in Japan (Krugman, 1987b, 1993).

3. Economic Geography

Imagine a world where more than half of the population lives in cities crowded with people. Further imagine this world is populated with a minority of individuals dedicated to the study of the economic structure of this world (call them 'economists'). With a large part of the world's population huddled together, explaining this phenomenon seems like a natural place to begin an economist's work. Alas, this imaginary world matches up rather poorly with experience. Yes, most of the world's population is part of the 'huddled masses'; but economists have shown little interest in understanding the reasons why the economy should have such a structure. Krugman (1995, p. 67), in a fabulous book on economic methodology, explains why economists have shown such ambivalence to questions of economic geography: this field was 'left untilled because the terrain was seen as unsuitable for the tools at hand.' Mainstream economists will, for years, leave important questions under evaluated because they don't fit neatly into their tool kit. The average economist seems content to allow important issues to sit quietly while waiting for the appropriate tools to be developed. For Krugman, the necessary tool kit for economic geography was none other than increasing returns within a monopolistically competitive setting, following Dixit & Stiglitz (1977).

In truth, economic geography, which studies the location of economic activity, has been part of the economic literature going back to at least Marshall's *Principles*, with its concept of external economies, and even to Smith's *Wealth of Nations*, if you include the concept of luck as part of economic reasoning. But, in general, Krugman's characterization of the situation seems correct—mainstream economics has largely ignored issues of geography. The first inroad made by Krugman (1981b) to issues of a geographic nature was through his use of Marshall's concept of external economies along with Smith's luck. Here Krugman wandered into the world of uneven development, an area traditionally the domain of radical economics (for an overview, see Brewer, 1980). Krugman developed a simple core–periphery model to capture much of the main message of the more radical literature—that the existence of a developed core can prevent the development of the periphery. In the model, one area gains a

small head start in the accumulation of capital due to its being lucky, external economies of scale implies that the initial lead will grow over time and effectively crowd out the other area.[3]

In awarding the Nobel Prize the committee (2008) emphasized the contribution of Krugman (1991a). The reason for combining the award across the new trade literature and Krugman's role in re-energizing the area of economic geography seems to have been twofold. First, the contributions to both areas were instrumental. Second, both contributions came from the same basic insight that increasing returns can be used to clear a path through years of muddled thought.

The structure of Krugman (1991a) follows that of his earlier papers (Krugman, 1979a, 1980). In fact, as the Nobel Committee pointed out, many of the issues were developed briefly in Krugman (1979a), again pointing to the dominance of this article in the awarding of the Nobel. The major question Krugman addresses in this first paper is why the world's population has developed into cores and peripheries. Krugman (1979a) considers a world where trade is restricted but the mobility of factors is allowed. When this world also includes differentiated products a larger initial region (luck again) will offer higher levels of welfare following equation (1), thus inducing migration. In the limit, this migration will be complete with the entire population in a single area.

Krugman (1991a, p. 484) allows increasing returns to interact with transportation costs of the iceberg variety to help answer the following question: 'Why and when does manufacturing become concentrated in a few regions, leaving others relatively undeveloped?' The tendency for an economy to develop into core–periphery areas is positively related to the strength of scale economies and negatively related to transport costs. As in Krugman (1979a), the model is simple with stark results. In addition, the model led to a resurgence of work on geography and location issues in economics. Much of this work is summarized in the textbook of Fujita *et al.* (1999) and in Krugman (1998). More recent work of note is summarized in Head & Mayer (2004). Other important work on economic concentration focuses on the density of economic activity through the interaction between generalized agglomeration effects versus congestion effects (e.g., Ciccone & Hall, 1996; Glaeser, 1998; Keller, 2002).

