Gains from Trade when Firms Matter
By Marc J. Melitz and Daniel Trefler

Globalization in Retreat?
By Davin Chor

Migration and the World Economy
By Esteban Rossi-Hansberg
Dear Reader,

In this issue, we delve into the field of international economics and examine important issues related to trade and globalization. The movement of goods, people, and technology between countries has been a topic at the forefront of debate – most recently, the presidential debates. Trade and globalization benefit and hurt different parts of our economy such that it is impossible to claim these phenomena as pareto improvements. Our increasingly interconnected world is a fascinating place, and we are fortunate to feature the work of very accomplished economists who are helping us understand it.

Ying Zhang and André van Stel share their findings on how entrepreneurship stemmed from and now drives economic development in China. Davin Chor addresses the phenomenon of global trade slowdown, revealing that its impact will depend on whether its cause is fundamental or cyclical. Marc Melitz and Daniel Trefler explain how trade is no longer solely driven by comparative advantage and differences in natural resources. They propose several novel ways that trade is improving the efficiency of producers and the variety available to consumers.

Esteban Rossi-Hansberg examines the impact of migration by acknowledging its positive and negative consequences for Americans and by ultimately suggesting that increased economic activity can lead to a net benefit for all. Thomas Prusa questions the efficiency of anti-dumping laws by reevaluating when a trade law is “unfair” and when anti-dumping laws are needed to combat unfairness.

In the context of the post-crisis global economy, Carter Johnson analyzes the effect of unpegging the Swiss franc and looks broadly at the monetary policies of Europe, Japan, and the United States. Masoud Movahed returns to the pre-crisis economy and suggests that the 2008 crisis resulted from a discrepancy between “what is good for banks” and “what is good for the economy.” Finally, Diego Perez reminds us of what we often take for granted: the availability of economic statistics. Perez studies an episode in which the Argentinian government purposefully understated inflation, leading to inefficiency and underproduction.

Thank you to the writers for sharing your work and knowledge. Thank you to the editorial board for putting together this issue. We hope you enjoy.

Sincerely,

Angela Ma
The Chinese economy has gone through major transitions in the last decades, where a substantial part of economic activity has shifted from state-owned sectors to private sectors. China has transitioned from a tightly centrally-planned economy to a market-oriented economy that contributes to be shaped by the government's long-term economic development plan and entrepreneurship (cf. Huang 2010). Policies have accelerated China’s economic development by making important adjustments in the areas of education, national innovation system, economic openness, market function, infrastructure investment, and more. This transition could, with a great leap in economic growth, have run for more than three decades and still plays a critical role in China's economic growth. One important characteristic of this economic and institutional transition, we argue, is the attitude transition in acknowledging entrepreneurship while developing from a factor-driven economy to an efficiency-driven economy in the past 30 years, and now towards the innovation-driven stage. These developments are not independent of each other with entrepreneurship undoubtedly contributing to China’s facilitating economic growth.

**CONCEPTUAL MODEL: THE ROLE OF ENTREPRENEURSHIP IN MODERN CHINA**

Given China’s economic development in recent decades, we posit that the fundamental structural change of the entire economy—is powered by its economic transition and its economic and institutional antecedents. Figure 1 displays our view on the three stages of economic development in China in its contemporary economy. Since 1978, the Chinese government has gradually experimented with various transitional policies, which have led to the improvement of welfare (the standard of living) for the majority of the population illustrated by the direct link between these leftmost and rightmost boxes in Figure 1; these transitional policies have also promoted entrepreneurial activities in two ways. First, by allowing and acknowledging the important role of private entrepreneurship in the Chinese economy, the policy directly contributed to an increase in the number of private firms (arrow 1 in Figure 1); these transitional policies have also promoted entrepreneurial activities in two ways. First, by allowing and acknowledging the important role of private entrepreneurship in the Chinese economy, the policy directly contributed to an increase in the number of private firms (arrow 1 in Figure 1). Second, by improving the conditions (antecedents) for entrepreneurship (e.g., investing in education or upgrading the institutional environment), the policies boosted entrepreneurial activities in a more indirect manner as well (arrow 2 in Figure 1). It is also the link between economic antecedents and entrepreneurship (arrow 2 in Figure 1) that we investigate empirically. In particular, we explain regional rates of getihu and siyingqiye over the period of 1997 to 2009 using a number of economic antecedents and investigate the extent to which these antecedents are in line with the theory of the ‘entrepreneurial economy’ (Audretsch and Thurik 2000). The theory describes how ‘productive’ entrepreneurship contributes to macroeconomic growth in the innovation-driven stage of economic development. This theory is particularly relevant for entrepreneurship development in China, which is now moving from an efficiency-driven economy towards an innovation-driven one. If economic antecedents of regional private firm rates in China are as described in the theory of the ‘entrepreneurial economy’, that is, if antecedents are conducive to knowledge production and knowledge spillovers, it may be argued that the economy has the right incentive structure in place to produce high-quality entrepreneurship, and hence, that the entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development. The antecedents found in the empirical analysis are consistent in allowing us to reflect on the extent to which entrepreneurship development in China has kept pace with the transition to the innovation-driven stage of economic development, i.e., to what extent entrepreneurial sector (private firm population) contributes substantially to economic development.

**EMPIRICAL MODEL**

We select economic antecedents from the literature on regional determinants of entrepreneurship (e.g., Reynolds et al., 1994), in particular indicators reflecting the renumeration of labor, the stock of human capital, the institutional environment, the degree of agglomeration, and economic openness. Using a two-equation model, we investigate how these variables affect the regional rates of getihu and siyingqiye (scaled on the regional population) over the period of 1997 to 2009. In our full paper we derive hypotheses on how these variables may influence the rates of getihu and siyingqiye differently (Zhang and Van Stel, 2016). We also control for the regional institutional environment and the investment intensity of state-owned enterprises. Moreover, our model allows us to investigate the degree of interaction between getihu and siyingqiye at the regional level. We use seemingly unrelated regression estimation to take into account the correlation between our two dependent variables, the getihu and siyingqiye rates. Moreover, we estimate two different set-ups of our two-equation model. In the first set-up, we focus on explaining the rates of getihu and siyingqiye over time of the regional population for the regional rates of getihu and siyingqiye, using a fixed effects set-up (dynamic approach). In the second set-up, we include variables for all regions but include only the years 1998, 2003 and 2009. Here, we do not include regional fixed effects but instead estimate a pooled (SUR) model to simultaneously explain the variation across regions of the regional rates of getihu and siyingqiye (static approach).

With one exception, all variables in our study are derived from the various Chinese Statistical Yearbooks from the National Bureau of Statistics of China (NBSC) database, covering 31 Chinese regions over 13 years (1997 to 2009). We total 403 region-year observations. As an illustration of our dependent variables, Figure 2 presents the rates of getihu and siyingqiye in Chinese regions for our most recent year of data, 2009.
We found that the impact of getihu on siyingqiye (estimated elasticity 0.51) is even stronger than vice versa (0.29), predicting that, ceteris paribus, the gap between the number of getihu and siyingqiye will decrease in the near future. As siyingqiye antecedents have been found to be more in line with the 'entrepreneurial' economy, this predicted increase in the share of siyingqiye firms (relative to getihu) suggests that China is slowly but surely transitioning towards an 'entrepreneurial' economy.
As China goes, so go global trade?

The case of China warrants separate consideration, given its important position as a manufacturer of the world’s goods. Figure 2 suggests that the trade-to-GDP ratio for China had started decreasing in the mid-2000s. In Figure 3, we see that there was a tapering off of the increase in intermediate imports generated in production by domestic entities. Along with a global production process where each country successively adds a little more value to the product in question, the total value of intermediate inputs received in gross terms will end up double-counting the value added that is actually accumulated. An increase in the use of imported intermediates would thus be expected to raise the observed trade-to-GDP ratio. This trend, however, was not evident.

The outlook for world trade will then hinge on how quick and successful countries are in reinvigorating macroeconomic growth and demand. For countries that are reliant on their trade linkages with China as upstream suppliers of intermediate inputs to China’s export processing firms, there would be cause for concern if China was systematically rolling back on its use of foreign inputs.

...policies that govern tax incentives to firms in China to be opaque — but that trend of shifting industrial activity away from China becomes less pronounced for countries that are reliant on China’s exports, there would be cause for concern if China was systematically rolling back on its use of foreign inputs.

Conclusio

In this article, we have argued that the outlook for world trade hinged on the extent to which the slowdown we are witnessing is cyclical in nature, as opposed to being driven by structural shifts in global value chains. With the latter scenario, we could be seeing a trend toward the development of other forms of localization, particularly in sectors where political and public opinion toward deeper integration (such as through the elimination of nondiscriminatory taxes) has been weakening in recent years.

The outlook for world trade will then hinge on how quick and successful countries are in reinvigorating macroeconomic growth and demand. For countries that are reliant on their trade linkages with China as upstream suppliers of intermediate inputs to China’s export processing firms, there would be cause for concern if China was systematically rolling back on its use of foreign inputs.

