How did China respond when the United States raised tariffs on Chinese goods in 2018 and 2019? What drives a firm's decision to make its own inputs to production instead of buying them? How do property rights impact financial inclusion in developing countries? Researchers explored these and other questions during a recent Richmond Fed conference.

Economists from the Richmond Fed, research universities and other institutions met in Richmond for a conference in September focused on insights from macroeconomic development. Researchers presented on the topics of trade, firm specialization, property rights and wealth inequality. This Economic Brief summarizes those presentations.

The U.S.-China Trade War

In 2018 and 2019, the U.S. raised tariffs across various Chinese imports, and China responded by increasing tariffs on U.S. imports. In 2020, the countries signed an agreement that included a pledge from China to increase its purchases of certain U.S. goods and services through the end of 2021. However, the deal did not require China to reduce its tariffs on U.S. imports. How was China able to increase its purchases of U.S. products without lowering tariffs?

Chang-Tai Hsieh of the University of Chicago presented a paper — "Non-Tariff Barriers in the U.S.-China Trade War," co-authored with Tuo Chen of Tsinghua University and Zheng Song of the Chinese University of Hong Kong — examining the U.S.-China trade war. The authors find that non-tariff barriers — or conditions that can unofficially impede trade — played an important role in both the initial reduction and the subsequent increase in U.S. exports to China during this period. Examples include Chinese health officials imposing lengthy inspections on U.S. apples and lumber in May 2018 and China's Agriculture Ministry changing the formula for pig feed to reduce the content of U.S. soybeans in October 2018.
Economists have long suspected that such non-tariff barriers can have large effects. However, the informal nature of such barriers make them difficult to assess empirically. Using Chinese customs level data, the authors infer the role of non-tariff barriers in the U.S.-China exchange between 2017 and 2020.

They find that China's use of non-tariff barriers on U.S. agricultural and manufacturing products increased significantly in 2018 and 2019 and were much larger than the increase in formal tariffs over the same period. Between 2019 and 2020, non-tariff barriers fell, while there was no change in tariffs. They estimated that non-tariff barriers accounted for about half of the decline in U.S. exports to China between 2017 and 2019. Conversely, non-tariff barriers were removed or employed in the U.S.' favor in 2020 and accounted for all of the increase in U.S. exports to China that year.

The cost of trade barriers is typically borne by consumers, and this case was no different. Hsieh, Chen and Song estimate that the non-tariff barriers accounted for more than 90 percent of the decline in Chinese welfare from trade in 2018 and 2019. Also, because non-tariff barriers are unofficial, their burden did not fall evenly on all firms. Most non-tariff barriers were applied to smaller, private Chinese firms rather than state-owned firms. This allowed China to retaliate to U.S. tariffs while protecting the profits of state-owned firms. However, it may have resulted in greater trade misallocation, which could explain the substantial welfare costs.

**What Drives Attitudes Toward Trade?**

Surveys suggest that economists hold very different views on trade issues than the broader public. Economists largely favor freer trade as a way to improve overall economic welfare, but the public's attitudes toward trade are more mixed. Diana Van Patten of Yale University presented a paper — "Voting on a Trade Agreement: Firms Networks and Attitudes Toward Openness," co-authored with Esteban Méndez of the Central Bank of Costa Rica in which they exploit a natural experiment to study what factors shape public attitudes toward trade.

In 2007, Costa Rica put a proposed free trade agreement with the U.S. to a national referendum. The U.S. was Costa Rica's main trading partner at the time, which helped garner a high turnout rate of 59 percent for the vote. In the final tally, the free trade agreement was approved by a narrow margin of 51.2 percent.

The authors obtained voting data from the referendum and merged that information with employer-employee data, allowing them to match voters and firms. They use this information to explore several questions, including:

- Does an employer's dependence on trade shape its employees' attitudes toward trade?
- Does an industry's exposure to trade shape the attitudes of workers in that sector?
- Do consumption habits affect how households feel about trade, given that greater trade openness would lower prices for some goods?
The authors conclude that a firm's exposure to this trade agreement significantly influenced the votes of its employees, particularly in the case of pro-trade voters. In general, higher-skilled workers were more likely to support the agreement, while workers more exposed to import competition were more likely to oppose it. Both household earnings and consumption habits also played a role in explaining how individuals voted. These insights could assist policymakers in designing trade agreements that both improve public welfare and garner popular support.

**Specialization and Economic Growth**

Firms making a product choose whether to make their inputs in-house or purchase them from other firms. For example, a company that sells shirts might purchase cotton yarn to turn into cloth and then into shirts, or it might simply purchase the cloth directly. The shorter a firm's input supply chain — that is, the less the firm makes in-house — the more vertically specialized the firm.

Ezra Obereld of Princeton University presented work in progress, "Growth and the Fragmentation of Production," which is being co-authored with Johannes Boehm of Sciences Po. They use data from the Indian Annual Survey of Industries covering 1989-2015 (with some gaps) to study the vertical specialization of manufacturing firms in India. They find that vertical specialization is positively correlated with economic development, and firms located in wealthier districts are more vertically specialized on average. Vertical specialization is also positively correlated with the size of manufacturing plants, with firms with more sales tending to have shorter input supply chains.

Obereld and Boehm examine several possible explanations for these links between vertical specialization and growth. They note that India enacted trade liberalizing reforms in the 1990s, lowering tariffs from very high levels. As India opened up to trade, demand for products went up, and this increased demand was associated with greater vertical specialization by manufacturing firms.