[3]There is an interesting aside point to be made here. The 1980s and 1990s saw many cases of mainstream economic theory crowding out heterodox theory by using the ever-expanding standard set of tools to better understand issues long part of heterodox theory. In addition to Krugman (1981b), Krugman (1986) developed a model of the technology gap, where he shows that technological change in the advanced countries benefits all countries but the transfer of this technology to less developed countries can hurt the developed countries. Other examples include north–south models and big-push models of development and their associated poverty traps (see Burgstaller, 1987; Murphy *et al.*, 1989) as well as the entire endogenous growth literature (e.g., Krugman, 1990). Thus, Krugman can be held at least partly responsible for the identity crisis that has plagued heterodox economics for the past 30 years, as orthodox theory came to dominate many traditionally heterodox areas of research.

4. Pop Paul

The life of the popular press Paul Krugman began with the publication of his undergraduate textbook *International Economics* in 1988, coauthored with Maurice Obstfeld. This book was an instant top seller. In many ways the book began, and still is, a mainstream conservative text. In its early editions, it was marked by a language that was too technical for many undergraduates (this was true for my students anyway). However, as the editions accumulated, much of the technical presentations were left aside; in its place rose a much more readable and undergraduate-relevant text. In fact, while the trade part of the text, Krugman's main contribution, is standard in its treatment of the basic and new trade models, it stands alone in the international economics market for its development of topics in the political economy of trade policy. Krugman masterfully weaves together a discussion that includes the median voter theorem, Mancur Olson's views on interest groups and other ideas to give a relatively complete explanation of the distribution of protection across sectors of the economy. While Krugman never made a significant contribution to this area, his text shines a bright light on an important area that others leave completely unsearched.

Following the success of this first book aimed at a more general audience, Krugman has written an introductory textbook and nine popular books. The tone of these books has changed substantially over the years, as Krugman himself moved from a middle-of-the-road liberal to the left of Barack Obama. His first popular book, *The Age of Diminished Expectations: U.S. Economic Policy in the 1990s*, first published in 1990, was reviewed by the *Library Journal* as occupying 'fairly rare territory: the middle ground.' The book argued that the US economy was not operating as well as it could have, but, all in all, not that badly either. The US seemed to have survived the Reagan years intact. Partly, this 'survival is OK' mentality of the populous was the result of the stagflation of the 1970s and the recession of the 1980s. Expectations were low regarding the future of the US economy. After all, the Japanese were set to overtake the US as the leading world economy resulting in real economic losses for the US economy, or so said many political writers. Krugman, however, was having none of it.

In his second popular book, *Peddling Prosperity* (Krugman, 1994), the purveyors of such talk were disrespectfully called 'strategic traders'. Lester Thurow, Robert Reich, Robert Kuttner and Ira Magaziner were held out as peddlers of policies that did not pass the laugh test, meaning that they were not based on sound economic theory. Krugman felt that this issue was so important that he devoted an appendix to the technical issues of productivity and competitiveness. Essentially, Krugman was rewriting the 'cosmopolitan' theory of growth and trade developed by David Hume that the US will benefit if other countries grow. This was a concept that was lost on the zero-sum mentality being promulgated by those advocating an activist industrial policy in the late 1980s and early 1990s. Krugman seems to have seen himself as setting the record straight.

Setting the record straight is a theme that flows throughout Krugman's popular writing. In his books, *Slate* and *New York Times* columns as well as his public appearances he constantly appeals to his training in economic theory to

make, often well-timed, arguments that are backed by solid data. By economic training, I mean largely theory now taught at the undergraduate level as comparative advantage micro and Keynesian macro. In contrast, Krugman holds the profession, specifically rational expectations macroeconomics, accountable for much of the current economic crisis. In his eyes the profession lost much of its credibility for advocating *laissez-faire* policies in financial markets that created the bubbles that led to the financial meltdown, for failing to understand the enormity of the crisis as it happened and for not advocating the activist monetary and fiscal policies necessary to turn the economy around (Krugman, 2009). In doing so, he falls back on an argument that he developed with great care in Krugman (1995). At some point, there is a price to be paid for mathematical precision in the form of decreased empirical relevance. In the search for models that would impress colleagues, especially those on tenure and promotion committees, economists assumed away the natural volatility of capitalistic markets, leading them to eventually believe that the reason for the economic model was to be found in its inner elegance and beauty.