...policies that govern tax incentives to firms in China to be opaque — but that trend of shifting industrial activity away from China becomes less pronounced for countries that are reliant on China’s exports, there would be cause for concern if China was systematically rolling back on its use of foreign inputs.
the gains from long-distance international trade have been understood and exploited since prehistoric times. Our pre-human ancestors were benefiting from long-distance trade in obsidian some 10,000 years ago, Plato’s Academy was built on the profits of Athenian silver exports, and Rome was not built in a day partly because goods moved too slowly in the vast Roman trade network. But whereas trade was once dominated by the movement of goods that could only be produced, harvested, or mined regionally, the international trade landscape is now dominated by two striking facts. The first is the rise of intra-industry trade—that is, trade in similar products. Chinese consumers can now buy a midsize car or a videogame console from any of several foreign-owned firms. For example, Intel is so large that it can operate at a larger scale than any of its competitors. The result is that world trade is dominated by huge, innovative and extraordinarily productive firms, and if you are reading this, you are likely to be reading the output of one of them.

The rising prominence of intra-industry trade and huge multinational firms has transformed the way economists think about the gains from trade. In the past, we focused on gains that stemmed either from endowment differences (what for iron ore) or inter-industry comparative advantage (David Ricardo’s classic example of cloth for port). Today, we focus on three sources of gains from trade: (1) love-of-varieties gains associated with intra-industry trade, (2) allocative efficiency gains associated with shifting labor and capital out of small, less productive firms and into larger, more productive firms, and (3) productive efficiency gains associated with trade-induced innovation. Back in the 1980s, a “New Trade Theory” was developed that focused on intra-industry trade in differentiated goods produced subject to increasing returns to scale. This theory centered on an elegant tension: Consumers love variety and are willing to pay a premium for the perfect product, but as the market fragments into niche products, producers struggle to attain the volumes needed to recoup their product development costs. International trade creates a larger market place, which means that each firm can operate at a larger scale and hence more firms can survive. The result is a stronger advertising for free trade: lower prices, more choice. Paul Krugman earned the Nobel Prize in 2008 in large part for his work highlighting how economies of scale and product differentiation lead to intra-industry trade, just as in our example above of midsize cars. See Krugman (1979, 1980), Helpman and Krugman (1985), and Helpman (2011, Ch. 4) for a review of love-of-varieties gains from trade.

More recently, a very different source of gains from trade has emerged from the research of Melitz (2003) and Bernard et al. (2003). This is the firm-level “re-allocation” effect that arises when there is firm heterogeneity. By firm heterogeneity we mean that even within narrowly defined industries some firms are much larger and more profitable than others because, for example, they are much more productive. Globalization generates both winners and losers among firms within an industry and these effects are magnified by heterogeneity. Better-performing firms thrive and expand into foreign markets, while worse-performing firms contract and even shut down in the face of foreign competition. This generates a new source of gains from trade: as production is concentrated towards better-performing firms, the overall efficiency of the industry improves. In this way, globalization raises average efficiency within an industry. Why is it that only the better-performing firms grow? Globalization expands markets but also increases competition in those markets. This competition effect dominates for the worse performing firms while the increased market access dominates for the better performing firms. Also, a firm’s international expansion—whether by exporting, by offshore outsourcing of intermediate components and assembly, or by building plants abroad (multinationals)—entails some up-front fixed costs, and only the best-performing firms have the sales volumes needed to justify these fixed costs. Our third source of gains from trade flows from the impacts of larger markets on innovation. New productivity-enhancing products and processes require up-front development costs. Trade integration, by expanding the size of the market, encourages firms to pony up these development dollars and this in turn raises the productivity of innovation-based gains from trade with homogeneous firms were analyzed by Melitz and Helpman (1991) and are supported by country-level evidence (Helpman, 2004, Ch. 5.6). At the firm level, there is a strong relationship between exporting and innovation. For example, Intel and Apple are major patent holders and Foxconn holds 40% of all Chinese patents. The evidence is strong (Melitz and Trefler, 2011) and Helpman et al. (2011). Of course, this correlation between exporting and innovation is not causal and lacks a framing theory featuring heterogeneous firms. Recently, however, there has been a great deal of theoretical and empirical progress. Lileeva and Trefler (2010) and Helpman and Trefler (2010) show theoretically and empirically how the market-expanding effects of intra-integration causally encourage firms to innovate. Verhoogen (2008), Busenitz (2011) and others assess other interesting channels through which trade promotes firm-level innovation. Note that this third source of gains deals with within-firm efficiency, in contrast, the second source of gains above deals with between-firm or allocative efficiency. This paper reviews these three sources of gains from trade and categorizes trade flows as either intra-industry (two-way trade within the same industry classification code) or inter-industry (imports and exports in separate industry codes). The United Nations uses the Standard International Trade Classification, or SITC, to categorize world trade flows. In its most detailed form, the SITC contains 1,161 separate industry codes (that can be consistently traced back over time), but these industries are often aggregated into a smaller subset of industries. Figure 1 shows the time trend for the share of intra-industry trade according to this most detailed classification, and a more aggregated version with only 59 international industry classification codes. Mechanically, the share of intra-industry rises with the level of aggregation for the industrial classification system (after all, with a single aggregate industry code, all trade would be “intra” to this aggregated industry). However, the
time trends for the two series are very similar: intra-industry trade grew rapidly from 1962 to the mid-1990s, before stabilizing at a substantially higher level. As countries industrialize, they tend to experience a higher share of intra-industry trade, because they tend to produce and export differentiated manufactured goods that are similar to other brands of goods that are imported. However, some of the countries with the highest shares of intra-trade in 2000 were newly industrializing nations such as the Czech Republic (76 percent), Mexico (73 percent), and Hungary (72 percent). For comparison, the U.S. had a 69 percent share of intra-industry trade in 2000 (World Economic Outlook, 2002, Ch. 6, based on the 59-industry level of aggregation). Most recently, China’s share of intra-industry trade has risen above the 50 percent mark.

Why might a country both export and import goods that are similar? As a starting point, consider world trade in automobiles. Consumers in a car-producing country are not limited to buying the car models that are produced domestically: many of those consumers choose to buy models that are produced elsewhere. The extent of this product differentiation is then limited by high fixed start-up costs for a new brand.

In 1957, the major countries of Western Europe established a free trade area in manufactured goods (the European Economic Community or EEC). The result was a rapid growth of trade, especially intra-industry trade. Trade within the EEC grew twice as fast as world trade during the 1960s, and intra-industry trade as a share of EEC trade more than doubled from 1960 to 1990.

and by the related economies of scale. We now highlight how the combination of product differentiation and economies of scale generates intra-industry trade using a theoretical example. Notice that this source of gains from trade provides a rationale for trade between two identical countries, which provides a stark contrast with the gains from inter-industry trade that arise from exploiting differences across countries such as differences in technology (Ricardian) or differences in factor supplies (Heckscher-Ohlin).

In our theoretical example, two identical countries produce differentiated widget varieties subject to the same constant-returns-to-scale technology. Assume that one worker can produce a widget, but that production of any new variety of widgets requires 4 workers to cover overhead costs: this implies decreasing average costs of production as the fixed cost is spread over an increasing number of employees (hence the economies of scale). Also to be specific, suppose that both countries have a fixed supply of 12 workers. If they do not trade, each country can produce (a) 8 units of 1 variety, or (b) 2 units each of 2 different varieties.

Allowing countries to trade leads to a new possibility that is better than what each country can achieve on its own. Suppose that each country produces 8 units of 1 variety and exports 4 of these units to the other country. Consumers are now consuming 4 units of the home variety and 4 units of the foreign variety. This is preferred to either of the no-trade production plans above. Compared to choice

product variety. Economic integration allows production of each individual variety to be consolidated for the whole integrated market; given increasing returns to scale, this reduces average production costs. At the same time, product variety increases because consumers can buy varieties produced anywhere in the integrated market.

One of the most salient real-world examples of economic integration between similar countries occurred between the United States and Canada. This integration started with the signing of the North American Auto Pact in 1964. Before then, most car models were produced in the United States for U.S. consumers and in Canada for Canadian consumers. High tariffs on auto trade made it uneconomical to export most car models across the border. Since the Canadian auto market was roughly one-tenth the size of the U.S. market, this implied substantial scale disadvantages for production in the Canadian market: labor productivity was about 30 percent below the U.S. level. The U.S. market was large enough that assembly lines could be dedicated to particular car models, while Canadian assembly lines had to switch across models, involving costly down-time and reconfiguration costs, while also holding substantially higher inventory levels.

The 1964 Pact established a free trade area for autos that allowed manufacturers to consolidate the production of particular car models in one country, and export that model to consumers in the other country. For example, General Motors cut in half the number of models assembled in Canada. However, total production of autos in Canada increased as the remaining models produced in Canada supplied the U.S. market as well as the Canadian one. Canadian automotive exports to the United States increased from $16 million in 1962 to $2.4 billion in 1968. That same year, U.S. automotive exports to Canada were valued at $2.9 billion under the Auto Pact.

Today, $85 billion worth of automotive products cross the U.S.-Canada border each year – roughly half in each direction. The productivity gains associated with this consolidation were also substantial: by the early 1970s, the Canadian auto industry’s 30 percent labor productivity shortfall relative to its U.S. counterpart had disappeared.

This transformation of the automotive industry was extended to include Mexico. In 1989, Volkswagen consolidated its North American operations in Mexico, shutting down its plant in Pennsylvania. This process continued with the implementation of the North American Free Trade Agreement between the United States, Canada, and Mexico. In 1994 Volkswagen started producing the new Beetle for the entire North American market in that same Mexican plant.

