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April 2011

The International Trade and Investment Program

The International Trade and Investment program meets for three regular meetings each year: two program meetings in the winter and spring, and the summer institute. The group had about 60 research associates with primary affiliation, and another 15 with secondary affiliation with the group, along with 15 faculty research fellows, so 90 members in total. Research within the ITI group covers a wide range of topics such as explaining patterns of international trade as well as foreign direct investment and immigration, and understanding the impact of trade policies. This is in addition to topics covered by specialized conferences, the two most recent of which were "Globalization and Poverty" and "China's Growing Role in World Trade."[1] These two conference volumes illustrate that a good deal of research in the group is concerned with developing countries, though that will not be discussed in this summary, where I focus on just a few topics dealing with trade patterns and trade policy.

The Great Trade Collapse

The financial crisis and great recession of 2008-2009, brought with a "great trade collapse": world trade relative to GPD fell by nearly 30% between these two years, which exceeds the experience of other post-war recessions. The question, then, is why trade fell so much (and also why it recovered relatively quickly). The leading explanations stress in varying degrees the roles of: inventory adjustment for imports; demand for durable versus non-durable goods; the use of intermediate inputs in trade, which might magnify the impact on trade as "supply chains" are temporarily disrupted; and the role of trade credit, which appears to have dried up temporarily during the crisis.

Beginning with the last of these explanations, Kalina Manova and co-authors provide the strongest evidence supporting the role of credit constraints on exports. These constraints are found to limit the extensive margin of exports in sectors that are most vulnerably to financial stress.[2] Furthermore, they argue that such sectors faced greater reductions in their exports to the U.S. market during the financial crisis.[3] That idea is confirmed by Mary Amiti and David Weinstein in work for Japan.[4] They find that Japanese exporters faced greater reductions in their sales abroad if they were affiliated with main banks that performed poorly. Focusing on China, Robert Feenstra and co-authors finds that firms faced tighter credit constraints on their exports than their domestic sales, and exports experiences a significant slowdown due to the 2008 crisis.[5] Ann Harrison and co-authors finds that for the United States, import prices often rose during the crisis, which is inconsistent with falling demand but can arise from a supply constraint such as a lack of export credit.[6]

Other work casts some doubt on the importance of export credit. George Alessandria and co-authors stress instead the role of inventory adjustment, which can lead to a rapid fall in imports as stocks are adjusted downwards.[7] Andrei Levchenko, Logan Lewis, and Linda Tesar also find a limited role for trade credit in their regression analysis of U.S. trade, but using an accounting definition of "trade credit" that applies equally well to exports or domestic sales.[8] As an alternative explanation, they find that sectors which are more reliant on imported intermediate inputs suffering more during the crisis, as these supply chains were temporarily disrupted. The importance of imported inputs is also stressed by Fabio Ghironi and co-authors, who model the different components of aggregate demand (consumption, investment, government spending and exports) as having different import intensities.[9] They construct a weighted average of C, I, G and X, where the weight reflect these import intensities. Using this variable as in income term and

also including an import price, they predict the fluctuations in import demand during the current crisis and earlier episodes much more accurately than conventional methods that rely on GDP and aggregate prices.

Of course, in the end it will be a combination of factors that explain the great trade collapse: even if inventories or imported intermediates are more important quantitatively, that finding need not detract from the significance of trade credit. Amiti and Weinstein, for example, argue that trade credit can account for about 20% of the fall in exports for Japan, so it was not the most important factor, but it is still economically significant. That point is also made for Peruvian exports by Veronica Rappoport and co-authors, who argue that the reduction in loans from banks performing poorly reduced aggregate exports by 15% during the crisis.[10] Perhaps the most comprehensive evaluation of the different factors contributing to the great collapse in trade Jonathan Eaton, Sam Kortum, Brent Neiman, and John Romalis.[11] They argue that the relative decline in demand for manufactures was the most important driver of the decline in manufacturing trade, and especially the decline in demand for durable manufactures. These factors account for more than 80 percent of the global decline in trade/GDP. While they find that trade frictions increased and played an important role in reducing trade in some countries, notably China and Japan, they only had a small impact on global trade.

