Globalization and Monetary Policy Institute

2012 ANNUAL REPORT • FEDERAL RESERVE BANK OF DALLAS

Contents

Published by the Federal Reserve Bank of Dallas, March 2013.
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Letter from the **President**

As 2012 drew to a close, the popular media were full of stories about supposed ancient Mayan predictions of the world ending in December 2012. The world did not literally end, of course, but the world in which many of us came of age, where economic activity was predominantly concentrated in the United States and Western Europe, is undergoing an end of a different sort: Sometime in 2013, the share of global economic activity accounted for by emerging market economies—measured on a purchasing-power-parity basis—will exceed that of the so-called advanced economies for the first time.

The forces of globalization unleashed in the 1990s have seen the global center of economic gravity shift. To the extent that it ever made sense to think of the United States as a closed economy, such a worldview is no longer tenable. International trade is more important to us now than it was 50 years ago. We remain a nation of immigrants, and our institutions of higher learning continue to attract the best and the brightest from around the world. We invest massive amounts overseas, even as we borrow to finance private and public consumption. Indeed, arguably the ability to borrow large amounts from overseas was instrumental in facilitating the excesses preceding the recent financial crisis.

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Five years ago the Dallas Fed established the Globalization and Monetary Policy Institute to gain a better understanding of these trends. The five-year anniversary seems a good point at which to take stock of what we have learned and where we need to focus our future research. The lead article in this year's annual report outlines some emerging themes in the institute's research program, summarizing many (but not all!) of the 137 working papers that institute staff and affiliated researchers have produced over the past five years (through January 2013).

We embarked on this research program without preconceived answers, but rather in the spirit of promoting rigorous economic research in international trade, finance and macroeconomics. I believe we have been successful and look forward to building on that success over the next five years.

Richard W. Fisher
President and CEO
Federal Reserve Bank of Dallas

Five Years of Research on Globalization and Monetary Policy: What Have We Learned?

By Mark Wynne

It has long been known that free trade contributes to higher standards of living over time.

Five years ago the Federal Reserve Bank of Dallas created the Globalization and Monetary Policy Institute to promote research that would help us better understand the implications of globalization for the conduct of monetary policy in the United States. We are now half a decade into this research program, and the institute's 2012 annual report is a fitting place to assess what has been accomplished over the past five years. The 2007–09 global financial crisis, from which the world economy is still recovering, shifted a lot of attention from the broad topic of globalization to thinking about the causes and consequences of the financial crisis.[1] However, the excesses (or imbalances) that facilitated the global financial crisis were a manifestation of financial globalization, and real globalization (in the form of trade linkages) was pivotal in the transmission of the crisis from the advanced economies to the emerging-market economies. Likewise, the contours of the policy response to the crisis were dictated by globalization. Never before have central banks had to create such extensive foreign exchange swap lines to stabilize the financial sector.

Globalization has not gone away, and the policy challenges it presents remain. In this essay, I will summarize some key research themes that have emerged in the institute's work.

When globalization began to attract attention, there was a widespread perception that its impact on inflation in advanced economies was in one direction only—downward. Yet the first paper we released as part of this research program, Evans (2007), argued to the contrary, namely that greater openness to international trade could be associated with higher equilibrium inflation. While Evans' result reflects in part the details of his modeling strategy, what now seems clear is that the impact of globalization on inflation is more subtle than first thought. The "tailwinds" of lower prices of manufactured goods produced in the rapidly growing emerging-market economies are offset by the "headwinds" these countries generate on commodity prices as a result of their voracious demand for raw materials.[2]

It has long been known that free trade contributes to higher standards of living over time. But the form that free trade takes may matter also. International trade flows made up primarily of durable goods have very different implications for how the world economy responds to shocks than do trade flows of nondurable goods. The channels through which globalization affects U.S. living standards are many and varied. For example, Cavallo and Landry (2010) show that imports of capital goods have been an important contributor to U.S. growth since 1967, contributing between 20 and 30 percent to growth in U.S. output per hour.

Before proceeding, it is worth highlighting some of what we have learned over the past five years. When Federal Reserve Bank of Dallas President Richard Fisher delivered the Warren and Anita Manshel Lecture in Foreign Policy at Harvard University in November 2005, he posed the questions: "How can economists quantify with such precision what the U.S. can produce with existing labor and capital when we don't know the full extent of the global labor pool we can access? Or the totality of the financial and intellectual

capital that can be drawn on to produce what we produce? As long as we are able to hold back the devil of protectionism and keep open international capital markets and remain an open economy, how can we calculate an 'output gap' without knowing the present capacity of, say, the Chinese and Indian economies? How can we fashion a Phillips curve without imputing the behavioral patterns of foreign labor pools?"

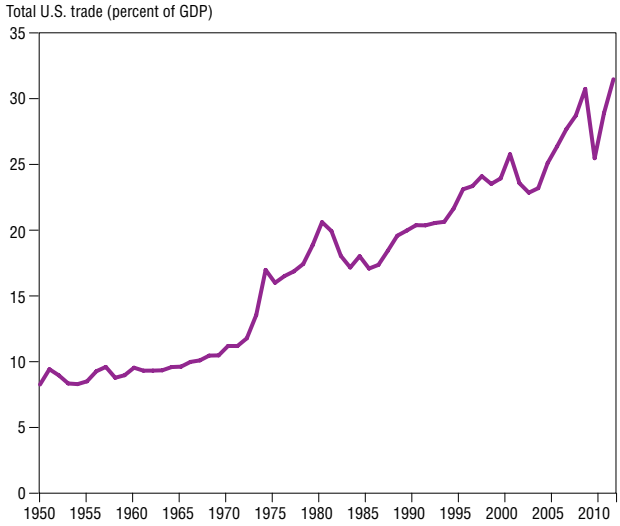
Put differently, is the concept of slack that is relevant for short-term inflation dynamics in an open economy domestic or global? When we began developing this line of argument, we met with some skepticism. However, our work over the past five years has shown that it has substantive content, even if the empirical evidence has been fragile.[3]

A second key thing we have learned is the importance of the international financial system in propagating and amplifying shocks. We also know that the form financial integration takes (whether through debt or equity market integration) matters for the extent to which economic activity comoves across countries. Global dynamics do not necessarily emerge from common shocks but could result from the international transmission of country-specific shocks. This has major practical implications—not just for business-cycle synchronization, but also for the conduct of optimal monetary policy. After all, we cannot insure against common shocks, but country-specific shocks, in principle, could be insured against. The main policy debate in that regard is whether "insuring against them" can be attained in a competitive environment where each country sets policy for itself or whether it requires some degree of policy coordination at a supranational level.

