

Gauging International Shocks and Their Implications

By Jian Wang



the Globalization and Monetary Policy Institute cosponsored a conference on “International Linkages in a Globalized World and Implications for Monetary Policy” with the School of International Business Administration at Shanghai University of Finance and Economics (SHUFE) and Shanghai Institute of Finance and Law. The event was held at SHUFE on June 21–22.

The theme was the impact of globalization on the transmission of shocks across countries and subsequent implications for policymakers. Conference organizers were Michael Devereux of the University of British Columbia, Kevin Huang of Vanderbilt University, Yuying Jin of SHUFE, and Jian Wang and Mark Wynne of the Federal Reserve Bank of Dallas. Presenters’ institutions

included the University of British Columbia, University of Virginia, New York University, the International Monetary Fund (IMF) and Federal Reserve Bank of San Francisco.

During three sessions, authors presented nine papers examining linkages between economies through trade, offshoring and international financial markets. The impact of these ties for conducting monetary policy was also discussed. In a short policy panel discussion, Benhua Wei, a former vice chairman of China’s State Administration of Foreign Exchange (SAFE), and Wynne, director of the Dallas Fed’s Globalization and Monetary Policy Institute, shared their views on the global economy, particularly current policy issues in the United States, China and the euro area.



Session I: International Trade, Offshoring and International Comovement

The first session featured studies on international linkages through trade and offshoring. Kim Ruhl, assistant professor of economics at New York University's Stern School, presented his paper "Antidumping in the Aggregate." The World Trade Organization (WTO) allows antidumping duties to punish "unfair" trade practices. The duties are gaining popularity among WTO members, with more than 200 cases initiated annually.

Antidumping policies, despite their merits in some situations, are also often a protectionist tool. For instance, antidumping initiations rose during the recent global financial crisis, and countries have resorted to antidumping claims during earlier economic recessions.¹ Previous studies mainly focus on how antidumping policies lessen competition between domestic and foreign firms. Because of the complicated game theory involved in antidumping models, they represent partial equilibrium and cannot be used to evaluate the aggregate welfare effect of antidumping policy.

Ruhl incorporates key antidumping properties into a standard macro trade model with heterogeneous firms and monopolistic competition. The model is then used to study the welfare implications of the antidumping law. In Ruhl's model, each foreign firm has a higher probability of being found guilty of dumping if its price is lower than the average price of domestic firms. As a result, foreign firms increase their prices to decrease the probability of being accused of dumping. Ruhl calibrates the model to match U.S. data and finds that the antidumping policy is equivalent to a 6 percent tariff.

Kadee Russ, an assistant economics professor at the University of California at Davis, provided commentary, noting that the antidump-

ing policy in Ruhl's model with heterogeneous firms induces an inefficiency not present in older models of tariff duties. In those models, antidumping provisions reallocate production toward less-efficient domestic firms. Moreover, Russ noted that production in Ruhl's model is reallocated by the antidumping policy toward less-efficient foreign firms because more-efficient foreign firms will charge higher prices to reduce the probability of being caught dumping. As a result, less-efficient foreign firms can survive. Russ suggested that Ruhl investigate the size of this inefficiency.

Nan Li, an assistant economics professor at Ohio State University and currently at the IMF, presented "Factor Proportions and International Business Cycles," coauthored with Keyu Jin, a lecturer in economics at the London School of Economics. Jin and Li observe that investment is positively correlated across major advanced economies during business cycles. However, this pattern is very difficult to replicate in standard international macro models. When the home country's productivity increases relative to that of the foreign country, investment and production shift from the foreign country to the home country. As a result, investment increases in the home country but decreases in the foreign country, generating negative cross-country investment comovement. Jin and Li call this the "resource-shifting effect."