Offshoring, Wages And Employment

One of the explanation mentioned above for the great trade collapse was that supply chains may have been disrupted during the crisis. While the "supply chain" concept is often mentioned in the social sciences, it has had limited modeling within international trade. That shortcoming is being addressed in very recent research. Costinot Arnaud, Jonathan Vogel and Su Wang model a sequential supply chain in which mistakes potentially occur at each stage in a

continuum.[12] There are many countries which differ in their probabilities of making mistakes, and in equilibrium, there is a matching between stages of production and countries. Richard Baldwin and Anthony Venables call this type of sequential product chain a "snake", and call the assembly of multiple parts at a central facility a "spider." They provide a partial equilibrium model that illustrates the difficulties of solving for the location of stages in this framework, and also that the assignments might be non-monotonically related to transportation costs.[13]

Closely related to the supply chain concept is the role of intermediaries, who provide services between buyers and sellers. Examples are large trading houses such as Li and Fung in Hong Kong. Recent research by Pol Antràs and Arnaud Costinot has modeled these intermediation activities.[14] Empirical evidence on the role of intermediaries in China is provided by JaeBin Ahn, Amit Khandelwal, and Shang-Jin Wei.[15]

Also closely related to international supply chains is the fragmentation of production across borders, or offshoring. The most recent theoretical paradigm for offshoring draws on "trade in tasks," due to Gene Grossman and Esteban Rossi-Hansberg.[16] In this framework, offshoring in low-skilled tasks acts like labor-saving technological progress in that factor. At unchanged prices for goods – as in a small-country framework – increased offshoring raises the wages of low-skilled labor. In contrast, when the prices of goods are endogenous – as in a large-country framework – then increased offshoring of less-skilled tasks raises the output of that good and lowers its relative price. This change in relative prices has the expected result of lowering the real and relative wage of less-skilled labor, consistent with the earlier work on "trade in inputs" due to Robert Feenstra and Gordon Hanson. [17] The overall change in wages depends on whether the impact of labor-saving technological change due to offshoring dominates the opposite effect from changing international prices, which depends on parameters of production

and other features of the economy.

This work on offshoring has been extended in a number of directions. Richard Baldwin and co-authors integrate the earlier "trade in goods" and "trade in tasks" frameworks, as well as examining the role of heterogeneous firms.[18] Andrés Rodríguez-Clare examines the impact of offshoring in a Ricardian model with a continuum of industries.[19] Arnaud Costinot and Jonathan Vogel provide the most general treatment of offshoring due to factor endowment differences, in a model with a continuum of goods and factors. This leads to a sophisticated matching of factors with goods, for which they provide a complete solution.[20] Pol Antràs, Luis Garicano and Rossi-Hansberg consider the effects of offshoring in a model of multinationals where managers monitor and solve problems for workers.[21] Ariel Burstein and Vogel also consider the role of multinationals that bring technology to the host countries.[22] Based on a quantitative exercise, they argue the growth of multinationals has been at least as important as the growth of trade in explaining the rising skill premium in the United States. Finally, Grossman and Rossi-Hansberg model offshoring between similar countries, where it is not factor-price differences that determine the location of production, but rather, local external economies.[23]

Ann Harrison, Margaret McMillan and co-authors provide new empirical studies of offshoring, using data on U.S. multinationals and data from from the current population survey.[24] They find that it is occupations rather than particular industries that are the best unit of analysis to identify the wage effects of offshoring, which can be significant. Runjuan Liu and Daniel Trefler also utilize the current population survey in the U.S. to link workers who are switching jobs, or becoming unemployed to their original industries.[25] They find only a very small effect of services offshoring on either switching or unemployment, with an offsetting positive impact of "inshoring" on employment rates and earnings.