We have developed a more nuanced understanding of exchange rates and exchange rate mechanisms. We understand now that flexible exchange rates per se will not insulate a country from foreign conditions, and we have a better grasp of the important role that international pricing behavior has on the macro effects of country-specific shocks and their transmission across countries.

Chart 1

Evolution of International Trade in the U.S.



SOURCE: Bureau of Economic Analysis.

At a more general level, we have a better understanding that in many circumstances it is misleading to look at the global economy as the sum of its constituent parts. We know that economic conditions and policy actions in one country could be amplified (or dampened) depending on the feedback from their impact on the global economy. And that, in turn, depends on the linkages (financial as well as through trade, immigration, information, etc.) across countries.

Globalization of the U.S. Economy

The basic facts about globalization are well known.[4] Over the past six decades, the share of imports in U.S. gross domestic product (GDP) has increased from just over 4 percent for much of the 1950s and 1960s, to around 10 percent for much of the 1980s and early 1990s, to an average of 16.5 percent during the years 2005–11. Over the same period, exports as a share of GDP have grown by a comparable order of magnitude. Chart 1 shows the evolution of the international trade sector relative to the size of the U.S. economy. Perhaps the single greatest manifestation of international trade's increased importance for the U.S. economy is the ubiquity of the "made in China" label on many of the manufactured goods we now buy. Accounting for less than 1 percent of U.S. imports in the 1970s, imports from China alone now make up almost one quarter of U.S. imports. Over the past two decades, China has become the workshop of the world, stripping the U.S. in 2010 of its mantle as the world's largest manufacturing country.[5] Meanwhile, China's economy has grown at such a rapid pace that it is now the world's second-largest economy and will, in all likelihood, overtake the U.S. economy in size sometime in the next decade.[6]

The flood of cheap manufactured goods from China and other emerging-market economies is far from the only or even the most important aspect of globalization. As trade volumes grew in recent decades, so did international flows of capital. The United States' total foreign assets increased from $961 billion in 1982 to $21 trillion in 2011; as a share of GDP, our foreign assets increased from 29.5 percent in 1982 to 139 percent in 2011. At the same time that we were investing overseas, we

were borrowing comparably large amounts: Our foreign liabilities increased from $722 billion in 1982 to $25.8 trillion in 2011, or from 22.2 percent of GDP to 171 percent of GDP. In 1989 the U.S. went from being a net creditor to the rest of the world to being a net debtor.

And finally, both actual and virtual flows of labor have been important to the U.S. economy in recent decades. The so-called second great migration saw the foreign-born share of the U.S. population increase from just under 3.5 percent in 1970 to 12.9 percent in 2010; in absolute numbers, there are now more foreign-born in the U.S. than during the great migrations of the late 19th and early 20th centuries. Virtual migration—through outsourcing of certain tasks previously performed in the U.S.—has become important also, although the exact number of U.S. jobs outsourced to other countries is difficult to measure.

Measuring globalization is tricky. Traditionally, we look to trade or financial flows to quantify the degree to which a country is globalized. However, as O'Rourke and Williamson (1999) point out, a better approach is to focus on prices and the extent to which prices paid within a country deviate from world prices. In the absence of barriers to trade—whether natural or man-made—the law of one price should hold. In a seminal paper, Engel and Rogers (1996) document deviations from the law of one price in consumer prices in U.S. and Canadian cities and reveal a significant border effect. That is, there are greater price differences between two cities located in different countries than between two equidistant cities located in the same country.

Other researchers have looked at the prices of standardized commodities to measure deviations from the law of one price or market segmentation. The Big Mac hamburger sold by McDonald's is one such product. For many years, *The Economist* newspaper has tracked the prices of Big Macs in different countries to provide a rough guide to exchange rate overvaluation or undervaluation. Landry (2011) uses the data from *The Economist* to assess price variations across cities within countries as well as across national borders. He shows that price differences across the U.S. are greater than those observed across international borders. Crucini and Yilmazkuday (2009) develop a model of international cities to quantify the relative importance of trade costs and distribution (retail) margins in accounting for deviations from the law of one price in *The Economist* data. They find that for the median good in their sample, trade costs account for 50 percent of the variance of long-run deviations from the law of one price, while distribution costs account for only 10 percent.[7] The importance of nontraded goods such as retail inputs in accounting for deviations from the law of one price for final goods is explored further by Crucini and Landry (2012). Crucini and Davis (2013) show that frictions in distribution can make the import demand elasticity time-varying. Imports and domestic goods may be close substitutes, implying a high import demand elasticity, but if inputs used in distribution are slow to adjust, then the actual import quantities may be slow to change following a change in international relative prices like a change in the nominal exchange rate.

Another apparent deviation from the law of one price is the positive correlation that some researchers have documented between the prices of tradable consumption goods and per capita incomes. That is, identical products sell for higher prices in rich countries than in poor countries. Simonovska (2010) proposes an explanation for this based on price discrimination by monopolistically competitive firms selling to consumers with variable price elasticities of demand. Berka and Devereux (2010) also find substantial and persistent deviations from the law of one price in Europe, even among the countries of the euro zone, and find that the deviations are very closely tied to relative per capita GDP levels.

But using price data to quantify the extent of market integration is not without its problems, as Mutreja et al. (2012) point out. They show that

even when prices are equalized across countries, significant barriers to trade may exist, and they argue that information on actual trade flows is also needed to infer whether markets are integrated.

International Pricing

Assessing the degree of globalization by looking at prices leads naturally to thinking about how globalization impacts firms' pricing decisions. Auer and Fischer (2008) look at how international trade with labor-abundant nations such as China, India, Indonesia and Brazil affect the pricing behavior of U.S. firms. They look at the period from 1997 to 2006 and show that when exporters from these countries capture a 1.0 percent market share in the U.S., producer prices decline by 3.1 percent. Most of the decline is accounted for by a 2.4 percent increase in productivity and a 0.4 percent decline in markups. Auer, Degen and Fischer (2010) look at the same issue from a European perspective and show that import competition from low-wage countries has strong price effects there as well, especially in the more-advanced countries of western Europe.[8] For example, when Chinese exporters capture a 1 percent share of a European market, producer prices in that market decline by about 2 percent. Moreover, they find that the effect is greatest for imports from China: Import competition from low-wage countries in central and eastern Europe does not appear to have a negative effect on western European producer prices. De Blas and Russ (2010) develop a theoretical model to illustrate the mechanism that causes markups to fall in the wake of trade liberalizations.