> As I see it, the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth . . . [W]hile sabbaticals at the Hoover Institution and job opportunities on Wall Street are nothing to sneeze at, the central cause of the profession's failure was the desire for an all-encompassing, intellectually elegant approach that also gave economists a chance to show off their mathematical prowess. (Krugman, 2009)

For Krugman, simplifying assumptions and mathematical techniques have always been tools to help a theorist see the essence of problems more clearly and to help to communicate those essences to an audience. When the tools become the ends, he argues, the consequences can be devastating. In the end, economics is simply too important to allow such gaming to dominate for, as we learned from Keynes, the world is ruled by little else.

While Krugman, the columnist, seems to have moved from center left to left-left on the American political spectrum, his methodology of sound economic reasoning backed by empirics has remained pretty consistent (some tirades against the George W. Bush administration exempted).[4] Indeed his harshest criticisms have come when it appears that he abandoned this path (see *The Economist* article, 'Paul Krugman, One-Handed Economist,' November 13, 2003). The columnist is at his best when he strays the least from his academic base.

[4]Income distribution has been a part of most of Krugman's popular books. His treatment of the issue can serve as an example of how his political views have changed over the years. In *Peddling Prosperity*, Krugman gave a measured look at the reasons for the increase in the dispersion of incomes that occurred in the US economy from 1977 to 1989. He downplayed the role played by trade and empathized various aspects of technological progress causing the return to the most scarce factors (super stars) to dramatically rise. In the end, however, he was left with hands in the air stating that 'we really don't know very well why inequality has increased' (Krugman, 1994, p. 150). By 2007, in his book *The Conscience of a Liberal*, Krugman was more than ready to lay the problem at the feet of Republican Presidents, especially, George W. Bush.

5. Conclusion

In assessing Krugman's research method after his winning the John Bates Clark Medal (for the American economist under the age of 40 who has made the most significant contribution to economic thought) in 1991, Dixit (1993, p. 173) made the following observation: Krugman 'spots an important economic issue coming down the pike months or years before anyone else. Then he constructs a little model of it, which offers some new and unexpected insight. Soon the issue reaches general attention, and Krugman's model is waiting for other economists to catch up.' I hope to have shown that this assessment is basically correct. However, it also seems to have some merit in assessing his work in macroeconomics and exchange rates (Krugman, 1979b, 1991b). Krugman has the mix of analytical skills and a wild imagination that forges new paths for the rest of us to follow. In this sense, I have mixed emotions regarding his decision to leave the active world of academic research for popular political analysis at the *New York Times*. I am left to wonder how the state of our knowledge would be different if he had made another choice. My hunch is that the opportunity cost of that decision has been extremely high for the rest of us.

References

Aquino, A. (1978) Intra-industry trade and inter-industry specialization as concurrent sources in international trade in manufactures, *Weltwirtschaftliches Archiv*, 114, pp. 275–296.

Baldwin, R.E. & Robert-Nicoud, F. (2008) Trade and growth with heterogeneous firms, *Journal of International Economics*, 74, pp. 21–34.

Bhagwati, J. (1965) On the equivalence of tariffs and quota, in: R. Baldwin *et al.* (Eds) *Trade Growth and the Balance of Payments: Essays in Honor of Gottfried Haberler* (Chicago: Rand-McNally).

Bhagwati, J. (1989) Is free trade passé after all?, *Weltwirtschaftliches Archiv*, 125, pp. 11–44.

Blaug, M. (1980) *The Methodology of Economics: Or How Economists Explain* (Cambridge: Cambridge University Press).

Brander, J.A. (1981) Intra-industry trade in identical commodities, *Journal of International Economics*, 11, pp. 1–14.

Brander, J.A. & Krugman, P. (1983) A 'reciprocal dumping' model of international trade, *Journal of International Economics*, 15, pp. 313–321.

Brander, J.A. & Spencer, B.J. (1983) International R&D rivalry and industrial strategy, *Review of Economic Studies*, 50, pp. 707–722.