Jin and Li propose a two-country, multisector model with heterogeneous factor intensities to solve this dilemma. The authors first note that factor intensity (capital-intensive versus labor-intensive) varies significantly across sectors in the data. In response, they propose a two-country model, each with capital- and labor-intensive sectors. When the home country is hit by a favorable labor-productivity shock, its labor-intensive sector expands relative to its capital-intensive sector. As a result, the prices of capital-intensive goods in-

Because of the complicated game theory involved in antidumping models, they represent partial equilibrium and cannot be used to evaluate the aggregate welfare effect of antidumping policy.

crease, encouraging the foreign country to invest more in the capital-intensive sector. In this case, investment rises in both countries following an increase in the home country's productivity. This effect can dominate the resource-shifting effect and generate a positive cross-country correlation of investment, Jin and Li show. The model's results are also consistent with some cross-sectional empirical findings in the data.

Wei Liao, an economist at the Hong Kong Institute of Monetary Research, during her discussion of the paper recommended that Jin and Li estimate their sector-specific shocks more carefully, since their results are highly dependent on shock calibration. In addition, Liao noticed that net exports are positively correlated with output in the model, which is at odds with the data. She also suggested that the authors investigate the correlation between trade balance and output at a sectoral level.

"Threatening to Offshore in a Search Model of the Labor Market" was presented by Sylvain Leduc, a research advisor at the San Francisco Fed. Leduc and his coauthor, David M. Arseneau, an economist at the Federal Reserve Board, examine whether the threat of offshoring significantly affects domestic wages and unemployment, using a two-country labor search model. Many people believe that offshoring hurts the U.S. economy by depressing domestic wages and increasing unemployment. However, the threat of offshoring is not formally modeled in previous studies, making it impossible to evaluate the effect of offshoring on wages and unemployment.

Arseneau and Leduc introduce search frictions—in the manner of Diamond-Mortensen-Pissarides—into the labor market in an open-economy model. In the search framework, employment relationships generate a surplus that must be divided between a worker and a firm. The option of firms to offshore significantly pressures wages downward in the source country. In their calibrated model, Arseneau and Leduc show that the ability of a multinational firm to offshore domestic production lowers the domestic wage by nearly 8 percent, even though the actual amount of offshoring is small (only 1 percent in the model).

Downward pressure of offshoring on domestic wages is largely a short-run effect, Arseneau and Leduc emphasize. In the long run, the impact that the threat of offshoring has on domestic wages is muted considerably when firm entry and the capital stock are allowed to adjust freely.

Bo Chen, an assistant professor of economics at SHUFE, discussed the paper. Arseneau and Leduc's findings highlight the importance of taking transitional dynamics into account when evaluating the effects of offshoring policy, Chen said. He also suggested that the effect of offshoring on domestic wages and employment may depend on whether offshoring is vertical or horizontal in nature.

Session II: International Financial Linkages and Optimal Monetary Policy

The conference's second session showcased studies and panels on cross-country linkages through international financial markets and their implications for conducting monetary policy. Michael Devereux, an economics professor at the University of British Columbia, presented his paper (joint with David Cook of Hong Kong University of Science and Technology) "The Optimal Currency Area in a Liquidity Trap." When a country joins a single currency area such as the euro zone, it loses the ability to depreciate its currency to adjust for a negative demand shock in the country—considered a disadvantage of a single currency area. Devereux and Cook argue that this conventional wisdom no longer holds when a country is in a liquidity trap (that is, when its