Competition from imports limits the pricing power of domestic producers and thereby affects inflation dynamics. Imports also have a more direct effect on overall price developments as imports make up a larger share of the consumption basket. Firms selling into foreign markets where a different currency is used need to factor exchange rate developments into their pricing decisions. When exchange rates change, import prices or profit margins change also. Exchange rate pass-through to import prices and final goods prices is one of the most important questions in international macroeconomics. From a theoretical perspective, the work of Martínez-García (2007) shows that the endogenous dynamics of flexible exchange rates as well as the exchange rate pass-through on prices will be different depending, among other things, on the pricing behavior of firms.

Amstad and Fischer (2009) look at the question of pass-through of exchange rate changes from import prices to consumer prices but use a novel (event-study) approach to come up with estimates. They find that the monthly pass-through ratio is about 0.3; that is, for each percentage point change in the exchange rate, about 0.3 percent is passed through to consumer prices within a month. Auer (2011) focuses on the appreciation of the renminbi between 2005 and 2008 to derive estimates of pass-through and finds pass-through estimates of exchange rate movements to import prices of about 0.8. Pass-through to U.S. consumer prices is lower, at 0.56. Auer also finds that exchange rate movements of other U.S. trade partners have much smaller effects on U.S. import prices and hardly any effect on U.S. producer prices. Based on his findings, he simulates the effect of a 25 percent appreciation of the renminbi over 10 months and shows that it would be equivalent to a temporary increase in the U.S. Producer Price Index (PPI) inflation rate of about 5 percentage points.

Kim et al. (2013) use microdata on U.S. import prices to examine pass-through during the renminbi's 2005–08 appreciation. An and Wang (2011) use a vector autoregression model with sign restrictions to identify exchange rate shocks to examine pass-through rates to import, consumer and producer prices in nine member countries of the Organization for Economic Co-operation and Development (OECD). They find that pass-through is incomplete at both short and long horizons and that pass-through is greatest for import prices and smallest for consumer prices.

Competition from imports limits the pricing power of domestic producers and thereby affects inflation dynamics.

They also show that pass-through rates depend on other features of an economy. Specifically, pass-through rates are higher the smaller the economy, the greater the share of imports, the more persistent are exchange rate movements, the more volatile is monetary policy and the higher the inflation rate.

Auer, Chaney and Sauré (2012) show that, in the European car market, exchange rate pass-through is larger for low-quality cars than it is for high-quality cars and develop a model to account for this observation. Auer and Schoenle (2012) further explore the role of market structure in accounting for incomplete exchange rate pass-through and show—using microdata on U.S. import prices—that pass-through following movements in the U.S. dollar is up to four times greater than pass-through following movements in the currency of U.S. trade partners. They also show that pass-through following movements in the currency of a U.S trade partner is greater, the greater the trade partner's sector-specific market share. Baxter and Landry (2012) use a novel dataset of prices set by IKEA to examine pass-through and find that pass-through rates are low (of the order of 0.14 to 0.30) but higher for new goods than for goods already in the catalogs. IKEA is, of course, the quintessential example of a multiproduct firm operating in many different international markets.

Bhattarai and Schoenle (2011) document some stylized facts about how multiproduct firms set prices using microdata from the U.S. PPI. One of their key findings is that firms that sell more goods tend to adjust their prices more frequently than firms that sell fewer goods. However, the firms that sell more goods also tend to adjust their prices on average by smaller amounts. Furthermore, price changes tend to be very synchronized in multiproduct firms, and this synchronization tends to increase as the number of goods sold by a firm increases.

These findings on pass-through raise the question of how we might account for them. Auer and Chaney (2009) develop a model of quality pricing to show why exchange rate pass-through might not be complete. In their model, exporters sell goods of different qualities to consumers who have different preferences for quality. The issue of pricing and pass-through is also addressed by Landry (2009) using a two-country version of the state-dependent pricing model of Dotsey, King and Wolman (1999). He shows that the assumption of state-dependent pricing—as opposed to the more widely used assumption of time-dependent pricing—allows the model to better match important features of the aggregate data.

The Global Slack Hypothesis

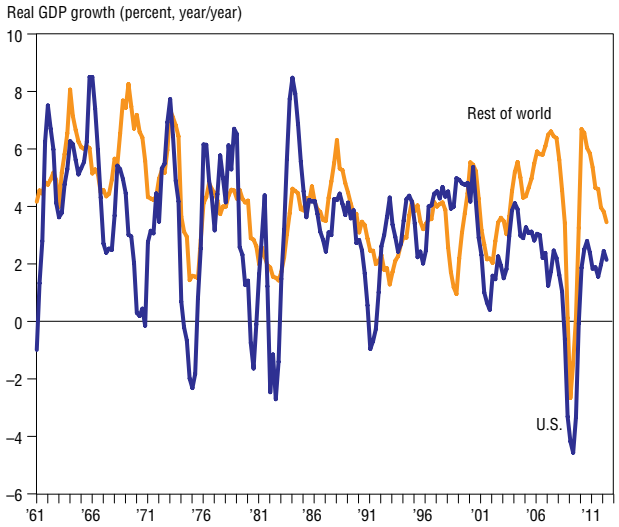
The debate about globalization and monetary policy—and specifically, about how globalization might impact inflation dynamics—received a major boost from the working paper by Borio and Filardo (2007), which showed that in addition to depending on domestic slack, inflation in many advanced countries seemed to be responsive to measures of global slack as well. Subsequent research by Ihrig et al. (2007) raised questions about the empirical robustness of Borio and Filardo's findings, and some questioned whether the notion of domestic inflation depending on foreign resource utilization even made sense from a theoretical perspective. Milani (2009b) examines the empirical content of the global slack idea for the U.S. and finds that globalization can only explain a small portion of the decline in the slope of the U.S. Phillips curve. He also finds that the sensitivity of U.S. inflation to global output is small. Milani (2009a) also investigates the global slack hypothesis for the G-7 countries and finds little evidence in favor of Phillips curve specifica-

tions that include measures of global slack as a driving variable. However, he does find some evidence that global output has a significant effect on aggregate demand in most countries he looks at and, through this channel, on domestic inflation dynamics. Calza (2008) also finds little evidence in favor of the global slack hypothesis using quarterly data for the euro area from 1973 through 2003.

Guilloux and Kharroubi (2008) examine globalization's impact on inflation in a panel of OECD countries from 1980 to 2005. They show that the extent to which domestic consumer price index (CPI) inflation depends on the domestic output gap declines as intra-industry trade becomes more important. Martínez-García and Wynne (2012) present some evidence in favor of the global slack hypothesis for the U.S. They find that U.S. inflation at an annual frequency has become less responsive to domestic slack (measured as the cyclical component of U.S. GDP) since 1990. From 1979 through 2010, there is a more significant relationship between U.S. inflation and slack in the rest of the world than between U.S. inflation and slack in the U.S. But they also document a puzzle—the relationship between measures of foreign slack and U.S. inflation seems to be weaker since globalization kicked into high gear (that is, post 1990) than in the period before.