This consolidation in response to closer economic integration with the United States was not limited to the auto industry. Following the implementation of the Canada-U.S Free Trade Agreement in 1989, each Canadian manufacturing industry experienced a dramatic reduction in its product offerings, concentrating on a smaller number of products (Baldwin, Beckstead, and Caves, 2002; Baldwin, Caves, and Gu, 2005; Baldwin and Gu, 2006b, Bernard et al., 2011). Baldwin, Caves and Gu (2005) also report that the decrease in product offerings was accompanied by substantial increases in production runs for individual products. This process is even evident in the Canadian wine industry, an industry that exclusively produces low-end wines that could not possibly compete with Californian giants such as Gallo. In response to the Agreement, Canadian manufacturers dramatically reduced the number of varieties produced and marketed in the entire North American market for ice wine. The industry is now healthier than ever (Beamish and Celly, 2003).
Gains from Re-allocation at the Firm Level

By the mid-1980s there was a large body of theoretical work demonstrating that freer trade could impact productivity. The Canadian impacts are not nearly as large as impacts from developing countries, which suggests that access to a variety of inputs is an essential ingredient in the process of economic development.

Using Indonesian data, Amiti and Konings (2007) show that a 10 percentage point fall in input tariffs leads to a productivity gain of 12 percent for firms that import their inputs. Kasahara and Rodrigue (2008), Kasahara and Lapham (2007), and Goldberg et al. (2010) show similarly large gains for Chile and India. In the context of the Canada-U.S. Free Trade Agreement, Lileeva and Trefler (2010) find that the fall in Canadian tariffs on inputs that Canadian firms purchased from the United States resulted in a 0.5% rise in Canadian manufacturing productivity. The Canadian impacts are not nearly as large as impacts from developing countries, which suggests that access to a variety of inputs is an essential ingredient in the process of economic development.

More variety means more competition and more competition forces firms to lower their markups and prices. We see evidence of this after the Turkish and Côte d’Ivoire trade liberalizations of 1985 (Lewinsohn, 1993; Harrison, 1994) and in Belgium during the 1994-2004 period of increased integration (Abraham et al., 2009; De Loecker 2011). On the other hand, there was no evidence of falling markups in the process of economic development.

Thus, some firms will regret their entry decision as their net profit is negative. This is the case for firm 2 in panel (b). On the other hand, some firms discover that their production cost is very low and earn a high (and positive) net profit. Firms consider all these possible outcomes, captured by the net profit curve in panel (b) of Figure 4 when they make their entry decision.

We assume that entrants face some randomness about their future production cost. This randomness disappears only after f is paid and is sunk. Thus, some firms will regret their entry decision as their net profit is negative. This is the case for firm 2 in panel (b). On the other hand, some firms discover that their production cost is very low and earn a high (and positive) net profit. Firms consider all these possible outcomes, captured by the net profit curve in panel (b) of Figure 4 when they make their entry decision.
competitive firms. Both firms face the same downward-sloping demand curve. A residual demand is demand as perceived by the firm, and thus depends on the behavior of other competing firms in the market. If the production side, marginal costs for firm 1 are shown as lower than those for firm 2. In Panel (a), firm 1 has a lower marginal cost ($c_1$) than firm 2 ($c_2$). We also assume that economies of scale exist because of a fixed cost that a firm must incur to develop a product and set up its initial production.

In this setting, each firm maximizes profit by choosing an output level $q$ that equals marginal cost and marginal revenue. Firm 1 chooses a higher output level than firm 2 ($q_1 > q_2$), associated with a lower price ($p_1 < p_2$). Firm 1 also sets a higher markup than firm 2: $\frac{p_1 - c_1}{c_1} > \frac{p_2 - c_2}{c_2}$. This is a consequence of the marginal revenue curve being steeper than the demand curve. Thus, firm 1 earns a higher operating profit than firm 2: $\pi_1^o > \pi_2^o$, as represented by the shaded areas in Panel (a) of Figure 2. We assume that all firms face the same set-up cost so firm 1 also earns higher net profits (subtracting the fixed cost for all firms). Of course, differences in fixed costs would not affect marginal costs, and thus would not affect firm decisions concerning price and output. We can thus summarize the relevant performance differences that result from marginal cost differences across firms in the following way. Compared to a firm with higher marginal cost, a firm with a lower marginal cost will: 1) Set a lower price, but at a higher markup over marginal cost, 2) represent a smaller share of the demand curve as perceived by the smaller firm, and 3) earn higher profits.

Panel (b) in Figure 2 shows how firm profit varies with its marginal cost $c_i$. Both operating and net profits will be decreasing functions of marginal cost, while the difference between the two is the fixed set-up cost $f$. Going back to panel (a), we see that a firm can earn a positive operating profit so long as its marginal cost is below the intercept of the demand curve on the vertical axis. Let $c^*$ denote this cost cutoff. A firm with a marginal cost $c_i$ above this cutoff is effectively priced out of the market and would earn negative operating profits if it were to produce any output (represented by the dotted segment for operating profit in Panel b). Such a firm would choose to shut down and produce zero (earning zero operating profit but incurring a net profit loss due to the fixed cost). Why would such a firm enter the market? Clearly, it would not if it knew about its high cost $c_i$ prior to entry and to paying the fixed cost $f$.

We assume that entrants face some randomness about their future production cost $c_i$. This randomness disappears only after the set-up cost is paid and is sunk. Thus, firms may not regret their entry decision, as their net profit is negative (they cannot recover the sunk cost $f$). This is the case for firm 2 in panel (b), even though its operating profit is positive, it does not cover the sunk cost $f$. On the other hand, some firms discover that their production cost $c_i$ is very low and earn a high and positive net profit. Firms consider all these possible outcomes, captured by the net profit curve in Panel (b) when they make their entry decision. Firms anticipate that there is a range of lower costs where net profits are positive (shaded area to the right below the horizontal axis), and another range of higher costs where net profits are negative (shaded area to the left above the horizontal axis). In the long run equilibrium, firms enter until their net profit is zero across all potential cost levels $c_i$ driven to zero. If every cost level $c_i$ from 0 to $c_{max}$ is equally likely, then this equilibrium is reached when the two shaded areas are equal. Panel (b) of Figure 2 summarizes the industry equilibrium for a given market size. It shows which range of firms survive and produce (with cost $c_i$ below $c^*$), and how their profits will vary with their cost levels $c_i$.

Putting together the downward shift in domestic operating profits and the upward shift in export operating profits, we see that trade liberalization generates both winners and losers — just as in the case of economic integration. Non-exporters lose because they only incur the losses from the lower domestic profits. Exporters, on the other hand, stand to gain as they can make up for the loss of domestic profits with profits earned from exporting.

**What changes when economies integrate?**

How will the situation faced by these heterogeneous firms alter when economies integrate into a single larger market? A larger market can support a larger number of firms than a smaller market, which implies more competition in the larger market. Increased competition — absent any increase in market size — leads to an inward shift of each firm’s residual demand curve. On the other hand, holding constant a larger residual demand curve and increasing competition to cut out the residual demand curves for all firms. Putting these two effects of increased competition and greater market size together gives us the combined effect of integration on the residual demand curve perceived by firms. This change is depicted in Panel (a) of Figure 3, as the shift from demand curve $D$ to $D'$. The residual demand curve shifts in from the perspective of the smaller firms with lower output levels that operate on the higher part of the demand curve: here, the effect of tougher competition dominates. However, from the perspective of the larger firms that operate on the lower part of the demand curve, the residual demand curve has shifted out: here, the effect of the larger market size dominates.

Panel (b) of Figure 3 shows the consequences of this demand change for the operating profits of firms with different cost levels $c_i$. The decrease in demand for the smaller firms translates into a new lower cutoff $c^*$. Firms with the highest cost levels ($c_i > c^*$) cannot survive the decrease in demand and are forced to exit. On the other hand, the flatter demand curve is advantageous to firms with the lowest cost levels: they can adapt to the increased competition by lowering their markup (and hence their price) and gaining some additional market share. Recall that the high cost firms are already setting low markups, and cannot lower their prices to induce positive demand, as this would mean pricing below their marginal cost of production.) Thus, the best-performing firms with the lowest cost levels $c_i$ now earn increased operating and net profits. Panel (b) of Figure 3 illustrates how increased market size generates both winners and losers amongst firms in an industry. Low cost firms thrive and increase their profits and market shares, high cost firms contract, and the highest cost firms exit. In this model, economic integration through market expansion does not directly affect firm productivity. Nevertheless, it generates an overall increase in aggregate productivity as market shares are reallocated from the low productivity firms with high marginal costs to the high productivity ones with low marginal costs.
allocation effect previously described and leads to a rise in aggregate productivity. However, adding trade costs also allows us to analyze an additional issue: whether firms choose to export or not. With trade costs, exporting is profitable only for a subset of better-performing firms. Some firms do not export, and instead may serve domestic consumers. We now extend our theoretical model to incorporate trade costs and firms’ export decisions. For this purpose, we can no longer analyze a single market; instead, we need to jointly look at firms’ decisions in both the domestic and export markets. For simplicity, we consider a special case where both countries are symmetric, so that demand conditions in both the domestic and export markets will be identical.

Assume that a firm must incur an additional trade cost $t$ for each unit of output that it sells to customers across the border. As a result of this trade cost, each firm will set a different price in its export market relative to its domestic market, which will lead to different quantities sold in each market, and ultimately to different profit levels earned in each market. Because we are assuming that each firm’s marginal cost is constant and does not vary with production levels, the decisions regarding pricing and quantity sold in each market can be separated: a decision regarding the domestic market will have no effect on the profitability of different decisions for the export market.