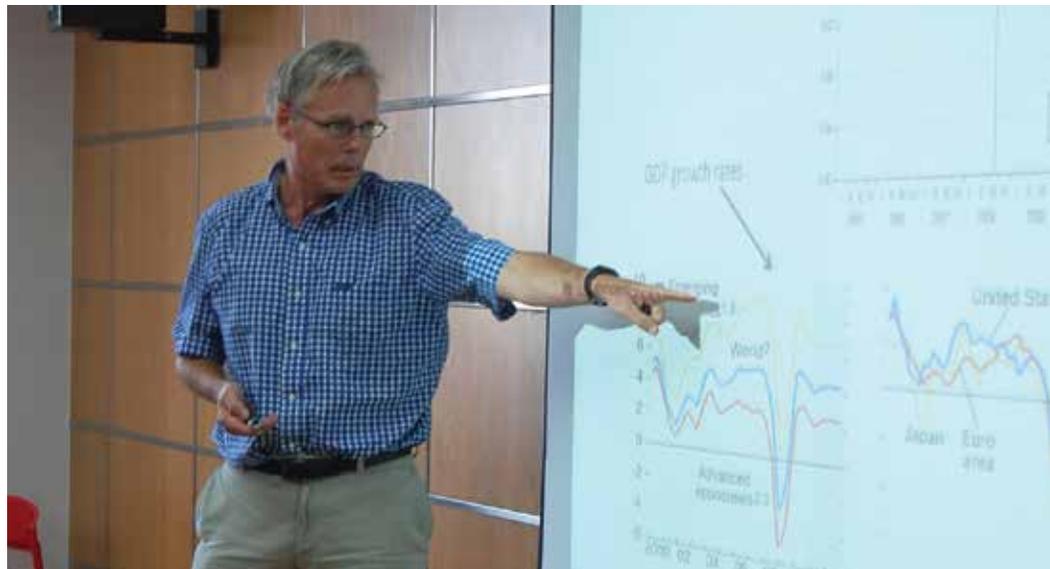
nominal interest rate is at the zero lower bound).

When a country is not in a liquidity trap, its central bank can carry out expansionary monetary policy in response to country-specific adverse demand shocks. For example, the real interest rate declines following a negative demand shock. As a result, the real exchange rate depreciates to help absorb the shock. By contrast, when a country is in a liquidity trap, its real interest rate rises relative to the foreign country because the home country's nominal interest rate cannot be lowered below zero. In this case, the home country's real exchange rate appreciates rather than depreciates, which complicates the response to the shock. Devereux and Cook show that a single currency area can solve this problem for a country in such a scenario. In a standard New Keynesian two-country model, they show that a negative demand shock causes a real exchange rate depreciation independent of whether the country is in a liquidity trap. Devereux and Cook admit that this is not an argument for a single currency area; however, they make the case that their model serves as an illustration that efficient price adjustment is not guaranteed under a flexible exchange rate regime following large demand shocks that may push a country into a liquidity trap.

Kevin Huang, an economics professor at Vanderbilt University, discussed Devereux and Cook's paper. Huang emphasized that transitional dynamics between normal and liquidity-trap environments may be important when evaluating an optimal currency area. For instance, if agents anticipate the possibility of reaching the lower bound in the future, the effects of adverse shocks may be amplified well before the bound is reached.

"International Contagion Through Leveraged Financial Institutions," the second paper of this session, was presented by Eric van Wincoop, an economics professor at the University of Virginia. While the 2008–09 financial crisis originated in the U.S., asset prices and output dropped sharply worldwide. Leveraged financial institutions are believed to have aided the global transmission. Van Wincoop investigated various transmission mechanisms associated with balance sheet losses in a simple two-country model. For realistic parameters, the model cannot account for global transmission of the financial crisis, either in terms of the size of

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Eric van Wincoop of the University of Virginia.

the impact or the extent of transmission.

If leveraged financial institutions weren't the transmission channel, what alternatives existed to account for the 2008–09 financial crisis? Van Wincoop argues that, plausibly, a self-fulfilling spike in risk occurred on a global scale. Due to the prominent role of the U.S. in global financial markets, the crisis in the U.S. in the fall of 2008 prompted fear across countries, which induced a sharp rise in risk. This, in turn, prompted a sharp drop in asset prices, confirming initial fears. Van Wincoop and his coauthors show in another paper that these changes in risk can be self-fulfilling.² This line of theoretical research is consistent with recent empirical findings that changes in sentiment may be important in driving business cycles.³



Scott Davis of the Federal Reserve Bank of Dallas.

According to standard international models, households in fast-growing economies should borrow to finance current consumption and repay the money in the future when they become relatively wealthier.

Scott Davis, an economist at the Dallas Fed, discussed the paper. Allowing for a closed-form solution for the extent of international contagion is one advantage of van Wincoop's paper, Davis said. However, several simplifications must be made to solve for such a solution. The payoff of the long-term assets in the model does not depend on the history of default, Davis noted, arguing that the global transmission of the financial crisis would be stronger if the model relaxed this simplification.