Martínez-García and Wynne (2010) seek to shed some light on these debates. Working with the somewhat more general (albeit still very stylized) version developed in Martínez-García (2008) of the benchmark open-economy New Keynesian model that is widely used in central banks around the world, they derive four important results. First, in theory at least, CPI inflation in an open economy does depend on the foreign output gap as well as the domestic output gap. Second, the importance of the foreign output gap as a driver of domestic CPI inflation increases the more the domestic country imports. Third, under producer currency pricing, one can write the Phillips curve for domestic CPI inflation either in terms of the domestic and foreign output gaps or with a domestic output gap and a terms-of-trade variable. That is, at least under certain assumptions about how firms set prices internationally, the terms of trade ought to fully capture all foreign influences on domestic inflation. Finally, the concept of the output gap that is consistent with New Keynesian theory bears little or no relationship to the output gaps as conventionally measured using statistical approaches. These four key findings in Martínez-García and Wynne (2010) have important implications for the empirical literature on globalization and inflation and how foreign activity should be captured in empirical Phillips curve relationships. Martínez-García, Vilán and Wynne (2012) explore how one might take a fully articulated general equilibrium model to the data that would allow an examination of the role of a theory-consistent measure of the (global) output gap as a driver of inflation dynamics.

Chart 2
Synchronization of Business Cycles



SOURCES: Bureau of Economic Analysis; International Monetary Fund; Organization for Economic Cooperation and Development; national sources; author's calculations.

International Transmission and Business Cycles

With greater economic integration, it is inevitable that what happens in one part of the world will have implications for the rest of the world through financial, trade and other linkages. Chart 2 shows how economic activity in the U.S. and the rest of the world tends to move together over the business cycle. In the recent financial crisis, economic activity contracted in the U.S. and around the world. However, after the crisis, economic activity has tended to recover a lot more rapidly in the emerging-market economies than in the advanced economies.

López (2007) examines the role that production sharing through the Mexican maquiladora industry plays in the synchronization of business cycles between Mexico and the U.S. manufacturing sector. He shows how a standard, two-sector, open-economy, real business-cycle model can match key features of the data for the Mexican maquiladora sector. Arkolakis and Ramanarayanan (2008) look at the impact of vertical specialization—that is, trade in goods across multiple stages of production—on business-cycle synchronization across countries. Intuitively, one might expect that

Globalization also increases the global impact of domestic policy actions in response to a crisis.

greater trade volumes between countries would lead to greater synchronization of business cycles, but Arkolakis and Ramanarayanan find that additional features are needed to fully account for the degree of synchronization observed in the data. Martínez-García and Søndergaard (2008) investigate the role of capital accumulation in smoothing consumption and buffering a country from external shocks. They argue that the costs of building new capital and the nature of foreign shocks can affect to what extent this channel can help insulate a country and lead to more synchronized cycles. Davis and Huang (2010) highlight the importance of strategic pricing by firms selling in domestic and foreign markets in generating comovement of production and investment in different countries.

Of particular interest in the wake of the financial crisis of 2007–09 is the role the international financial system plays in transmitting shocks across national borders. Devereux and Yetman (2010) show how the presence of binding leverage constraints (that is, limits on the ability of households and firms to borrow) can create important new channels for the international transmission of shocks through the financial sector. Importantly, they show that the interaction of these constraints with diversified portfolios creates a powerful financial transmission mechanism for shocks that is independent of the size of linkages through international trade channels. Martínez-García (2011) highlights the importance of the persistence of shocks in assessing the role of international asset market incompleteness. His research suggests that asset market incompleteness has more sizeable wealth effects on the equilibrium allocation whenever the cycle is driven by persistent investment-specific technology shocks (that is, shocks that affect the shadow price of productive capital). Ueda (2010) examines the role of global banks that engage in cross-border borrowing and lending in the international transmission of shocks. In Ueda's model, business-cycle synchronization increases as financial globalization intensifies.

Globalization also increases the global impact of domestic policy actions in response to a crisis. Davis (2011) shows that the form of international financial integration matters for the degree of business-cycle comovement. Specifically, he shows that cross-border credit market integration through debt markets has a positive effect on business-cycle comovement, while cross-border capital market integration through debt markets has a negative effect. The role of global banks in transmitting shocks across national borders in the recent financial crisis is also investigated in Kollmann, Enders and Müller (2011). They find that while bank capital requirements have little effect on the international transmission of shocks and that loan defaults have a negligible contribution to business-cycle fluctuations under normal circumstances, an exceptionally large loan loss in one country will induce contractions in economic activity in all countries. This issue is explored further in Kollmann (2012), who shows that during the Great Recession, banking shocks accounted for about 20 percent of the decline in real economic activity in the U.S. and the euro area.

The issue of the international transmission of shocks during the recent financial crises (the global financial crisis in 2007–09 and the European sovereign debt crisis in 2010–11) is examined at length in Chudik and Fratzscher (2012). They study the transmission of liquidity shocks and risk shocks and find that emerging-market economies were much more adversely affected during the global financial crisis than during the European sovereign debt crisis.

Yet another potential channel for transmission of shocks across national borders is the operations of multinational firms. Kleinart, Martin and Toubal (2012) use microdata on firms operating in France to show that the presence of foreign affiliates increases the comovement of economic activity between the region of the affiliate and the affiliate's country of ownership.

Migration

One of the more interesting channels

through which economic developments in one country are transmitted to other countries is through emigrants' remittances. An estimated 11.7 million Mexican nationals live in the U.S., and each year this community sends between $20 billion and $25 billion in remittances back to Mexico.[9] Similar flows occur between many other pairs of countries with large immigrant populations (for example, Germany and Turkey). Coronado (2009) looks at how these remittance flows change over the course of the business cycle, focusing on the flows from the U.S. to Mexico and El Salvador, and from Germany to Turkey. He shows that remittances tend to go up when economic conditions in the immigrants' home country deteriorate. Interesting, remittances from the U.S. to Mexico seem to also go up when the U.S. economy contracts, while the remittance flow from the U.S. to El Salvador and from Germany to Turkey declines when economic activity in the U.S. and Germany declines.