Consider the case of firms located in Home. Their situation regarding their domestic (Home) market is exactly as was illustrated in Figure 2, except that all the outcomes such as price, output, and profit relate to the domestic market only. Now consider the export (Foreign) market. The firms face the same demand curve in Foreign as they do in Home (the two countries are identical). The only difference is that each firm’s marginal cost in the export market is shifted up by the trade cost $t$. What are the effects of the trade cost on the firms’ decisions regarding the export market? A higher marginal cost induces a firm to raise its price, which leads to a lower output quantity sold and to lower profits (as highlighted in Figure 2). We also know that if marginal cost is raised above a threshold level $c^*$, then a firm cannot profitably operate in that market. Thus, when there are trade costs, some firms will find it profitable to operate in the domestic market but not in the export market because the trade cost pushes their marginal cost for that market above the threshold $c^*$. Figure 4 helps to visualize the production and export decisions for all firms based on their marginal cost $c_i$. Panel (a) of Figure 4 separates a firms operating profit from a portion earned from domestic sales, and a portion earned from export sales. (Both portions are functions of a firm’s marginal cost $c_i$ as in Figure 2.) Because the only difference between the domestic and export markets is the additional per-unit trade cost $t$, the horizontal distance between the two curves is equal to the trade cost $t$. Firm 1 earns positive operating profits from sales in both the domestic and export markets: it will export and reach consumers in both markets. This will be the case for all firms with cost below $c^* - t$. On the other hand, firm 2 only earns positive operating profits from sales in the domestic market—and thus chooses not to export. Any firm with cost above $c^* - t$ will be in this same situation and therefore will not export: those firms only serve their domestic market. As before, the worst performing firms $c^* > c_i$ cannot profitably operate at all (even in their domestic market) and therefore exit.

Panel (b) of Figure 4 summarizes the effects of trade liberalization— a reduction in the trade cost $t$— for those firm decisions. The figure shows the same two operating profit curves from Panel (a) both before and after (dashed curves) trade liberalization. The operating profit for the domestic market shifts down due to the increase in competition (which shifts the residual demand curve for the domestic market inward as explained earlier). Some of the higher cost firms that used to produce for domestic consumption no longer earn a positive operating profit after trade liberalization and exit. On the other hand, the operating profit for the export market shifts up due to the lower trade cost. (Increased competition in the export market tends to reduce operating profits there, but this effect is dominated by the direct effect of the trade cost reduction.) A key empirical prediction is that some firms start exporting. Specifically, among the firms that did not export prior to trade liberalization, only the most productive of these start exporting. Evidence that some firms start exporting.

**EVIDENCE ON GAINS FROM INTER-FIRM REALLOCATIONS**

In many ways, the Canada-U.S. Free Trade Agreement is a useful natural experiment for considering the effects of trade integration. The policy experiment is clearly defined: it dealt only with market integration and was not part of a larger package of macroeconomic reforms that often accompany trade liberalization. The enactment of the agreement was largely unanticipated: a Canadian general election was fought on the issue one month before the agreement was to be signed into law and pollsters unanimously predicted that Canada’s ruling party—which had supported the free trade agreement—would be defeated (Brander, 1991; Thompson, 1993). Thus, evidence about the extent of aggregate productivity changes as a result of reallocations among heterogeneous firms can be sought by looking at the distribution of productivity across Canadian manufacturing plants before and after the agreement, at entrants before and after the agreement, and at the productivity distribution of exporters and non-exporters.

The agreement came into effect on January 1, 1989. Panel (a) of Figure 5 shows the distribution of labor productivity as measured by value-added per employee across Canadian manufacturing plants both before the agreement in 1988 and in 1996, when there had been time for firm adjustments to occur. For example, the 1996 curve summarizes the productivity distributions of all 35,000 Canadian manufacturing plants in that year. Clearly, the distribution of firms shifted rightward: Between 1988 and 1996, the share of low-productivity plants in manufacturing declined and the share of high-productivity plants rose.

The horizontal axis is based on a measure of the log of labor productivity. However, to ensure that dispersion is driven by within-industry rather than between-industry differences in labor productivity, we scale each plant’s log productivity by subtracting from it the median log productivity of the plant’s 4-digit SIC industry. Thus, the median plant in each industry has a value of zero on the horizontal axis. The vertical axis shows the share of plants with the indicated level of productivity. These frequencies are weighted by plant employment, otherwise, tiny plants that account for only a tiny fraction of total employment would dominate the figure. To get a sense of the share of plant productivity dispersion, consider the horizontal shift of $c^*$ in Figure 5: Panel (b) Labor Productivity Distribution of Exporters and Non-Exporters, 1996 (employment weighted).
First, the fall in the U.S. tariffs allowed Canadian plants to export more. This shifted the composition of output towards high-productivity exporters and away from low-productivity non-exporters. Lileeva and Trefler (2010) estimate that the fall in U.S. tariffs caused Canadian manufacturing productivity rose sharply. In the wake of the Canada-U.S. free trade agreement, Canadian manufacturing productivity increased by 4.3 percent.8 A very large percentage of plants started exporting after the agreement came into force. Panel (b) of Figure 4 shows that those who started exporting were among the most productive of those who never exported before. To test this prediction, Lileeva and Trefler (2010) examined a sample of over 5,000 Canadian manufacturing plants that had never exported prior to the Canada-U.S. free trade agreement. A very large percentage of these plants (40 percent) started exporting after the agreement came into force on January 1, 1989. Lileeva and Trefler examine whether these plants started exporting because of the U.S. tariff cuts and, more importantly, whether those that started exporting because of the tariff cuts were more productive than non-exporters. To this end, Lileeva and Trefler divide their sample into quartiles of the 1988 distribution of labor productivity (with the quartiles defined separately for each industry, to net out industry characteristics). Only 20 percent of the plants in the bottom quartile of labor productivity started exporting because of the tariff cuts, compared to nearly 60 percent of the plants from the top quartile of labor productivity. These estimates are from a probit regression in which the dependent variable is 1 if the plant started exporting and 0 if the plant remained a non-exporter. The key independent variable is a plant-specific measure of the change in the U.S. tariff. This measure is described below. The key conclusion is that, among firms that did not export before trade liberalization, the most productive of these three times more likely to start exporting in response to the U.S. tariff cuts. This is as predicted in panel (b) of Figure 4.2

A central prediction of the theory is that in the presence of trade costs, only low-cost, high-productivity firms export. Panel (c) of Figure 5 shows the distribution of Canadian plants separately for exporters and non-exporters. Clearly, the distribution for exporters is to the right of that for non-exporters. On average, Canadian exporters are 40 percent more productive than non-exporters in the same industry (Baldwin and Gu, 2003). Since the seminal work of Bernard and Jensen (1995), a large body of research covering dozens of countries has found this same pattern of higher productivity for exporters relative to non-exporters.9 A much more demanding prediction of the theory deals with who will start exporting in response to falling trade costs. Panel (b) of Figure 4 shows that those who start exporting will be among the most productive of those who never exported before. To test this prediction, Lileeva and Trefler (2010) examined a sample of over 5,000 Canadian manufacturing plants that had never exported prior to the Canada-U.S. free trade agreement. A very large percentage of these plants (40 percent) started exporting after the agreement came into force on January 1, 1989. Lileeva and Trefler examine whether these plants started exporting because of the U.S. tariff cuts and, more importantly, whether those that started exporting because of the tariff cuts were more productive than non-exporters. To this end, Lileeva and Trefler divide their sample into quartiles of the 1988 distribution of labor productivity (with the quartiles defined separately for each industry, to net out industry characteristics). Only 20 percent of the plants in the bottom quartile of labor productivity started exporting because of the tariff cuts, compared to nearly 60 percent of the plants from the top quartile of labor productivity. These estimates are from a probit regression in which the dependent variable is 1 if the plant started exporting and 0 if the plant remained a non-exporter. The key independent variable is a plant-specific measure of the change in the U.S. tariff. This measure is described below. The key conclusion is that, among firms that did not export before trade liberalization, the most productive of these three times more likely to start exporting in response to the U.S. tariff cuts. This is as predicted in panel (b) of Figure 4.2

TRADE COSTS AND THE EXPORT DECISION

in the previous section we focused on how trade raises aggregate productivity by allowing productive plants to expand at the expense of less-productive plants. In this section we move from this ‘between-plant’ effect to a ‘within-plant’ effect: trade raises productivity of individual plants by raising the returns to innovation. This is our third and last source of gains from trade. At least as far back as Schmookler (1945), economists have known that the larger the market, the more profitable it is for firms to invest in productivity-enhancing activities. Firms in large markets have the large sales volumes needed to justify incurring the high fixed costs of innovation. The U.S. tariff cuts that were part

---

**Gains from Rising Within-Plant Productivity**

In the wake of the Canada-U.S. free trade agreement, Canadian manufacturing productivity rose sharply. We have shown that part of this productivity gain was due to the reallocation of models that make a large number of parametric assumptions (assuming very specific functional forms for preferences that determine the extent of product differentiation, as well as for the utility derived from love-of-variety) and that make use of parameter estimates which are highly uncertain. In short, there is a lot of uncertainty surrounding welfare gains from trade liberalization. Lower trade costs increase an exporter’s sales in the export market, and thus increases the exporter’s overall output level. For some exporters, this increase in output will tip the balance in favor of innovating. For some non-exporters, trade liberalization will tip the balance in favor exporting and innovating.

---

Lower trade costs increase an exporter’s sales in the export market, and thus increases the exporter’s overall output level. For some exporters, this increase in output will tip the balance in favor of innovating. For some non-exporters, trade liberalization will tip the balance in favor exporting and innovating.