Brander, J.A. & Spencer, B.J. (1985) Export subsidies and market share rivalry, *Journal of International Economics*, 18, pp. 83–100.

Brewer, A. (1980) *Marxist Theories of Imperialism: A Critical Survey* (London & New York: Routledge & Kegan Paul).

Burgstaller, A. (1987) Industrialization, deindustrialization, and north-south trade, *American Economic Review*, 77, pp. 1017–1018.

Ciccone, A. & Hall, R. (1996) Productivity and the density of economic activity, *American Economic Review*, 86(1), pp. 54–70.

Dixit, A. (1993) In honor of Paul Krugman: winner of the John Bates Clark Medal, *Journal of Economic Perspectives*, 7, pp. 173–188.

Dixit, A. (1986) Trade policy: an agenda for research, in: P. Krugman (Ed.) *Strategic Trade Policy and the New International Economics* (Cambridge, MA: MIT Press).

Dixit, A. & Norman, V. (1980) *Theory of International Trade* (Cambridge: Cambridge University Press).

Dixit, A. & Stiglitz, J. (1977) Monopolistic competition and optimum product diversity, *American Economic Review*, 63, pp. 297–308.
Eaton, J. & Grossman, G. (1986) Optimal trade and industrial policy under oligopoly, *Quarterly Journal of Economics*, 101, pp. 383–406.
Evenett, S.J. & Keller, W. (2002) On theories explaining the success of the gravity equation, *Journal of Political Economy*, 110, pp. 281–316.
Fujita, M., Krugman, P. & Mori, T. (1999) *The Spatial Economy: Cities, Regions and International Trade* (Cambridge, MA: MIT Press).
Gans, J.S. & Shepherd, G. (1994) How are the mighty fallen: rejected classic articles by leading economists, *Journal of Economic Perspectives*, 8, pp. 165–179.
Glaeser, E. (1998) Are cities dying?, *Journal of Economic Perspectives*, 12, pp. 139–160.
Gray, P. (1973) Two-way international trade in manufactures: a theoretical underpinning, *Weltwirtschaftliches Archiv*, 109, pp. 19–39.
Grubel, H.G. (1970) The theory of intra-industry trade, in: I.A. McDougall & R.H. Snape (Eds) *Studies in International Economics* (Amsterdam: North-Holland).
Grubel, H. & Lloyd, P. (1975) *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products* (New York: Wiley).
Harrison, A. (1994) Productivity, imperfect competition and trade reform: theory and evidence, *Journal of International Economics*, 36, pp. 53–73.
Head, K. & Mayer, T. (2004) The empirics of agglomeration and trade, in: J.V. Henderson & J.F. Thisse (Eds) *Handbook of Regional and Urban Economics, Volume 4. Cities and Geography,* (Amsterdam: Elsevier).
Helpman, E. (1981) International trade in the presence of product differentiation, economics of scale, and monopolistic competition: a Chamberlin-Heckscher-Ohlin approach, *Journal of International Economics*, 11, pp. 305–340.
Helpman, E. (1987) Imperfect competition and international trade: evidence from fourteen industrial countries, *Journal of the Japanese and International Economics*, 1, pp. 62–81.
Helpman, E. & Krugman, P. (1985) *Market Structure and Foreign Trade* (Cambridge: MIT Press).
Helpman, E. & Krugman, P. (1989) *Trade Policy and Market Structure* (Cambridge: MIT Press).
Helpman, E., Melitz, M.J. & Yeaple, S.R. (2004) Export versus FDI with heterogeneous firms, *American Economic Review*, 94, pp. 300–316.
Helpman, E., Meltiz, M. & Yona, R. (2008) Estimating trade flows: trading partners and trading volumes, *Quarterly Journal of Economics*, 123, pp. 441–487.
Hummels, D. & Levinsohn, J. (1995) Monopolistic competition and international trade: reinterpreting the evidence, *Quarterly Journal of Economics*, 110, pp. 799–836.
Keller, W. (2002) Geographic localization of international technology diffusion, *American Economic Review*, 92, pp. 120–142.
Krishna, K. (1989) Trade restrictions as facilitating practices, *Journal of International Economics*, 26, pp. 251–270.
Krugman, P. (1979a) Increasing returns, monopolistic competition, and international trade, *Journal of International Economics*, 9, pp. 469–479.
Krugman, P. (1979b) A model of balance-of-payment crises, *Journal of Money, Credit and Banking*, 11, pp. 311–325.
Krugman, P. (1980) Scale economies, product differentiation, and the pattern of trade, *American Economic Review*, 7, pp. 950–959.
Krugman, P. (1981a) Intraindustry specialization and the gains from trade, *Journal of Political Economy*, 89, pp. 959–974.
Krugman, P. (1981b) Trade, accumulation, and uneven development, *Journal of Development Economics*, 8, pp. 149–161.
Krugman, P. (1984) Import protection as export promotion: international competition in the presence of oligopoly and economics of scale, in: H. Kierzkowski (Ed.) *Monopolistic Competition and International Trade* (Oxford: Oxford University Press).
Krugman, P. (Ed.) (1986) *Strategic Trade Policy and the New International Economics* (Cambridge: MIT Press).
Krugman, P. (1987a) Is free trade passé?, *Journal of Economic Perspectives*, 1, pp. 131–144.