Fischer (2009) looks at a different aspect of immigrants' interaction with their host country—their currency use. Contrary to what might be expected, he finds that demand for high-denomination Swiss banknotes is actually lower in cities with large immigrant-to-native ratios, and he attributes the use of large-denomination banknotes to tax avoidance by natives. Fischer (2011) looks at yet another dimension of how immigrants interact with their host countries, namely via the housing market. Other things being equal, one would expect an inflow of immigrants to put upward pressure on housing prices. Fischer asks if it matters whether the immigrants come from a country that uses the same language as the host country, the idea being that immigrants from a non-common-language country are less price sensitive than immigrants from a common-language country. Using Swiss data, he finds that an immigrant inflow from a non-common-language country equal to 1 percent of an area's population is associated with a 4.9 percent increase in the price of single-family homes, whereas an immigrant inflow from a common-language country appears to have no statistically significant effect on house prices.

Optimal Monetary Policy

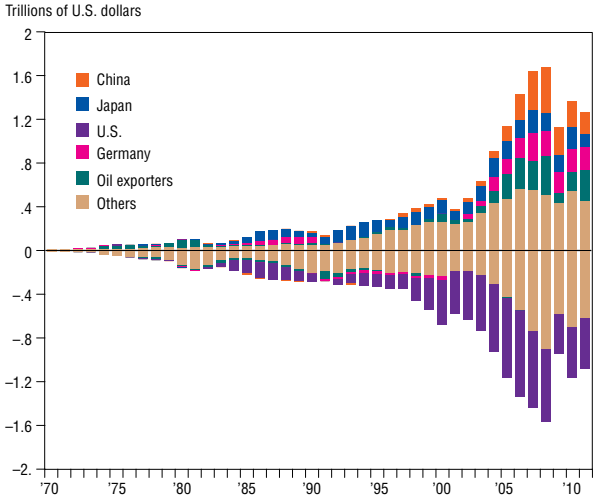
The traditional specification of the Taylor rule has central banks setting monetary policy as a function of the domestic output gap and the deviation of domestic inflation from target. However, it might be argued that in a more open economy the central bank should respond to more variables, such as the exchange rate.

Engel (2009) argues that there is a case for policy to stabilize exchange rates, as large fluctuations in exchange rates lead to inefficient allocation of resources. The essence of his argument is that changes in exchange rates that cause relative prices to deviate from relative costs of production are undesirable from a welfare point of view. Noting that policymakers cannot always be relied upon to intervene in foreign exchange markets in a benign way, he argues that exchange rate management is best achieved via international cooperation among policymakers.[10]

Wang (2010) evaluates the question of how central banks should adjust interest rates in response to real exchange rate movements in a standard two-country dynamic stochastic general equilibrium (DSGE) model. He finds that when monetary policy is set to maximize the welfare of the representative agent, the central bank should not seek to stabilize exchange rate movements. Furthermore, he finds that contrary to what other researchers have argued, there is little to be gained from international coordination of monetary policies. By way of contrast, Faia and Iliopulos (2010) argue that optimal monetary policy in a financially globalized environment calls for central banks to stabilize the exchange rate as well as output and the price level.

Evans (2007) examines how the welfare-maximizing inflation rate changes as economies become more open. He finds that greater openness is associated with higher inflation rates rather than lower inflation rates. Central to his finding

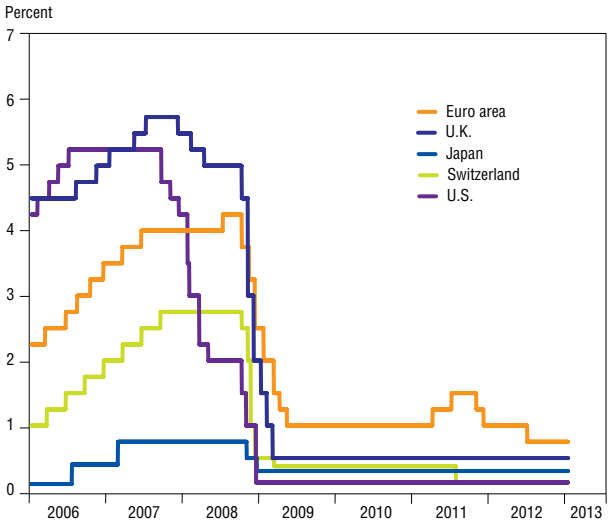
Chart 3
Global Current Account Balances



NOTES: Oil-exporting countries are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Oman, Qatar, Saudi Arabia and Venezuela. Sixteen countries are excluded due to data limitations (Andorra, Cuba, Democratic Republic of the Congo, Kiribati, Liechtenstein, Marshall Islands, Micronesia, Monaco, Nauru, Palau, North Korea, San Marino, Tuvalu, United Arab Emirates, Uzbekistan and South Sudan). The remaining 162 United Nations members compose "Others."

SOURCE: International Monetary Fund.

Chart 4
Monetary Policy Rates



SOURCE: National central banks.

is his modeling assumption that foreign consumers need to hold domestic currency to be able to consume domestically produced goods, and the domestic monetary authority has an incentive to generate a higher inflation rate as a result to impose the inflation tax on these foreign holdings. Cooke (2012) also explores the issue of optimal monetary policy in a two-country setting and also finds that greater economic integration is associated with higher long-run inflation. Furthermore, in Cooke's model environment, there are increased gains from international cooperation in the conduct of monetary policy as countries become more closely integrated.

The issue of how best to conduct monetary policy in a globalized environment is also addressed at some length in Moutot and Vitale (2009).

The Financial Crisis

The global financial crisis that began in late summer 2007 and saw the world teetering on the brink of a second Great Depression by fall 2008 generated a host of research questions that will keep the economics profession occupied for years to come.[11] Chart 3 illustrates the extent of international global capital flows over the past four decades. Among the factors facilitating the buildup of excesses that ultimately culminated in the crisis were the massive global imbalances that prevailed (and to some extent still do). Ca' Zorzi, Chudik and Dieppe (2011) argue that the chances were minimal that current accounts in the U.S., U.K., Japan and China were aligned with fundamentals before the crisis. The role of capital flows in driving the housing boom(s) that preceded the crisis is also explored by Sá and Wieladek (2011) and Sá, Towbin and Wieladek (2011). Sá and Wieladek find that shocks to capital inflows to the U.S. driven by foreign savings have a positive and persistent effect on residential investment and house prices in the U.S., while monetary policy has a limited effect on the housing market. Sá, Towbin and Wieladek do a similar analysis for a broader

group of OECD countries and find that both types of shocks matter.

Financial crises are commonly characterized by adverse feedback loops that seem to make the associated downturns in economic activity more severe and the subsequent recoveries weaker than might otherwise be expected.[12] The pace of recovery from the 2007–09 crisis has been very weak by historical standards. Davis (2010) develops a model with financial frictions to quantify the impact of adverse feedback loops where falling profits and asset values in the real economy lead to increased loan defaults, which translate into increased loan losses in the banking sector. This in turn makes it more difficult for the banking sector to raise funds, which leads to fewer loans to firms. Davis finds that adverse feedback loops of this sort may add as much as 20 percent to the volatility of economic activity.