---

In the previous section we focused on how trade raises aggregate productivity by allowing productive plants to expand at the expense of less-productive plants. In this section we move from this ‘between-plant’ effect to a ‘within-plant’ effect: trade raises productivity of individual plants by raising the returns to innovation. This is our third and last source of gains from trade. At least as far back as Schmookler (1945), economists have known that the larger the market, the more profitable it is for firms to invest in productivity-enhancing activities. Firms in large markets have the large sales volumes needed to justify incurring the high fixed costs of innovation. The U.S. tariff cuts that were part

---

In the previous section we focused on how trade raises aggregate productivity by allowing productive plants to expand at the expense of less-productive plants. In this section we move from this ‘between-plant’ effect to a ‘within-plant’ effect: trade raises productivity of individual plants by raising the returns to innovation. This is our third and last source of gains from trade. At least as far back as Schmookler (1945), economists have known that the larger the market, the more profitable it is for firms to invest in productivity-enhancing activities. Firms in large markets have the large sales volumes needed to justify incurring the high fixed costs of innovation. The U.S. tariff cuts that were part
of the U.S.-Canada free trade agreement greatly increased the size of the market faced by Canadian firms. It should therefore have encouraged Canadian firms to increase their exporting and to increase their investments in productivity-enhancing technologies. We start here with a short extension to the theoretical model that captures how larger markets generate incentives for some firms to innovate, and then turn to empirical evidence.

A THEORY OF MARKET SIZE AND FIRM INNOVATION

Suppose that there is an innovation process that requires an up-front fixed cost \( f \), and in return generates a reduction in marginal cost \( \Delta c \). That is, innovation reduces marginal cost from \( c \) to \( c - \Delta c \). A firm that produces \( q \) units of output and engages in innovation will lower its production costs by \( c - c - \Delta c \). The firm will weigh this cost saving against the fixed innovation cost \( f \), and innovate if \( q > \Delta c / f \), and innovate if \( q > \Delta c / f \).

In words, only firms with large enough volumes \( q \) (i.e., those with initially lower levels of marginal cost) will find it profitable to innovate. What happens to this firm-level innovation decision when trade is liberalized? Lower trade costs increase an exporter’s sales in the export market, and thus increases the exporter’s overall output level \( q \). For some exporters, this increase in output will tip the balance in favor of innovating. For some non-exporters, trade liberalization will tip the balance in favor exporting and innovating.

EVIDENCE ON WITHIN-FIRM PRODUCTIVITY GROWTH AND TRADE

For evidence on the link from growth of trade to within-firm productivity, we turn again to Canada’s experience with the free trade agreement. Lileeva and Treffer (2010) look at their sample of 5,000 Canadian manufacturing plants that did not export prior to 1988 and divide these plants into those that started exporting after the passage of the free trade agreement and those who did not. In the raw data, the labor productivity of those who started to export rose 29 percent more than for non-exporters: Starting to export was highly correlated with within-firm productivity growth. Of course, this 29 percent number does not take into account a serious problem of reverse causality: does exporting lead to increased productivity or does increased productivity lead to exporting?

To answer this question one needs an instrument for exporting. That is, one needs an event that causes a firm to export but that does not directly affect its productivity growth. Lileeva and Treffer (2010) show that ‘plant-specific’ tariff cuts fit the bill as an instrument. Consider a Canadian manufacturing plant (Lumberjack Inc.) and the many products it produces. Empirically, products are defined very narrowly, at the six-digit level of the Harmonized System product classification, so that there are thousands of products in manufacturing. For each product produced by Lumberjack Inc., one can calculate the U.S. tariff cut. Averaging these tariff cuts across all of Lumberjack Inc’s products yields a plant-specific tariff cut. This plant-specific tariff cut has enormous power in predicting whether a Canadian plant starts exporting and how much it exports. The tariff cut is the only direct impact either theoretically or empirically on a plant’s productivity growth. It is thus a novel and valid instrument.

Lileeva and Treffer (2010) actually do something fancier than instrumental variables – they estimate the local average treatment effect (LATE). This is the impact on productivity of starting to export for those plants that started exporting because of the tariff cut. Thus, unlike all previous studies of the causal impacts of exporting on productivity, their work only uses information drawn from plants that were likely to be affected by the free trade agreement. Using their plant-specific tariff instrument and the LATE estimator, Lileeva and Treffer (2010) establish that the free trade agreement caused the productivity of new exporters to rise by 15.3 percent. Since this 15.3 percent rise occurred in plants that accounted for 23 percent of Canadian manufacturing output, the 15.3 percent rise in labor productivity raised overall Canadian manufacturing productivity by 3.5 percent (3.5 = 15.3 x 0.23; see Table 2 below).

By 1996 also increased their technological spending increased most in Argentinean firm level data for the 1992–1996 period. Bustos (2011a,b) develops a related model of scale-biased technology choice, which she takes to Argentinian firm level data for the 1992–1996 period. Studies of Brazilian product markets (i.e., Mercosur and the many product cuts into the exporters’ overall output level \( q \). For some exporters, this increase in output will tip the balance in favor of innovating. For some non-exporters, trade liberalization will tip the balance in favor exporting and innovating.

Table 1: Innovation Response to FTA by New Exporters

<table>
<thead>
<tr>
<th>Raw Adoption and Innovation Rates</th>
<th>New Exporters</th>
<th>Non-exporters</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Information Systems</td>
<td>16%</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td>Inspection and Communications</td>
<td>18%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Any Product or Process Innovation</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>Any Product Innovation</td>
<td>26%</td>
<td>14%</td>
<td>12%</td>
</tr>
</tbody>
</table>

The final column, which reports LATE estimates, shows that 7 of the 10 percentage points was attributable to the effects of increased exporting resulting from the U.S. tariff cuts. As shown in Table 1, similar results hold for the adoption of other technologies and for innovation. These results break with the ‘majority view’ (i.e., Bernard, Jensen, Redding, and Schott (2007) who correctly argue that most careful studies show that exporting does not raise productivity. Over the years there have been a few careful studies that find otherwise, as in Canada (Baldwin and Gu, 2003, 2004, Lileeva, 2008), in nine African countries (Van Biesebrook, 2005), in Slovenia (De Loecker, 2007); and See Lopez (2005) for an overall survey.

What has recently buttressed the ‘minority view’ is a spate of papers isolating the causal mechanisms through which exporting affects productivity. We have already seen the market-size mechanism of Lileeva and Treffer. Bustos (2011a,b) developed a related model of scale-biased technology choice, which she takes to Argentinian firm level data for the 1992–1996 period. Studies of Brazilian product markets (i.e., Mercosur and the many product cuts into the exporters’ overall output level \( q \). For some exporters, this increase in output will tip the balance in favor of innovating. For some non-exporters, trade liberalization will tip the balance in favor exporting and innovating.

A NEW DIMENSION OF HETEROGENEITY

In our theoretical model, above, firms below a certain productivity threshold should not be exporting. Yet in the empirical work reviewed above, we saw that many low productivity Canadian plants started exporting in response to U.S. tariff cuts. There is a second puzzle that we have not yet noted: Lileeva and Treffer (2010, Table III) report that the plants that gained most from starting to export (both in terms of productivity gains and increased innovation) were primarily plants that initially had low productivity. That is, among plants that started to export, the benefit was greatest for the least-productive plants.

To see why, consider a firm that is just indifferent between investing and not investing. From equation (1), indifference means that \( g = f / \Delta c \), where \( \Delta c \) is the reduction in marginal cost or the increase in productivity. Re-arranging \( \Delta c = f / g \) and noting that sales \( q \) are increasing in initial productivity, we arrive at a simple conclusion. Among the set of firms that are just indifferent between innovating and not innovating, the less-productive, low-\( q \) firms must experience effects of the free trade agreement.

Table 2: As the last row shows, labor productivity rose by 13.8 percent. The idea that a single government policy could raise productivity by such a large amount and in such a short timespan is truly remarkable.
Recent research into the welfare gains from trade has focused on three sources of gains: 1) gains from increased variety and economies of scale; 2) productivity gains at the level of the firm; and 3) productivity gains at the level of the firm from innovating for a larger market. Each of these mechanisms have proven to be highly important empirically in the context of the exhaustively studied Canada-U.S. free-trade agreement, and also appear important in many other less-studied contexts. Indeed, Balistreri et al. (2011) show that adding heterogeneity to standard computable equilibrium models of trade raises the gains from trade liberalization by a multiple of four. Empirical confirmation of the gains from trade predicted by models with heterogeneous firms represents one of the truly significant advances in the field of international economics.

We summarize the causal effects of the free trade agreement on overall Canadian manufacturing productivity in Table 4. As these gains are predominantly labor market gains, the overall manufacturing labor productivity gain was 13.8 percent. The idea that a single government policy could produce such a large and in such a short span is truly remarkable.

In writing this review, we have focused on the net gains from trade. Yet the model we have developed highlights how intra-industry trade will generate both winners and losers. For example, in the context of the Canada-U.S. free-trade agreement, Trefler (2004) shows that 12 percent of the workers in low-productivity firms lost their jobs. Research suggests that American workers are similarly hit in response to the Chinese import surge (Lu and Trefler, 2011; Autor et al., 2011). Clearly, this suggests policies that provide an adequate safety net and transitional assistance for those affected workers. There are winners and losers from trade in the overall labor market, but firms, and also among their employees.1

---

1The equation for the demand facing a firm is the one that is used in what follows is \( Q = \alpha - \beta \cdot (P - P^*) \). Here, \( P \) is the quantity of goods sold in the domestic market, and \( P^* \) is the price charged by the firm itself, and \( P^* \) is the price charged by its competitors. This demand equation may be given the following intuitive justification: If all firms charge the same price, each will have a market share 1/6. A firm charging more than the other average of other firms will have a smaller market share and potentially a larger share.