Rather than examining the impact of offshoring on the level of wages, we can instead consider its impact on the volatility of wages. John McLaren and co-author model employment contracts as long-term, and then examines whether international integration weakens these relationships.[26] Paul Bergin, Robert Feenstra and Gordon Hanson take an alternative approach whereby wage fluctuations vary the range of tasks offshored, and the availability of offshoring magnifies the wage fluctuations themselves.[27] Evidence from Mexico supports the hypothesis that wages exhibit greater fluctuations due to offshoring than in similar industries in the United States. Alejandro Cuñat and Marc Melitz argue that industries displaying greater volatility will tend to locate in countries with more flexible labor market institutions.[28]

Of course, offshoring can be expected to influence unemployment in addition to wages. Current research on unemployment in trade models depends on either "fair wages," that are above the market clearing level, or on search frictions. Examples of papers that make use of "fair wages" include work by Donald Davis with Mary Amiti and James Harrigan.[29]

Recent theoretical work has put these search frictions in models of offshoring. One of the early model along these lines was by Devashish Mitra and Priya Ranjan, who find that unemployment is actually reduced due to offshoring, because the cost-savings for firms leads them to expand employment.[30] More general treatments of trade and unemployment are provided in a series of papers by Elhanan Helpman with Oleg Itskhoki and Stephen Redding.[31] Their framework combines search frictions, wage bargaining and firm heterogeneity. They find that openness to trade may increase unemployment, but that the gains from trade are still positive. Empirical evidence on the effects of trade on labor markets outcomes is provided by Kerem Coşar, Nezih Guner and James Tybout.[32] Their analysis is also based on a model with search

frictions, wage bargaining and firm heterogeneity, that is fitted to Colombian micro data on establishments and households.

Extending The Monopolistic Competition Model

A great deal of research in international trade uses the monopolistic competition model, introduced into trade during the early 1980s by Paul Krugman, Elhanan Helpman, and others. The early models assumed that firms were symmetric in size, which contradicts the fact that a great deal of exports in most economies are accounted for by a relatively small number of large firms. That observation was incorporated in the monopolistic competition model by Marc Melitz, who added heterogeneous firms with random productivities.[33] Since that time, research has focused on extending many other aspects of the monopolistic competition model. Two rather fundamental contributions are made by Arkolokis Costinot and Jonathan Vogel. Costinot introduces marketing costs into the model, thereby allowing for the presence of small exporters (which cannot arise in the Melitz model).[34] Vogel is the first to introduce heterogeneous firms into a spatial version of the monopolistic competition model.[35]

Evaluating the importance of firm heterogeneity requires firm-level data, which can lead to restrictions on data availability due to confidentiality. Fortunately, those problems can be overcome in various ways. For the United States, the imports and exports of individual firms are collected from customs documents by the Foreign Trade Division of the Census Bureau, and several members of the ITI group have obtained permission to merge those data with the Census of Manufactures. That firm-level database is available at the Census Regional Census Data Centers, one of which is at the NBER office in Cambridge. When analyzing these data in a series of papers,[36] Andy Bernard, Bradford Jensen and Peter Schott have coined the term “most globally engaged” firm to describe the small number of U.S. firms that are engaged in a

disproportionate amount of trade. They find that many importing firms are also exporters, and they are extremely important to the U.S. economy. For example, they find that in 2000, the total number of workers at firms that either import or export was about 50 million, or one-third of the total civilian workforce. More than one-half of the firms in the U.S. that import also export, and these firms account for 90% of U.S. trade. So it is these large, trading firms that account for the vast majority of U.S. trade and related employment. In joint work with Stephen Redding, they have also analyzed the importance of wholesalers and retailers in trade, and intra-firm trade.[37]