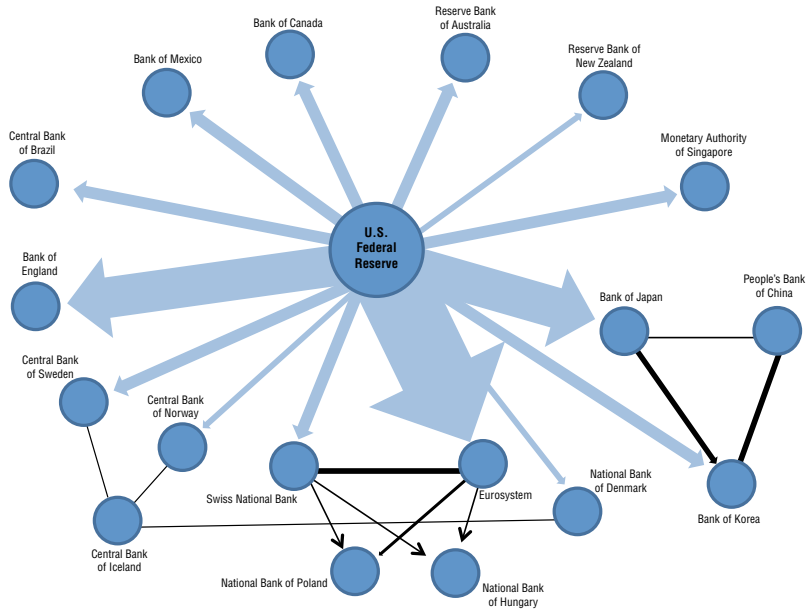
Hirakata, Sudo and Ueda (2011) explore the importance of shocks to the banking sector in a standard DSGE model of the U.S. economy. They find that shocks to the net worth of financial intermediaries in their model are important for understanding the dynamics of investment, accounting for 17 percent of investment variation on average. However, during the Great Recession, they find that such shocks were more important, accounting for 36 percent of the variation in investment between 2007 and 2010.

The financial crisis saw interest rates in most advanced countries fall to historic lows and once again raised the question of the appropriate policy response to a global liquidity trap. Chart 4 shows monetary policy rates in the advanced economies since 2006. Devereux (2010) examines the policy options in a closed-economy environment when interest rates have fallen to zero and conventional monetary policy is no longer an option. He shows that in such an environment, deficit-financed increases in government spending may be a lot more expansionary than spending increases financed by higher taxes. He also shows that a monetary policy that aims at increasing monetary aggregates directly may also be effective, even with fixed interest rates.

Fujiwara et al. (2010) explore the appropriate policy response in a standard two-country model where both countries are caught in a liquidity trap. One of their findings is that it is better from a welfare point of view to target the price level rather than the inflation rate (as is standard practice in most countries now) and that monetary policy in each country should respond not only to the domestic price level and output gap, but also to the price level and output gap in the rest of the world. Cook and Devereux (2011) also investigate policy options in a global liquidity trap where the natural real interest rate is below zero in all countries as a result of a collapse in aggregate demand in the home country. They find that the optimal cooperative policy response in such an environment consists of a domestic fiscal expansion combined with tight monetary policy in the foreign country. Fujiwara and Ueda (2010) find that fiscal multipliers can exceed 1 when countries are confronted with a global liquidity trap.

One of the unique features of the recent crisis was the extent to which central banks had to provide liquidity not just to domestic financial institutions but also to international institutions. At the height of the crisis, a significant portion of the Federal Reserve's balance sheet consisted of loans made under swap arrangements with foreign central banks to provide dollar liquidity to banks overseas. And it was not just the Federal Reserve System that made such loans. Chart 5 (which is adopted from McGuire and von Peter 2009) shows the network of international swap arrangements created during the crisis to alleviate foreign currency liquidity crises in different countries. Auer and Kraenzlin (2011) document how these liquidity programs worked from the Swiss perspective. During the financial crisis, 80 percent of the Swiss franc liquidity provided by the Swiss National Bank was provided to banks domiciled

Chart 5
Central Bank Network of Swap Lines



NOTE: The arrows indicate the direction of flows (where known). Light shaded arrows represent U.S. dollars provided to other central banks; dark arrows represent other currencies (evaluated at average 2008:Q4 exchange rate). Line thickness is proportional to the size of the swap line.

SOURCE: McGuire and von Peter (2009).

outside Switzerland. Alberola, Erce and Serena (2012) look at the stabilizing role of international reserves during periods of global financial stress and show how they facilitate disinvestment by domestic residents.

Davis and Huang (2011) consider the more general question of whether financial sector conditions should factor into monetary policy decisions over and above any impact such conditions might have on inflation or the output gap. They find that it is optimal for central banks to respond to fluctuations in the interbank lending spread that are driven by exogenous financial shocks and, specifically, that the policy rate should be reduced by about 66 basis points in response to a 1 percentage point increase in the interbank lending spread.

What determines how well policymakers will respond to a downturn in economic activity? It may be too early to pronounce the policy response to the Great Recession a success. (A full evaluation of the success of the fiscal and monetary policies adopted in response to the downturn will depend on whether those policy responses come with significant long-term costs.) However, Calderón, Duncan and Schmidt-Hebbel (2012) show that institutional quality seems to be an important determinant of a country's ability to adopt countercyclical macroeconomic policies.

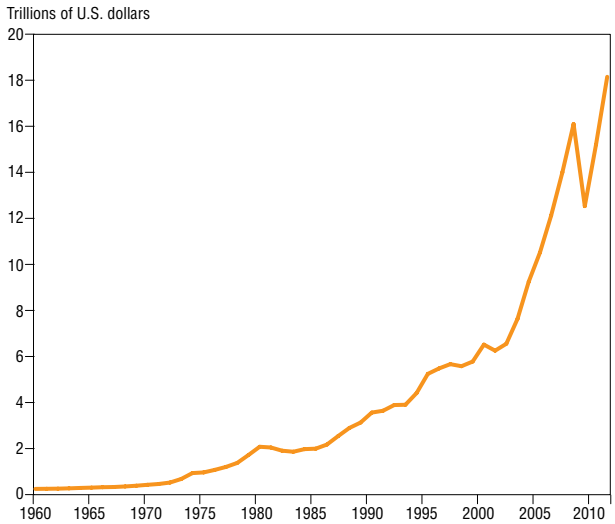
The ultimate recourse of countries facing financial crisis is to default on their public debt. Of course, when governments default, they often discriminate between different creditors, for example, defaulting on domestically held but not foreign-held debt, or vice versa. Erce (2012) looks at the factors that may lead government to treat different classes of creditors differently and finds that factors such as the business sector's reliance on foreign capital markets, the soundness of the domestic banking system and the source of the liquidity pressures (whether due to a need to meet external obligations or a need to roll over domestic debt) all play a role.