Krugman, P. (1987b) The narrow moving band, the Dutch Disease, and the competitive consequences of Mrs. Thatcher: notes on trade in the presence of dynamic economies of scale, *Journal of Development Economics*, 27, pp. 41–55.
Krugman, P. (1990) *Rethinking International Trade* (Cambridge: MIT Press).
Krugman, P. (1991a) Increasing returns and economic geography, *Journal of Political Economy*, 99, pp. 483–499.
Krugman, P. (1991b) Target zones and exchange rate dynamics, *Quarterly Journal of Economics*, 160, pp. 669–682.
Krugman, P. (1993) The narrow and broad arguments for free trade, *American Economic Review*, 83, pp. 362–371.
Krugman, P. (1994) *Peddling Prosperity: Economic Sense and Nonsense in the Age of Diminished Expectations* (New York: W.W. Norton).
Krugman, P. (1995) *Development, Geography, and Economic Theory* (Cambridge, MA & London: MIT Press).
Krugman, P. (1998) Space: the final frontier, *Journal of Economic Perspectives*, 12, pp. 161–174.
Krugman, P. (2007) Introduction, in: J.M. Keynes, *The General Theory of Employment, Interest and Money* (London: Palgrave Macmillan).
Krugman, P. (2009) How did economists get it so wrong?, *New York Times*, September 6.
Lancaster, K. (1980) Intra-industry trade under perfect monopolistic competition, *Journal of International Economics*, 10, pp. 151–175.
Leamer, E.E. (1980) The Leontief paradox, reconsidered, *Journal of Political Economy*, 88, pp. 495–503.
Levinsohn, J. (1993) Testing the imports-as-market-discipline hypothesis, *Journal of International Economics*, 35, pp. 1–22.
Linder, S.B. (1961) *An Essay on Trade and Transformation* (New York: Wiley).
Loertscher, R. & Wolter, F. (1980) Determinants of intra-industry trade: among countries and across industries, *Review of World Economy*, 116, pp. 280–293.
Melitz, M.J. (2003) The impact of trade on intra-industry reallocations and aggregate industry productivity, *Econometrica*, 71, pp. 1695–1725.
Murphy, R., Shleifer, A. & Vishny, R. (1989) Industrialization and the big push, *Journal of Political Economy*, 97, pp. 1003–1026.
Prize Committee of the Royal Swedish Academy of Sciences (2008) Trade and geography—economies of scale differentiated products and transport costs. Available at www.kva.se (accessed 21 October 2008).
Trefler, D. (1995) The case of missing trade and other mysteries, *American Economic Review*, 85, pp. 1029–1046.