Firm level trade data is also for France, where Jonathan Eaton and Sam Kortum work with Francis Kramarz at the Center for Research on Economics and Statistics.[38] They analyze the trading patterns of firms, and confirm that more productive firms sell to many more markets. Costas Arkolakis and Marc-Andreas Meundler use data for Brazil to analyze the extensive margin of exporting firms.[39] In addition to these country studies, firm-level data can sometimes be available from public sources for particular industries. An example is the motion-picture industry, analyzed by Gordon Hanson and Chong Xiang.[40]

Beside heterogenous firms, other important features of the monopolistic competition model that are being examined in current research are product quality and product variety. Melitz observed that exogenous product quality enters the heterogeneous firms model in much the same way mathematically as exogenous productivity. But a key difference is that with productivity, the firms that become large are the most productive and therefore have the lowest prices; whereas with quality, the largest firms have the highest quality products and therefore high prices. So this implies a natural dichotomy between industries where firms compete based on productivity, and so the largest firms should have low prices; and industries where firms compete

based on product quality, and so the largest firms should have high prices. This dichotomy is explored by Richard Baldwin, James Harrigan, and Tadashi Ito.[41]

We would expect that the demand for high-quality goods varies with income, so that non-homothetic preferences and the distribution of income become important. David Hummels and co-authors examine the role of income distribution using a utility function due to Harry Flam and Elhanan Helpman, which implies that cross-country differences in income distributions are related to variations in import variety and price distributions.[42] Empirical support for the model is obtained using micro data on income and price distributions obtained from trade data. An alternative preference structural drawing on the discrete choice literature is employed by Pablo Fajgelbaum, Gene Grossman, and Elhanan Helpman.[43] Their framework allows us to study the welfare consequences of trade, transport costs, and trade policy for different income groups in an economy. Ina Simonovska also employs a non-homothetic utility function to study the role of price discrimination in international trade,[44] while Ana Cecilia Fieler introduces non-homothetic preferences into the Eaton-Kortum model of trade.[45] A survey of results obtained with non-homothetic preferences is provided by James Markusen.[46] Finally, a production-side explanation for the quality of traded inputs and outputs is developed by Maurice Kugler and Eric Verhoogen, who analyze data for Colombia firms.[47]

The above studies are general equilibrium, combining theory and empirical work. Other empirical research focuses on partial-equilibrium frameworks to develop measures of product quality. Amit Khandewal uses a discrete choice framework to estimate product quality in a wide range of U.S. manufacturing industries, at the Harmonized System 10-digit level.[48] In his framework, a good that is in high demand but does not have a low price necessarily must have high quality. The same idea, but with different functional form for demand, is used by Juan

Carlos Hallak and Peter Schott to estimate product quality for the United States.[49] Kalina Manova and Zhiwei Zhang examine the quality heterogeneity across Chinese exporting firms.[50]

Turning from product quality to product variety, this concept also lends itself to empirical implementation. Bruce Blonigen and Anson Soderbery compare two methods of measuring product variety in automobiles: the first using product-level import data and the second using actual market data on automobiles sold in the United States.[51] They find that implied welfare benefits from using the product-level import data are only half what is found with market-based data. They further show that the welfare gains from all foreign-owned varieties (both imported and from foreign affiliates) are well over 50% larger than that stemming from imported varieties alone. Other researchers have studied the positive impact of importing a greater variety of intermediate inputs on the productivity of the downstream industries. This is shown using data for India by Penny Goldberg, Amit Khandelwal, Nina Pavcnik, and Petia Topalova.[52] Further, in dynamic models the gains from product variety in inputs can contribute to enhanced efficiency and increased growth, as demonstrated by Christian Broda, Joshua Greenfield and David Weinstein.[53]

Closely related to the concept of variety in trade is the "extensive margin" of exports, which refers to the number of firms within an industry who are exporting. For an individual firm, the extensive margin of exports refers to the range of products that it produces and exports. Hand-in-hand with the large differences in the size and productivity of firms are differences in their product range. This has been demonstrated theoretically and empirically by Andrew Bernard, Bradford Jensen, Stephen Redding and Peter Schott, using U.S. data.[54] An alternative theoretical approach to analyzing the scope of firms is presented by Volker Nocke and Stephen Yeaple.[55]

A final area where the monopolistic competition model is being extended is in the assumption of CES preferences, which lead to constant markups being charged by firms. Alternative preferences, such as the non-homothetic cases referred to above, will lead to markups that are endogenous and therefore have important implications for welfare. This topic is discussed in the next section.