The policy response to the global crisis is unprecedented, with official interest rates in many countries at or near historic lows (essentially zero) and central bank balance sheets at record levels relative to the size of national economies. White (2012) characterizes the stance of many advanced-economy monetary policies as "ultra easy" and raises concerns about the potential unintended consequences of such policies if pursued for too long.

One of the enduring legacies of the crisis in many countries will be extraordinarily high levels of public debt, which many fear that central banks will be pressured to monetize at some point. Bhattarai, Lee and Park (2012) investigate the relative contributions of fiscal and monetary policy to inflation dynamics under different assumptions about the nature of the regimes governing both. Under an active monetary and passive fiscal policy regime, inflation follows closely the path of the inflation target. However, under an active fiscal and passive monetary regime, inflation moves in the opposite direction of the inflation target.

The scale of the collapse in international trade that accompanied the Great Recession has attracted much attention, prompting some to talk

Chart 6
Evolution of Global Exports



SOURCE: World Bank.

about deglobalization. Chart 6 plots the evolution of global exports (measured in dollar terms) since 1960. The unprecedented nature of the collapse in 2008–09 stands out.[13] Bussière, Chudik and Sestieri (2012) use a global vector autoregression to explore the dynamics of global trade flows between 21 advanced and emerging-market economies. One of their key findings is that shocks to domestic or foreign demand have much stronger effects on trade flows than shocks to relative prices. Petropoulou and Soo (2011) develop a simple analytical model that highlights the importance of product durability as a mechanism driving trade collapses in response to shocks. Auer and Sauré (2011) examine why Swiss exports seem to be so insensitive to movements in the Swiss franc. They find that Swiss exports are heavily concentrated in products that are relatively insensitive to movements in the exchange rate, such as machinery and pharmaceuticals.

Data

Good data are essential for any research program. The Globalization Institute has sponsored the development of three new databases that will advance our understanding of how the global economy works. Booms and busts in housing markets were central to the 2007–09 financial crisis in the U.S. and the ongoing debt crisis in the euro area. Mack and Martínez-García (2011) constructed an international database on house prices at a quarterly frequency that covers 21 (mainly advanced) countries starting in 1975. The database is updated on a regular basis and available to the public (www.dallasfed.org/institute/houseprice/index.cfm). One of their main contributions is to report measures of house prices and household disposable income that are comparable across countries.

Policymakers have to make decisions in real time with flawed and incomplete data that are often revised, and accurate evaluation of forecasting models and policy rules needs to take account of this fact. Models and rules that are evaluated using final revised data that were not available to policymakers at the time policy decisions were made often perform quite differently when evaluated using the data available in real time. Fernandez, Koenig and Nikolsko-Rzhevskyy (2011) have made available a real-time database of 13 major macroeconomic aggregates for the OECD countries (www.dallasfed.org/institute/oecd/index.cfm). Their data complement the current OECD real-time database that starts with 1999, extending the coverage back to 1962.

Perhaps the most ambitious data creation project undertaken by the institute over the past few years has been the database of prices of products the Swedish retailer IKEA sells in many countries around the world. Baxter and Landry (2012) provide detail on the richness of the dataset and explore its implications for some central questions relating to the pricing of goods in international markets.

Conclusions

While economists have been thinking about the implications of international trade and finance—"globalization"—since the emergence of economics as a separate field of scientific inquiry in the late 18th and early 19th centuries, the passage of time and the progress of technology have posed new questions and facilitated the development of new tools to address these questions. When David Ricardo sought to illustrate the gains from international trade between Britain and Portugal, he used a simple example of trade in cloth and wine; 200 years ago, almost all international trade was trade in final goods. Today, most international trade is trade in intermediate goods, with the same good crossing international borders many times on its way to the final consumer.[14] In the early 19th century, most countries relied on some form of commodity money, and the ideal of using monetary (or fiscal) policy to stabilize economic activity was unheard of. Under today's fiat money standards, the optimal conduct of monetary policy takes on a new urgency.

We launched this research program during the period known as the Great Moderation. At the time, there were some concerns about "global imbalances," but few anticipated the scale of the crisis that would lead to the Great Recession. Prior to the financial crisis, the broad consensus in the central banking community was that inflation targeting represented the best practice in terms of monetary policy strategy. The crisis has prompted some rethinking of that view, and Issing (2011) argues for broader perspective that includes monetary factors in making central bank decisions. White (2009) addresses the question of whether monetary policy should lean against asset price booms to prevent asset prices from becoming too elevated or should, instead, simply let asset prices evolve as they will and clean up the aftermath of an asset price bust. Both views had their proponents in the central banking community: Policymakers in Europe favored a greater response of policy to asset price developments, while U.S. policymakers seemed to prefer the clean-up-the-mess-afterward approach.

More generally, while we thought we had a good sense of what globalization might mean for the conduct of monetary policy in the U.S. (see, for example, the essay by Wynne 2009), the Great Recession has thrown up a whole new set of issues that will be front and center in our future work. Foremost among these will of course be the interaction between the financial sector and the real economy. But we will continue to work on the central issues related to international pricing, inflation dynamics, business-cycle synchronization and the optimal conduct of monetary policy in a more integrated global economy.

Notes

[1] Dating the onset and (more importantly) the ending of the global financial crisis is somewhat arbitrary. Strains in the financial system first emerged in late summer 2007. According to the National Bureau of Economic Research, economic activity in the U.S. peaked in December 2007 and the U.S. entered a recession. The most intense phase of the financial

crisis occurred around the time of the Lehman Brothers failure in September 2008. Global GDP growth slowed from 5.4 percent in 2007 to 2.8 percent in 2008. In 2009, global GDP contracted by 0.6 percent, the first absolute decline in global GDP since at least the 1970s. (International Monetary Fund data on global GDP do not go back any further.)

[2] Davis (2012) highlights the importance of central bank credibility in anchoring inflation expectations when commodity prices are subject to large shocks.

[3] Martínez-García (2008) elaborated an international version of the widely used New Keynesian model to begin to address this issue.

[4] This discussion focuses on just the economic dimensions of globalization, although it has important political and cultural dimensions as well.