In contrast, when there is no uncertainty about marginal cost because all firms share the same cost \( c \), then entry drives the realized profit net to zero for all firms. With firm heterogeneity, expected net profit is zero, but realized profits will vary as shown in Panel (b) of Figure 2.

The general version of this model analyzed by Melitz and Ottaviano (2008) allow for multiple countries and sizes for arbitrageable trade costs across any country pair (though the trade costs are proportionate to production costs instead of per output unit as in the current version). That paper show that the effects of multilateral liberalization (all countries proportionately reduce trade costs) are very similar to the case of full economic integration that leads to a single world price for all goods. Let \( \phi_A \) and \( \phi_B \) be productivities of A and B and let \( c_A \) and \( c_B \) be their unit costs. Assume they are 1 unit apart i.e., \( \ln(\phi_A) - \ln(\phi_B) = 1 \) from the property of logs, \( \ln(\phi_A) - \ln(\phi_B) = \ln(\phi_A/\phi_B) = \ln(c_A/c_B) = c_B/c_A \). In other words, in a single world market, the prices of similar goods will be equal, and this property is called comparative advantage.

Bernard and Jensen (1999), Trefler (2004), Li (2005), Melitz and Ottaviano (2008), and Rudebusch and Ohanian (2008) can point out that one must look not just at pre-FTA trends (Figure 5), but also at pre-FTA trends. All of the FTA results reported here hold with pre-FTA controls for both levels and trends. For example, partials of some of the panels in Figure 5 with pre-FTA controls appear in Liliu and Trefler (2011).

In examining panel (c) of Figure 5, the critical reader may wonder why there are so many high-productivity non-exporters and whether this contradicts the theory. A simple but prominent explanation is that high-productive workers may gain by staying in low-productivity firms, but also among their employees.2

---

2In a related note, profits play a key role in the model of Melitz and Ottaviano (2008). In particular, Branden (2006) confirm that profits move in the expected directions. In particular, they find that non-manufacturing firms are associated with declining Canadian profits, especially for import-competing firms, while falling U.S. tariffs are associated with increased Canadian profits, especially for export-oriented firms.

Specifically, Trefler (2004) argued against productivity growth in the period after the free-trade agreement (relative to the pre-agreement period) on U.S. and Canadian tariff cuts mandated by the agreement. He showed that the Canadian tariff cuts raised productivity at the industry level, but not at the plant level. This means that the gains in productivity were coming from selection, rather than from improvements at the plant level. Using this approach, he finds that the free trade agreement raised Canadian productivity by 3.4 percent, with 50 percent of which 4.5 percent was due to the entry associated with the Canadian tariff cuts. Exploring this idea further, Melitz and Ottaviano (2008) show that the increase in productivity can be further bolstered by policies that impede the reallocation of resources from producers who do not profitably produce to those that do. In particular, they show that if a firm is charging more than the price charged by its competitors, then it is earning higher profits which can be further improved by policies that increase the efficiency of resource allocation.


The process of globalization, so lauded until recently, is under attack. Many people blame international trade and migration for the stagnation of their incomes and the difficulties that they face in life. Politicians are, naturally, exploiting this discontent. None of the major candidates in the primaries in the U.S. supported expanding the number of free trade agreements, and the nominees of both parties oppose TPP. Migration is, perhaps, suffering even more. Listening to the debate between Clinton and Trump in the 1980s presidential primary and contrasting it with the current discussion on immigration reforms is a case in point. The idea that migrants are good for the development of a country is simply not present in the current debate in most countries. At best, people advance arguments on why bringing in highly educated people, like Indian programmers, or allowing some students to stay after their post-graduate degree could be beneficial. It is hard to find commentators or academics, let alone politicians, who favor opening the borders to immigration more broadly? My current research implies that there is an economic case for opening the borders to immigration.

By Esteban Rossi-Hansberg
Princeton University

Migration and the World Economy

The topic of immigration is so loaded because it affects so many dimensions of human life. There are the economic implications of migration, but there are also social, cultural, and political implications. I am an economist, so let me exclusively address the broad economic consequences. It is natural to view migration with some suspicion. After all, we do not normally invite strangers to our home and allow them to live with us. Our home is our property, and we want property rights to be respected. Respecting property rights is also essential for the good performance of an economy. Furthermore, having a stranger at home strains resources, particularly if he does not pay rent, or not fully. The size of our home feels smaller if one extra person lives there permanently. The same can be said of a country. Foreigners come and use the land and other fixed or inefxible factors (like good institutions), and as a result things are more congested. There is less for the original owners, the original citizens, to use. This is the case if migrants get some of these fixed factors for free (like government services or good institutions), or ownership is unevenly distributed across citizens, which is undoubtedly the case everywhere in the world. Of course, one can question who are the original citizens and who can claim property rights of a country. Although perhaps interesting, let’s leave that discussion aside and let’s just say that the current citizens are the owners. Should they leave the door open and share the fixed endowments of their country? Is this in the interest of current citizens?

If all resources were fixed and in use and technology was given, the answer to these questions would clearly be no. Other wise, we would break one of the fundamental mechanisms in economics, namely that returns are diminishing in the quantity of a factor when other factors are constant. The rationale is simply based on congestion. The more there are of us, the more we tried to share the other factors, which causes our marginal contribution to decline. Owners of private factors could gain, but citizens that do not own factors lose. And if returns to fixed factors and public resources are shared uniformly between all residents, including migrants, everyone loses. This basic economic logic is sound, and I do not attempt to argue in favor of migration by arguing that the large amount of evidence in its favor is somehow flawed. Instead, it is true that the premise of the argument is violated, that is, many factors apart from labor are not fixed, not all factors are fully utilized, and technology evolves endogenously as a result of investments, spillovers, and diffusion.

Clearly, as we increase the number of people in a country, the returns of capital and other complementary factors increase, in turn increasing capital investments. Similarly, more workers translate to greater expenditures, which incentivize a firm’s investment in technology since its innovation costs can be shared more widely across consumers. Finally, a substantial amount of factors are not fully utilized. Consider the cost of land in Manhattan relative to the cost of land in the middle of Montana. Montana is a beautiful state, but the price of land anywhere in the state is clearly lower than in virtually every block of Manhattan. Clearly, land is more extensively utilized in Manhattan than in Montana. There would be plenty of space in the U.S. to create many more cities like NY. Furthermore, if everyone lived in cities like NY, most of the U.S. would be completely empty. In reality, most of the U.S. is essentially empty, so the lack of space, at least in the U.S., cannot be a fundamental factor limiting the productivity of migrants and other workers. There is plenty of land in the world that is not utilized for economic purposes.

Can these mechanisms dominate the diminishing returns resulting from congestion and the scarcity of complementary factors? Could it be the case that more immigrants will increase local welfare for current citizens because the resources dominate? The answer requires us to measure and compare them. There is no way we can simply argue our way around this. Measuring these forces is, however, intricate because people move to locations that are extremely heterogeneous. Some places are beautiful, some are extremely productive, and some are simply where your friends, family, or that local vibe that you like so much are. Accounting for this heterogeneity is important. Perhaps even more important is accounting for the fact that locations in an economy and across the world are linked via trade networks, migration networks, and production networks. The world is incredibly interconnected and these connections are important to truly measure the effect of migrants. The impact of migrants is the sum of their effects throughout the network.

One thing is clear, simply measuring the effect that migrants to a city have on the wages of other similarly skilled agents in the same city misses a tremendous number of effects. What if current residents move to other cities and improve those? What if they leave for the suburbs instead? What if they decide to obtain a degree or become entrepreneurs? The logic of partial equilibrium measurement that treat locations as isolated islands is flawed, and will result in wrong answers. In economics, it is fairly common to focus on certain details and leave the big picture behind. Such an approach can be particularly perilous when analyzing the effects of migration.

With these concerns in mind, I have been working on frameworks that account for many of these channels in order to try to measure the true effect of liberalizing migration. I want to think about general migration flows, independently of the skill or wealth of the migrant. Ultimately, the skill and wealth of the current generation is just a temporary, and short lived, characteristic. Future generations will decide their own savings and investments in education based on the returns they face.

Together with Klaus Desmet and David Nagy, I have recently measured the implications of relaxing migration flows in such a framework. The exercise requires large amounts of data for thousands of locations in the world. The goal is to assess the evolution of the world economy over time with current migration restrictions as well as with counterfactual migration costs, and compare them. The results are stark. A reform that liberalizes migration so that 10% of the population moves at impact would yield an increase in real world output in present discounted value of 18%. Such a reform would also cause some extra congestion in Europe and the U.S., which implies that average welfare would increase by 9%, a smaller but still impressive figure.

There is no policy that could be readily applied at the world-level for which estimated world benefits are as large. Migration is uniquely powerful in generating good effects. So in economic terms, this is a no-brainer not because of implausible or abstract theoretical arguments, but because the measurement of the relevant forces tells us so. If one is worried about secular stagnation, namely the slowdown in growth and innovation, liberalizing migration seems like a much more effective policy than any other one we know. It certainly promises to be more effective than monetary or industrial policy.