Trade Policy And Welfare

An ongoing area of research in the ITI program are the impacts of, and explanations for, trade policies. Some studies examine the impact of policies in particular sectors. An important example is the textile and apparel sector, which experienced a large reduction in quotas as the Multifibre Agreement was phased out in January 1, 2005. Many people expected that China would take over in this sector, since it had been the most constrained in its textile and apparel exports. But James Harrigan and Geoffrey Barrows showed that along with these change in market shares, there was a massive downgrading in the type of product exported from China.[56] It is these products at the lower end that it took sales away from countries such as Mexico or Guatemala, and served to offset to some extent the competitive impact on other Asian countries. Another sector that has received attention for its ongoing trade policies is steel. Bruce Blonigen and coauthors show that the response of this industry to tariffs versus quotas is highly sensitive to its market structure, which they estimate.[57]

Another topic of strong interest is the impact of free trade agreements, particularly its impact on workers. This topic has received renewed interest for the United States, in what might be considered “round two” of the debate over the impact of trade on wages and employment. Making use of broad changes in tariffs through trade agreement and detailed datasets on individuals, these studies identify potentially large effects of tariff reductions. A recent example

is the work by David Autor, David Dorn and Gordon Hanson, which examines the acceleration in Chinese exports to the United States following its WTO accession in 2001.[58] They match the changes in wages and employment in local labor markets defined by "commuting zones" to the Chinese exports to manufacturing industries in those zones. They link the rise in Chinese exports, and the implied reduction in employment, to changes in federal support payments to individuals for trade adjustment assistant, disability, retirement, etc. They find that the deadweight loss from the increase in support payments is very similar in magnitude to the welfare gains from the increased imports: both are on the order of $30 – $70 annually per capita. But since the support payments are expected to be temporary while the welfare gains from imports are permanent, there are still gains from trade.

A second example of a study using the current population survey is the work by John McLaren and Shushanik Hakobyan, who analyze the impact of NAFTA on local labor markets in the United States.[59] Drawing on earlier theoretical work by McLaren, they allow for possible wage increases in response to anticipated tariffs cuts (as workers leave industries), and wage decreases when the tariff cut occurs. They find a significant negative impact of NAFTA on blue-collar workers, with smaller effects of either sign on college educated workers. Their overall message is that NAFTA has large distributional effects even if it overall welfare impact is small.

All of these studies find sizable changes in trade flows following the enactment of the tariff changes, despite the fact that U.S. tariffs on Mexico were already low, and the tariffs on China were already at their MFN level before its accession to the WTO. Why can trade change so much in response to small tariff changes? The answer proposed by Kyle Handley and Nuno Limão is that preferential agreements reduce the policy uncertainly associated with tariffs that might change in the future.[60] Their application is to Portugal, which was already a member of the

EFTA and had an agreement with Spain when it joined the EEC in 1986. So the drop in its tariffs with members of the EEC who were also in EFTA was zero, but nevertheless, there was a sizable increase in exports to EC members. Handley and Limão attribute this to a reduction in policy uncertainty, which they measure by the difference in the zero tariffs within the EEC and the MFN tariffs charged to outside members. Variation in that difference allows them to identify the policy impact across industries and explain the increase in trade.