The session's last paper, "Exchange Rate Pass-Through, Firm Heterogeneity and Product Quality," by Zhi Yu of SHUFE, explored how exchange rate pass-through (ERPT) depends on firms' productivity heterogeneity and product quality differentiation. ERPT refers to the percentage change in a country's prices responding to a 1 percent exchange-rate change. According to the literature, ERPT is less than 1 in the data. Yu proposes a model with variable markup and product quality differentiation. In his model, the optimal price that a firm charges is a variable markup over a constant cost. When the exchange rate changes, the firm's profit margin will change as it passes along only part of exchange-rate movements. The firm can also adjust for the quality of its products in response to exchange-rate movements, further providing incomplete ERPT. Yu proposes using Chinese export data in model estimates.

Deokwoo Nam, an assistant economics professor at City University of Hong Kong, discussed Yu's work. Nam praised the theoretical analysis in the paper but expressed concern about model estimates using the Chinese export data. China allowed some exchange-rate flexibility only after 2005, potentially making the sample period too short for use in Yu's model.

Session III: Exchange Rates, Optimal Monetary Policy and the Chinese Economy

Ken West, an economics professor at the University of Wisconsin–Madison, presented "Global Interest Rates, Monetary Policy and Currency Returns" (joint with Charles Engel and Mian Zhu of the University of Wisconsin–Madison). In most open-economy macro models, monetary policy influences exchange rates through its effects on expected current and future real interest rates.

However, monetary policy may also influence exchange rates by affecting expected current and future excess returns. Engel, West and Zhu empirically examine these effects in their paper.

Most theoretical open-economy macro models assume that the uncovered interest-rate parity (UIP) condition holds. Under this setup, the real exchange rate is determined by the expected current and future real interest rate differentials between the home and foreign countries. Monetary policy affects the real exchange rate through its influence on the real interest rate. However, the failure of UIP is well documented in the data. In this case, the real exchange rate is driven by both real interest rate differentials and excess returns. Therefore, the effect of monetary policy on the real exchange rate can occur through either the real interest rate or the excess returns channel. Engel, West and Zhu implement an empirical method to study the effects of these two channels on U.S. real exchange rates relative to the G-7 countries and Switzerland. They find that surprise monetary tightening raises current and expected real interest rates, which appreciates the currency. This finding is consistent with the standard open-economy macro models. However, the effect of monetary shocks on excess returns differs from currency to currency.

Shu Lin, an economics professor at Fudan University, discussed the paper, suggesting that the authors consider different monetary policy rules to estimate monetary shocks. In addition, he noted that a country's monetary policy regime may have changed throughout the sample period. As a result, the authors may want to identify these breaks using econometric methods explored in the literature.

The last two papers of the conference were devoted to understanding the Chinese economy. China has recently overtaken Japan as the world's second-largest economy in terms of gross domestic product. A better understanding of China's economy helps explain its impact on the global economy. Nelson Mark, an economics professor at Notre Dame University, presented the paper "Demographic Patterns and Household Saving in China" (joint with Chadwick C. Curtis and Steven Lugauer of Notre Dame University). China's household saving rate is high and has risen over the past three decades. This pattern is at odds with China's rapid economic growth during the same period. Accord-

ing to standard international models, households in fast-growing economies should borrow to finance current consumption and repay the money in the future when they become relatively wealthier.

Curtis, Lugauer and Mark argue that demographic patterns in China can explain high and rising household savings. Following China's one-child policy in the late 1970s, the age distribution of the Chinese population has changed dramatically. Curtis, Lugauer and Mark highlight three channels in their model to explain China's high saving rate. First, the decline in the number of dependent children following the one-child policy has freed up household resources for saving. Second, the share of the prime working age group (ages 20–63) in China has increased from 46 percent in 1970 to 65 percent today. The prime working age group is net savers; thus, a population increase will raise the aggregate saving rate. Third, the number of retirees per worker is expected to increase sharply in China because of the one-child policy. As a result, current workers must save more to support their future retirement.