Clearly, once we start discussing policy, we need to extend the scope of our thinking beyond economics. Can the world incorporate 10% of migrants without suffering important disruptions in institutions and its social fabric? My guess is that it can, in fact, some of these costs are already accounted for in the welfare numbers presented above. Migrants do create congestion and disrupt societies, but our measurement says that the associated increase in real output alleviates, by far, these costs.

Globalization has brought many economic gains. It can, sometimes, also create losers, particularly when people do not react optimally to the new opportunities it offers. Even if we acknowledge these problems, allowing for the flow of goods and people across regions and countries is still one of the best ways we know to create wealth and wellbeing.

By Esteban Rossi-Hansberg
Princeton University

Are the Unfair Trade Laws Fair?¹

By Thomas J. Prusa²
Rutgers University

I n recent decades many long-established firms and industries have struggled with foreign competition. Profits have fallen and in some cases turned negative. Jobs have been lost. Economists argue that such changes are a natural and important part of development and progress. Schumpeter (1942) called this process “creative destruction.”

This ivory tower view is often seen by businessmen and politicians as out of touch with reality. Job change and resource reallocation are painful, often slow, and almost always hard to accept. The unhappiness with job losses is intensified when the unhappiness with job losses is intensified when positions are filled by foreign competitors. The unhappiness with job losses is intensified when the unhappiness with job losses is intensified when...
Wile the WTO provides general guidelines and principles for how the dumping margin should be computed, individual countries have substantial latitude in implementing these guidelines. For example, in the process of computing the AD duty, a government must aggregate the results of comparisons between the normal value and export prices. Hundreds or even thousands of individual transactions are aggregated to produce a single AD duty. Zeroing refers to one particular step in the calculation. Zeroing is the practice of replacing the actual dumping margin with a more attractive dumping margin (i.e., export transactions for which the export price exceeds the calculated normal value) with a value of zero prior to the final calculation of a weighted average margin of dumping for the product under investigation. Because the zeroing method drops transactions that September. To keep the example as simple as possible I will assume that each transaction is for the same volume, i.e., one unit. As seen, prices vary from transaction to transaction in both markets. As often the case in the real world, the export price is below the home market price on some dates and above the home market price on other dates. Occasionally, the same price is charged in both the markets.

Under WTO rules, a government can calculate the difference in price on a transaction-by-transaction basis and then compute the weighted average of these price differences, i.e., the individual export transactions are compared with the individual domestic transactions made at or at about the same date as the export transactions concerned. In column (4) of Table 1, I compute the difference for each comparable transaction. According to, for some comparisons the difference is zero (which means dumping) and for other comparisons it is negative. When I sum the allowed to offset each other, the conclusion using the transaction-to-transaction method will be that there is zero dumping. As clean and simple as the above calculations are, the U.S. has had a long practice of not computing the margins as described. Instead, in the process of the comparison-to-comparison transactions, the U.S. employs the practice of zeroing. The use of zeroing leads to dramatically different margins. To see this, in column (5) of Table 1, I have computed the difference for each comparable transaction using zeroing. Each of the five negative margins is set to zero. In our example, the amount of dumping is 35, which implies that dumping margins are 9.3% (35 divided by the total export value of 900 = 0.039).

Several important insights are gleaned from this example. First, zeroing can never lower the margin. Zeroing only drops negative margins. Second, zeroing treats some foreign prices as if they were something different than what they actually were. On both September 12th and September 17th, exactly 50 percent of the transactions would zero to -35. In absolute value to the amount (-35) for the September 12th price as if it were just the formal definition suggests. In Table 1, I present an example of a firm’s foreign home and export sales in a given month. I assume that the data in Table 1 represent net prices for separate transactions on a series of dates in the month of

### Table 1 – An Example of Zeroing

<table>
<thead>
<tr>
<th>Sales date</th>
<th>Export transaction</th>
<th>Home Mkt transaction</th>
<th>Difference: No Zeroring</th>
<th>Difference: Zeroring</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Sep</td>
<td>75</td>
<td>90</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>4-Sep</td>
<td>75</td>
<td>95</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>10-Sep</td>
<td>100</td>
<td>95</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12-Sep</td>
<td>105</td>
<td>95</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>16-Sep</td>
<td>105</td>
<td>105</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>18-Sep</td>
<td>110</td>
<td>105</td>
<td>-5</td>
<td>-5</td>
</tr>
<tr>
<td>20-Sep</td>
<td>110</td>
<td>110</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>24-Sep</td>
<td>120</td>
<td>110</td>
<td>-10</td>
<td>-10</td>
</tr>
<tr>
<td>Wld Avgerage</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### References

S

ecause the Global Financial Crisis, it has become abundantly clear that global financial markets post-2008 have increasingly been defined not by the crisis itself, but rather by the world’s reaction to it. The most fundamental of differences in a world pre- and post-crisis are not to be found in an investment bank’s balance sheet or a homeowner’s mortgage; rather, they are to be found in the actions of a lone government institution: the central bank. On December 24th, the Swiss National Bank announced that its own central bank would be joining the Fed in the midst of the Greek crisis. The move was enough to put many traders and brokers out of business. Large U.S. forex brokers FXCM needed a $300 million bailout to survive. US brokers and Citigroup tallied $500 million in losses from their franc positions. The actions of the SNB—and the Swiss franc move—are indicative of the monetary mire in which central banks are now stuck, much of it formed with the implementation of Quantitative Easing programs by the U.S. and the United Kingdom in the aftermath of the crisis. QE was first introduced, with little success, by the Bank of Japan in the early 2000s as the country fought through what has since been termed a “Lost Decade” of falling prices, declining wages, and low growth. The practice, however, marked a radical departure for the Federal Reserve and Bank of England. Between 2008 and 2010, these two central banks collectively purchased nearly $2 trillion worth of mortgage backed bonds and Treasury securities.

And so recent central bank moves to “rewrite” the rules of the game call to mind several burning questions: Why do these rules need to be rewritten? What aspects of modern, global financial markets and economies are so fundamentally flawed as to be unfixable under decades-long systems and practices? And, perhaps most ominously, what happens when these aggressive practices (negative interest rates, Quantitative Easing, and currency devaluations) don’t work?"
What Is Good for Banks Is Not Good for the Economy

“...is the declining economic and housing markets. The fundamental origins of today’s economic depression, investigated in the housing and securities markets as the point of departure...”

By Masoud Movahed

Economists and analysts of the 2007–2009 financial meltdown usually take the domestic housing and securities markets as the point of departure in their prognoses of the crisis. While refusing to look beyond the apparent roots of the malaise, they continue to begrudge the decline in housing prices as the bedrock of the financial crisis. And, that, of course, makes perfect sense. With a housing bubble bursting by the end of 2006 that forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, and numerous banks forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, and numerous banks...

Former Fed Chairman Paul Volcker.

By Masoud Movahed

Economists and analysts of the 2007–2009 financial meltdown usually take the domestic housing and securities markets as the point of departure in their prognoses of the crisis. While refusing to look beyond the apparent roots of the malaise, they continue to begrudge the decline in housing prices as the bedrock of the financial crisis. And, that, of course, makes perfect sense. With a housing bubble bursting by the end of 2006 that forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, and numerous banks

Former Fed Chairman Paul Volcker.

By Masoud Movahed

Economists and analysts of the 2007–2009 financial meltdown usually take the domestic housing and securities markets as the point of departure in their prognoses of the crisis. While refusing to look beyond the apparent roots of the malaise, they continue to begrudge the decline in housing prices as the bedrock of the financial crisis. And, that, of course, makes perfect sense. With a housing bubble bursting by the end of 2006 that forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, and numerous banks

Former Fed Chairman Paul Volcker.

By Masoud Movahed

Economists and analysts of the 2007–2009 financial meltdown usually take the domestic housing and securities markets as the point of departure in their prognoses of the crisis. While refusing to look beyond the apparent roots of the malaise, they continue to begrudge the decline in housing prices as the bedrock of the financial crisis. And, that, of course, makes perfect sense. With a housing bubble bursting by the end of 2006 that forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, and numerous banks

Former Fed Chairman Paul Volcker.

By Masoud Movahed

Economists and analysts of the 2007–2009 financial meltdown usually take the domestic housing and securities markets as the point of departure in their prognoses of the crisis. While refusing to look beyond the apparent roots of the malaise, they continue to begrudge the decline in housing prices as the bedrock of the financial crisis. And, that, of course, makes perfect sense. With a housing bubble bursting by the end of 2006 that forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, forced the prices of assets down, a deregulated credit market running on an unbridled debt explosion, and numerous banks

Former Fed Chairman Paul Volcker.
The logic of the rise of finance— as the most thriving and profit-generating sector of the economy—can be explained by the following simple economic rationale. For any given industry to borrow, there has to be sufficient demand for the output of that industry. The level of demand—the volume of spending and investment—for a specific industry determines the growth rate of that industry because of the growing demand for software and high-speed IT infrastructure, which has invited a mammoth investment in the sector. Little wonder why! Now in such a depressing economic climate, where the global manufacturing market suffers from over-capacity and as a result reduced profit rates, which by itself disincentives firms from hiring more labor and generating more employment, the economy demanded—or to encourage spending—other than by way of ever greater borrowing, which meant running the economy on credit. This was essentially dependent upon banks. To boost private spending, the Fed lowered the short-term interest rate in the 1990s, which made highly risky credit available to households, many of whom were unqualified (see Figure 3).