In addition to these empirical studies, the question of why countries pursue preferential agreements has been analyzed theoretically by several members of the program, using game-theoretic techniques. For example, Philippe Aghion, Pol Antràs and Elhanan Helpman model this as a question of sequential bargaining, where a country make deals with a series of other countries, but the bargains negotiated must be consistent with the deals that will potentially be made in the future.[61] They show that this model generates both "building bloc" and "stumbling bloc" effects of preferential trade agreements, to use the terminology of Jagdish Bhagwati. In particular, they find conditions under which global free trade is attained when preferential trade agreements are permitted to form (a building bloc effect), and other conditions where global free trade is attained only when preferential trade agreements are forbidden (a stumbling bloc effect).

In a series of papers, Kyle Bagwell and Robert Staiger analyze games in which the countries are constrained by the WTO rules, and show that these rules can lead to welfare improvements.[62] An example is the most-favored nation rule, which states that all WTO members must be treated equally. This rule means that a reduced trade barrier given to a current negotiating partner must be automatically extended to later partners. Bagwell and Staiger argue that the MFN principle makes it less likely for countries to be willing to offer concessions at early stages of the sequential bargaining process, but that this potential source of conflict can be

offset by two other WTO principles: first, by renegotiation at later stages, and second, by reciprocity in the concessions made by each country. Incorporating these principle into the bargaining game allows for an efficient outcome even under the MFN rule. This line of research enables Bagwell and Staiger to rationalize various provisions of the WTO.

There are other approaches, too, that can be used to rationalize the provisions to the WTO. Ralph Ossa uses a monopolistic competition model with a "home market" effect, whereby tariffs attract firms to enter the protected market.[63] That framework can generate political economy considerations for trade policies and WTO rule that are similar to what arises from the terms-of-trade model. Using a different approach, Giovanni Maggi and co-authors argue that WTO-type rules can be understood as arising from the inevitable incompleteness of trade agreements (see his Research Summary in this issue of the Reporter).[64]

The analysis of trade policy naturally leads to the question of the gains from international trade, and we conclude with this classic question. Analysis of the monopolistic competition model has shown that it gives rise to a remarkably simple formula for the gains from opening trade: those gains are equal to one minus the import share of the economy, raised to a negative power that depends on the specific details of the model. In the Krugman monopolistic competition model with homogeneous firms, that power depends on the elasticity of substitution in consumption. In the Melitz model with heterogeneous firms that have a Pareto distribution for productivities, the same formula for the gains from trade holds, but the power depends on the Pareto parameter.[65] Robert Feenstra argues that this results obtains in the Melitz model because import competition drives out a number of domestic varieties that just cancels in welfare terms, so that the only remaining source of gains from trade is from productivity improvements.[66] Remarkably, Costas Arkolakis, Arnaud Costinot and Andrés Rodríguez-Clare have recently

argued that a similar result holds in a broader class of models. The fact that such a simple formula for the gains from trade arises in models that can be quite complex in their market structure leads them to pose the question: "new trade models, same old gains?"[67]

This view has been challenged in other recent work. Robert Feenstra and David Weinstein estimate a monopolistic competition model with heterogeneous firms, where the aggregate consumer has translog preferences.[68] In that case, the markups charged by firms are endogenous, and we do not expect that the gains from trade depend only on the import share. Feenstra and Weinstein estimate the gains from rising imports over 1992 – 2005 for the U.S. economy, and find that the gains from reduced markups are on the same order of magnitude as the gains due to increased import variety.

Variable markups are also obtained by Ina Simonovska, discussed above, and by Beatriz de Blas and Katheryn Russ in the context of the model by Andrew Bernard, Jonathan Eaton, Bradford Jensen and Sam Kortum.[69] In that model, Bertrand competition leads to markups that equal the difference between the productivity of the most efficient and second-most efficient firms. But with entry by a finite number of potential rivals, de Blas and Russ show that these markups are not fixed by the productivity distribution of firms, but depend on the number of rivals. If opening to trade alters the number of potential rivals, then markups will also change. In that case, we can conjecture that the gains from trade will not depend on only the import share and a parameter. Understanding the class of models in which this conjecture holds true is an important direction for further research.

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