They also find evidence that economies of scale play a role in specialization. In their model, firms can either choose to buy or to make inputs for their products. Since making inputs requires more labor, firms that expect to grow will choose to buy inputs to save on labor costs, investing more time and effort into searching for trading partners that offer the cheapest inputs. Firms that expect to remain small, on the other hand, will invest less time in searching for inputs and instead make those inputs themselves. Overall, the researchers say, these findings point to a strong link between specialization and economic growth.

**Sectoral Development Multipliers**

Researchers who study development economics have long understood the importance of trade and complementary investments across sectors to reduce distortions and improve growth. At the core of this literature is the idea that sectors are interconnected. There has
been some research on how an economy's production structure affects its response to various frictions or distortions (such as the presence of market power or financial constraints) that result in inefficient production choices. However, there have been few attempts to model all these factors together.

Nicholas Trachter of the Richmond Fed presented work in progress, "Sectoral Development Multipliers," which is being co-authored with Francisco Buera of Washington University in St. Louis. They use a model of a multisector economy with complementarities to conduct a quantitative analysis of technology adoption by firms. Their goal is to study how both economy-wide and sector-specific subsidies interact with economic distortions as well as which sectors provide the greatest amplification of those distortions.

Their model features monopolistic competition, differentiated products and economic distortions. Firms produce using labor and intermediate inputs from a rich input-output architecture. Firms can produce using either "traditional" or "modern" technologies, with the latter requiring intermediate goods in addition to labor. Using data from manufacturing firms in India, they examine the difference between industrial policies that uniformly subsidize modern technology adoption versus those that subsidize specific sectors.

The authors' early results suggest that there is a large degree of heterogeneity of technology adoption both across and within sectors. Each sector also has a different development multiplier, suggesting that the overall impact of subsidies varies based on how they are targeted. That is, some combinations of subsidies applied to certain sectors may be more effective at encouraging widespread technology adoption. Trachter and Buera plan to expand on this work, including extending the analysis to the U.S. economy.

**Property Rights, Financial Frictions and Resource Allocation in Developing Countries**

What accounts for economic disparities across countries? One leading theory is that the economies of low-income countries are less effective at allocating resources productively than those of high-income countries. In developing countries, weak property rights contribute to this misallocation of resources. Without property rights, land can't be sold or rented, can't be used as collateral for borrowing and may be subject to expropriation, reducing incentives for private investment and development. Relatedly, financial markets in developing countries often feature more frictions, impeding access to credit to fuel investment and growth.

Kristina Manysheva of Princeton University presented a paper, "Land Property Rights, Financial Frictions and Resource Allocation in Developing Countries (PDF)," in which she examines the role of property rights and financial frictions on economic development. She incorporates both factors into a heterogeneous-agent dynamic macro model to quantify their effects on the economy. Both property rights and financial frictions are connected through the collateral channel, since privately owned land can be used as collateral for
borrowing. This allows Many sheva to study the interaction between property rights and financial frictions. She then uses household data from Tanzania to estimate the parameters of the model.

Agriculture accounts for about 30 percent of gross domestic product and 65 percent of employment in Tanzania. Most farms are small and family operated, encompassing about 2 hectares of land and producing an average annual harvest of about $500. Less than 15 percent of the land is titled, and fewer than 10 percent of households borrow. The lack of property rights results in lower overall productivity. Land is divided among many small and relatively unproductive farms, and households are unable to sell their land to enter other industries, limiting entrepreneurship.

Using her model, Many sheva studies the impact of land reform that improves private property rights. She estimates that such a policy leads to more efficient allocation of land and enables more households to enter other occupations, boosting agricultural output by 7.4 percent and non-agricultural output by 8.2 percent.

Expanding property rights also improves financial inclusion, especially among poorer households. In contrast, large private landowners are made worse off by the change, suggesting that they could oppose reform efforts despite the overall benefits. Financial market reform has a similar effect on overall welfare, but its benefits are less concentrated among poor households. Overall, the research provides evidence that strengthening property rights leads to higher welfare, more efficient allocation of resources and a more financially inclusive society.

**Wealth Inequality and Returns to Private Business Wealth**

Wealth inequality in the U.S. and other developed countries is well-documented. Many of the households at the top of the wealth distribution are private business owners, and several recent studies have argued that different rates of return on private business wealth is an important determinant of wealth inequality.

Virgiliu Midrigan of New York University presented his paper "Why Are Returns to Private Business Wealth So Dispersed?" which is co-authored with Corina Boar of New York University and Denis Gorea of Danmarks Nationalbank. Their paper examines what might explain the different returns to private business wealth. Previous studies on the topic computed returns as business income divided by the net worth of the business, which Midrigan, Boar and Gorea define as accounting returns. Such measures could reflect different rates of return on business wealth (defined as financial returns) due to financial frictions like borrowing constraints. But dispersion in accounting returns might also reflect returns to some fixed factor, such as market power or talented management.
Midrigan, Boar and Gorea first explore the size and dispersion of accounting returns using micro data on firm balance sheets and income statements from a number of European countries. They find that the dispersion in accounting returns is large, persistent and negatively correlated with firm equity.

They then study a model consistent with their data which allows them to calculate the distribution of financial returns. They find that financial returns are also large and dispersed, but those differences are half as large as those for accounting returns. This suggests that fixed factors are important for understanding the dispersion in accounting returns, not just financial frictions. Differences in financial returns mostly reflect differences in uninsurable risks rather than financial frictions like collateral constraints. As a result, the dispersion in rates of return for firms seems to be driven not by financial constraints, but rather by different willingness to expand and take on risks.

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