As a matter of fact, because of the stagnant growth of wages, many of those households had ever higher debts compared to their incomes. In an attempt to pinpoint origins of the housing bubble prior to 2006, two economists at the University of Chicago Atif Mian and Amir Sufi argued that there exists a statistically causal relationship between the massive supply of mortgages and the rapid rise of house prices which led to the bubble by the end of 2006. Surprisingly enough, they find that the period between 2001 and 2005 is the only one in recent U.S. history where housing prices increased in zip codes that had negative income growth. This is strong evidence that credit was in one way or another supplied in an extraordinary way to ever more unqualified borrowers. In an economy that had already demonstrated sluggish growth rates by the mid 1990s, injections of risky credit by way of lowering short-term interest rates offered a way out of the predicament (see Figure 4). This massive injection of credit became the benchmark economic policy that laid the groundwork for the spectacular ascent of finance.

I mentioned earlier that since the 1990s, manufacturing firms have been enfeebled by the decline of profit rates, as were households by the wage stagnation. Corporations along with households were thus enabled to increase their borrowing. Speculative run-ups in asset prices in both the housing and securities markets enabled huge, largely fictitious increases in the wealth of corporations and households. Nurtured by easy credit and deregulation policies of the Federal Reserve Banks, there was a massive run up in the housing prices between 2000 and 2006. Whenever the run-ups in financial markets led along with the Fed would not hesitate to reduce the short-term interest rates so as to incentivize financial investors to step up their borrowing in order to correspondingly increase their purchases of housing and financial assets. The key to the complete explosion of the credit market was the Fed’s policy of maintaining low short-term interest rates. For banks, that was a license to make their ever little risk, particularly since they can get people to open savings accounts that pay close to nothing. The low short-term rates meant easy access to cheap credit for borrowers who then invested enormously in the stock and securities markets. Indeed, what is good for banks is not good for the economy. The excessively low short-term interest rates in the past two decades thus created an environment conducive to financialization. The flood of easy credit to the stock and housing markets paved the path for the historic run-ups of equity and land prices that ensued during the second half of the decade. The increase in paper wealth that was required to enable both corporations and households to step up their borrowing, raise investment and consumption, and keep the economy expanding. The low interest rates of the 1990s and early 2000s created conditions under which households could borrow easily, invest in the housing and stock markets, and push up their prices. So banks took it upon themselves to stimulate growth by enabling corporations and households to increase their borrowing, which precipitated a significant increase in housing and securities prices.

With credit made so cheap, and profit-making on lending rendered so easy, banks and non-bank financial institutions could not resist opening the floodgates and advancing funds without limit.

In short, the crisis of 2007 to 2009 was one of the most disastrous financial meltdowns since the Great Depression. While there is a pervasive tendency among economists to look at the financial and securities market to understand the roots of the crunch, a few have departed among economists to look at the financialization of the economy as well as the recent crisis in the financial sector. The decline of U.S. manufacturing profitability posed serious threats to economic dynamism and vitality as firms were ever more reluctant to hire labor or raise wages. For the Fed to continue generating growth, it had to enable both the public and private sectors—both households and the government—to increase their borrowing.

The decline of U.S. manufacturing profitability posed serious threats to economic dynamism and vitality as firms were ever more reluctant to hire labor or raise wages. For the Fed to continue generating growth, it had to enable both the public and private sectors—both households and the government—to increase their borrowing.

That is to say, no sector in an economy—be it manufacturing or services—can grow if there is no demand for it. For instance, the IT industry has witnessed an unrivaled growth rate in the past two decades simply because of the growing demand for software and high-speed IT infrastructure, which has invited a mammoth investment in the sector. Little wonder why! Now in such a depressing economic climate, where...
The Value of Economic Statistics

By Diego Perez
New York University

Every month, the Bureau of Labor Statistics and the Bureau of Economic Analysis publish statistics on inflation, employment and several other economic variables. Providing macroeconomic statistics is a public good associated with gathering and processing a large amount of data. At the same time, the public provision of economically relevant information is likely to confer certain benefits on society. After all, the availability of timely and accurate economic data is a common feature of any country with solid institutions. In this column, I focus on the benefits associated with the provision of macroeconomic statistics. A proper understanding and measurement of these benefits is key to adequately allocating resources to be invested in the provision of public information.

In a recent paper Price Setting Under Uncertainty About Inflation, joint with Andres Drekin, I quantify the economic effects of providing precise statistics about the aggregate inflation rate. The provision of accurate inflation statistics enhances the availability of information that firms have when setting prices. Using an economic model, we show that more precise information is associated with a more efficient allocation of resources in the economy, which in turn increases social welfare.

Using an economic model, we show that more precise information is associated with a more efficient allocation of resources in the economy, which in turn increases social welfare.

THE ECONOMIC EFFECTS OF THE PROVISION OF STATISTICS

How does the availability of inflation statistics affect the macro economy? The answer revolves around the information firms must have to efficiently determine the prices they should set for goods and services. In making such decisions, firms must use both idiosyncratic information (information specific to their own revenues and costs) as well as aggregate information (information about economy-wide levels of prices and employment). Precise statistics about inflation allow firms to disentangle the components of demand for their products that are idiosyncratic to them from those components that are aggregate and common to all firms. For example, in a high inflation environment, a high level of sales is more likely to be attributable to aggregate factors such as an expansionary monetary policy, if there are more dollars circulating, families will demand more of all goods in the economy. On the other hand, in a low inflation environment, a high level of sales is more likely to be attributable to a high real demand for the goods that the firm produces. Therefore, more precise information about inflation helps firms disentangle idiosyncratic from aggregate shocks, as well as monetary from real shocks.

With better information regarding the demand for their goods, firms can set prices in a way that better reflects both the production cost and the value as signed by buyers. When prices more accurately reflect the value of demand and the cost of production, inputs of production (labor, physical capital, intermediate inputs) are assigned in a more efficient way. If input factors are more efficiently assigned, the aggregate level of production given the same amount of inputs is higher, which leads to higher social welfare.

A symptom of better access to information is a lower level of price dispersion for a given type of good. When more precise inflation statistics are available, the price of a cup of coffee should be more similar between different stores and brands. The reason is that, with more accurate information about aggregate inflation, firms optimally choose to put more weight in inflation statistics when setting prices; when all firms optimize in this way, their prices are more aligned with each other. One mechanism through which the availability of public information can effect the macro economy is understood, the next challenge is to quantify it. We can measure this effect if we have: (i) an economic model that fits the macroeconomic behavior of an economy and (ii) an episode of analysis in which the access to information about the inflation rate changed significantly. Using data on disaggregated prices for Argentina and Uruguay, we found that the manipulation of inflation statistics brought about an increase in price dispersion (measured by the coefficient of variation of the prices of similar goods) in Argentina of 13%. With this measured effect in hand, we can estimate an economic model for Argentina tailored to studying our episode of analysis and we can then use it to quantify the value of providing trustworthy inflation statistics. According to our model estimates, the manipulation of inflation statistics led to a less efficient allocation of inputs of production that in turn led to an equivalent, permanent drop in the aggregate level of output of 1.3%. With less precise information, the most value do not hire more labor or capital.

We then explore the extent to which our estimates can be generalized to the United States. To do so, we re-estimate our model to match the most salient features of the American economy and then re-do our hypothetical exercise that replicates the manipulation of inflation statistics.

Once the mechanism through which the availability of public information can affect the macro economy is understood, the next challenge is to quantify it.

We can measure this effect if we have: (i) an economic model that fits the macroeconomic behavior of an economy and (ii) an episode of analysis in which the access to information about the inflation rate changed significantly. Using data on disaggregated prices for Argentina and Uruguay, we found that the manipulation of inflation statistics brought about an increase in price dispersion (measured by the coefficient of variation of the prices of similar goods) in Argentina of 13%. With this measured effect in hand, we can estimate an economic model for Argentina tailored to studying our episode of analysis and we can then use it to quantify the value of providing trustworthy inflation statistics. According to our model estimates, the manipulation of inflation statistics led to a less efficient allocation of inputs of production that in turn led to an equivalent, permanent drop in the aggregate level of output of 1.3%. With less precise information, the most value do not hire more labor or capital.

We then explore the extent to which our estimates can be generalized to the United States. To do so, we re-estimate our model to match the most salient features of the American economy and then re-do our hypothetical exercise that replicates the manipulation of inflation statistics. We find that the negative welfare effects associated with this policy are more than ten times smaller than those for Argentina. The reason is that the availability of inflation statistics provides less value in the US, since aggregate prices do not fluctuate as much as in Argentina. In other words, the US would not incur such large efficiency losses if firms set their prices by taking into account the long run level of inflation rather than by considering the current level of inflation.

In summary, we find that significant welfare gains can be made by providing trustworthy and precise statistical information about the inflation rate, as it helps to allocate resources in a more efficient way. Additionally, these welfare gains are larger in highly volatile economies where prices fluctuate significantly and firms place greater value on information about the aggregate macroeconomic state. The Argentinean episode is ideally suited to measuring these welfare consequences and quantifying their magnitudes.

"We can measure this effect if we have: (i) an economic model that fits the macroeconomic behavior of an economy and (ii) an episode of analysis in which the access to information about the inflation rate changed significantly."
THE HARVARD COOP

A Campus Institution For Generations of Students

MEMBERS RECEIVE A 10% DISCOUNT ON ALL PURCHASES, IN ADDITION TO ANY OTHER SALES OR DISCOUNTS

JOIN AT ANY COOP LOCATION, OR ONLINE AT WWW.THECOOP.COM