Kang Shi, an assistant economics professor at the Chinese University of Hong Kong, discussed Curtis, Lugauer and Mark's paper, noting that high household saving rates are an interesting phenomenon, but household savings played a limited role in China's rising aggregate savings and current account surplus. Indeed, corporate and government savings accounted for most of the increase in China's aggregate savings and its current account surplus in the past decade.

The final paper of the conference was "A Model of China's State Capitalism," presented by Yong Wang, an assistant professor of economics at Hong Kong University of Science and Technology (joint with Xi Li and Xuewen Liu of Hong Kong University of Science and Technology). A striking feature of China's economy in the past decade is the sharp profits rise among state-owned enterprises (SOEs). The profit margin of SOEs, measured by the ratio of total profit to sales revenue, was lower than that of private enterprises in the 1990s. However, this pattern reversed in the 2000s, an interesting finding considering that SOEs are usually believed to be less efficient than their private counterparts, based on empirical evidence. In addition, the profits of China's SOEs are also highly

correlated with exports, though SOEs account for a very small share of Chinese exports.

Li, Liu and Wang propose a model with vertical economic structure to explain these findings. They argue that China's SOEs monopolize upstream industries, while downstream industries are largely open to private competition. Examples of upstream industries include energy and telecommunications, which have government-imposed entry barriers and are shielded from private competition from both home and foreign firms. Downstream industries, such as textiles and clothing, are internationally traded and subject to international competition. Following China's accession to the WTO in 2001, these downstream industries expanded rapidly due to China's comparative advantage in producing labor-intensive, manufactured goods. As a result, upstream SOEs increased profits by using their monopoly power to extract greater returns from downstream exporting firms. Li, Liu and Wang argue that China should remove entry barriers in its upstream industries to allow private competition in order to maintain long-run economic prosperity.



What happens in the U.S. not only affects foreign economies through trade and financial markets, but also changes sentiment in foreign countries.

Jian Wang, discussant of Li, Liu and Wang's paper, noted that their model is likely realistic of the Chinese economy. He advised, though, that data may be required to verify several of the model's assumptions. For example, Wang mentioned that upstream and downstream industries should be more carefully defined and compared with the data. Li, Liu and Wang assumed that high profits in the upstream industries are due to government-imposed entry barriers. However, there could be other reasons. Wang suggested that the authors do a cross-country comparison to verify their assumption.

Conclusion

The two-day conference examined international linkages of economies through the channels of international trade, offshoring and financial markets. Their implications for monetary policy were discussed, and conference participants also exchanged views on current issues in the global economy.

Two overarching questions emerged from the conference: First, what are the mechanisms of international transmission of shocks from one country to another? Second, what is the role of monetary policy in such transmission channels?

Standard international macro models usually fail to replicate international comovement of investment and output. Unless one assumes an unrealistically high correlation of shocks, these models usually generate small or even negative

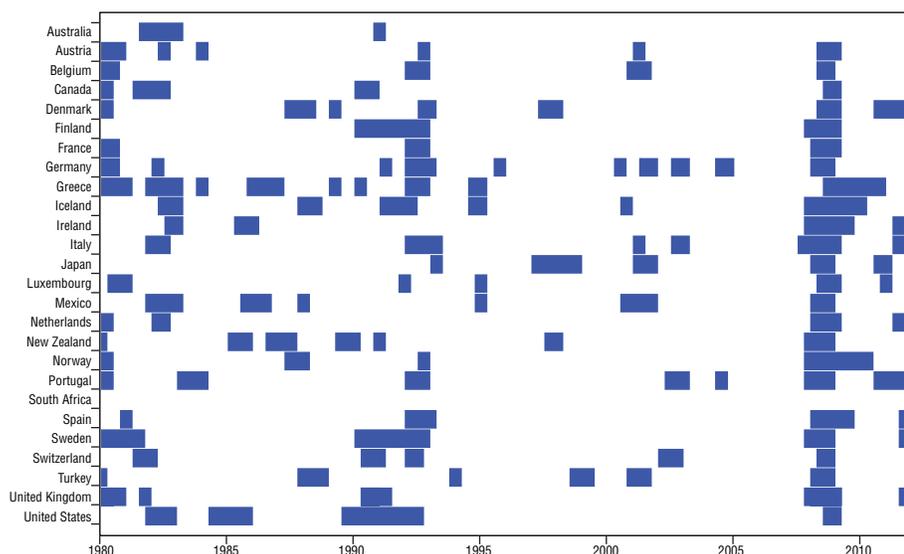
cross-country correlation of investment and output. By comparison, investment and output are highly correlated in the data, especially among advanced economies. Such discrepancies between the model and the data cast serious doubt on policy recommendations based on such models. This problem became more pronounced following the recent global financial crisis, when the global economy experienced a remarkably synchronized recession among most major economies (*Chart 1*). Most studies focus on either trade or financial linkages to reconcile the model and the data. For instance, Jin and Li's paper uses heterogeneous factor intensities in the tradable goods sector to increase the cross-country correlation. Van Wincoop's paper lists studies using leveraged financial institutions to generate cross-country correlation.

Despite advances in these studies, several questions remain in the literature. For both trade and financial channels, the cross-country spillover of shocks seems much larger than what can be justified by the size of the trade and the extent of cross-country holdings of financial assets. For example, in Jin and Li's paper, all goods are assumed to be tradable. Van Wincoop shows that given the extent of international asset holdings in the data, various models fail to replicate the international transmission of the financial crisis.

For the future, at least two avenues of study appear promising. First, strategic interactions between domestic and foreign markets may have played an important role in the cross-country comovement even though actual trade is limited. As discussed by Arseneau and Leduc, the threat of offshoring has significant effects on domestic wages even if the actual offshoring is small. Maybe such interaction could provide a new channel for cross-country transmission of shocks.

Second, as van Wincoop offered at the conference, changes in self-fulfilling expectations may have been instrumental in cross-country comovement. What happens in the U.S. not only affects foreign economies through trade and financial markets, but also changes sentiment in foreign countries. As a result, economies are more correlated than can be justified simply by direct channels such as trade and financial markets. This story is consistent with Jian Wang's recent work on news shocks and changes in sentiment driving

Chart 1

Recession Appears Synchronized in 2008–09

NOTE: Bars indicate contraction (peak to trough).

SOURCES: Organization for Economic Cooperation and Development; author's calculations.

U.S. business cycles.⁴

Another issue several papers discussed is the role of an exchange rate in transmitting the effect of monetary policy. In standard, open-economy monetary models, an important channel for the international transmission of monetary shocks is through the UIP condition. Devereux and Cook examine a case in which the nominal interest rate is at its zero lower bound. They find that a flexible exchange rate is destabilizing in response to demand shocks in this case. This contradicts the conventional wisdom that exchange rate movements can help absorb demand shocks.

However, UIP's failure in the data is well documented. Engel, West and Zhu empirically investigate effects of monetary shocks on exchange rates through both the UIP condition and excess returns. They find that the excess-returns channel is quite different from the UIP channel. Indeed, exchange-rate movements in the data are mainly driven by fluctuations in excess returns. Therefore, it is important to develop a better understanding of how monetary shocks interact with excess returns. Future empirical and theoretical studies addressing these topics should further an understanding of the many ways that economies are connected on a global level.

Notes

¹ For example, see "Durable Goods and the Collapse of Global Trade," by Jian Wang, Federal Reserve Bank of Dallas *Economic Letter*, vol. 5, no. 2, February 2010.

² See "Self-Fulfilling Risk Panics," by Philippe Bacchetta, Cedric Tille and Eric van Wincoop, *American Economic Review*, vol. 102, no. 7, 2012, pp. 3674–700.

³ For instance, see "Do Mood Swings Drive Business Cycles and Is It Rational?," by Paul Beaudry, Deokwoo Nam and Jian Wang, Federal Reserve Bank of Dallas, Globalization and Monetary Policy Institute Working Paper no. 98, December 2011, and NBER Working Paper no. 17651, November 2011.

⁴ See note 3.