[5] Measured in current dollars. Source: National Accounts Main Aggregates Database, United Nations Statistics Division, http://unstats.un.org/unsd/snaama/dnllist.asp.

[6] The date at which the Chinese economy will become bigger than the U.S. economy depends on which measure of the relative size of economies one uses: In purchasing-power-parity terms, the transition will occur sooner. Wynne (2011b) addresses the question of whether China will ever be as rich as the U.S. in terms of average living standards.

[7] Crucini, Shintani and Tsuruga (2008) use a model with sticky information to account for deviations from the law of one price in U.S. and Canadian data.

[8] Specifically, Germany, France, Italy, Sweden and the U.K.

[9] For the number of Mexican nationals living in the United States, see Grieco et al. (2012). Data on remittances are from HAVER, series N273BW@EMERGELA.

[10] The argument is developed in more (technical) detail in Engel (2011).

[11] Given that the profession continues to study the causes of the Great Depression of the 1930s, we may expect the issues raised by the Great Recession of 2008–09 to be with us for many years indeed.

[12] See, for example, the discussion in Wynne (2011a).

[13] Wynne and Kersting (2009) explore the potential role of the drying up of trade finance as a contributor to the collapse.

[14] Perhaps the iconic example is the Apple iPhone; see Xing and Detert (2010).

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T-Shirt's Journey to Market

Highlights Shifting Global Supply Chain, Economic Ties

By Janet Koech

The life of a T-shirt—from its origins in a Lubbock, Texas, cotton field to its final days in a used-clothing store in Tanzania—aptly tells the story of globalization, comparative advantage, trade regimes, proximity to market and modern retailing.

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In the book *The Travels of a T-Shirt in the Global Economy*, Georgetown University economist Pietra Rivoli documents the roles of three countries on three continents (*Chart 1*): the United States, where the raw materials are produced; China, where cheap labor and flexible manufacturing practices are tailored to U.S. speed-to-market demands; and Tanzania, an east African country, whose used-clothing industry imports extensively from the U.S. Along the way, cotton for the T-shirt is spun, woven, cut and stitched to U.S. specifications in China. Before the garment can travel from the factory, it is subject to trade policies (most formulated in Washington), which determine sourcing and the quantity allowed into the country. Once the T-shirt arrives in North America, a U.S. shopper becomes its first owner.

Years later, after a household spring cleaning, the now-faded garment is donated to charity, perhaps to the Salvation Army or Goodwill.[1] It then starts another journey, this time across the Atlantic to used-clothing stores in parts of Africa and other developing nations. Here, a second consumer buys the T-shirt. The single garment provides a source of income to many during its lifespan (Rivoli 2009).

The tale of this everyday item sheds light on the complexities of globalization, mapping the role of apparel and textiles in emergent economic development, global shifts in sourcing and the impact of trade policies.

Apparel and Textiles in Industrialization

Producing textiles and apparel typically represents a "starter" opportunity for countries engaged in export-oriented industrialization. It involves global production, employment and trade ties as nations cater to various markets. The textiles and apparel industries each offer a range of possibilities, including entry-level positions for unskilled labor and a broad source of earnings (Gereffi 2003). The two industries have migrated from high-income locales to developing (low-income) ones. Countries importing textiles and apparel consider not only production costs and trade agreements, but also the speed to get products to market and flexibility to adapt to retailers' demands. Supply chains able to react quickly to changing requirements have gained prominence over inflexible ones.

Textile and apparel industries—although often thought of interchangeably—are two distinct, albeit closely related, endeavors. Both represent important links in the chain of production and distribution responsible for providing consumers with clothing and related products. Textile mills manufacture yarn, thread and fabric for clothing and items such as carpeting, automotive upholstery, fire hoses, cord and twine. The textile industry is highly automated and includes yarn spinning, weaving, knitting, tufting and nonwoven production.

Apparel manufacture converts textile industry-produced fabrics into clothing and other finished goods. The industry's intermediate processes include cutting, sewing, assembly, design, pressing, dying and transportation to the consumer. The largest apparel-related occupation is sewing machine operator, the most labor-intensive step in production (Mittelhauser 1997).

Industrialization's First Rung

Development theory suggests that a poor country opening up to international trade will tend to specialize in the export of raw or slightly processed (primary) products—typically, output from agriculture, forestry, mining and quarrying and oil extraction. As income growth exceeds that of the rest of the world, export specialization will gradually accompany a shift to manufacturing. Initial manufactured goods will be especially labor intensive, dependent on a country's resource endowment or its population density. Since many processes in textile and clothing production rely on an abundance of unskilled labor, textiles and apparel are among the first items an industrializing economy exports. As national income rises with growing exports, and the workforce becomes more skilled, the country moves on to the manufacture of more capital- and technology-intensive goods it previously imported. In time, another generation of newly industrializing countries replicates this process, gradually displacing predecessors (Park and Anderson 1991).

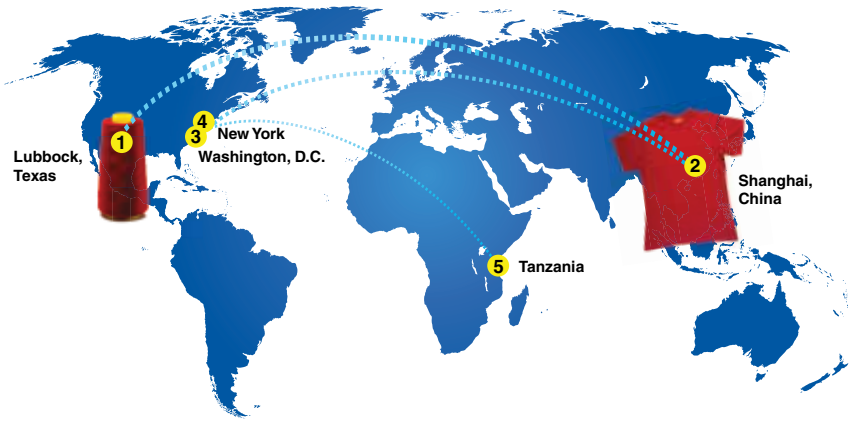
Barriers to entry in the clothing industry are low, and capital requirements are not onerous. Knowledge requirements vary and tradability of goods at each level of production is high. Moreover, clothing and textiles have been the source of rapid, export-led industrialization in several countries (Gereffi and Memedovic 2003). The textile and clothing value chain is particularly suited to global production networks since most products can be exported at each stage of the chain, making the sector highly trade-intensive and sensitive to a country's trade regime. Thus, clothing and textile industries become a good starting point for countries with an abundance of low-wage labor to export their way to development. Textiles' role as a forerunner for industrialization goes back to 18th-century Britain, where the mechanization of cotton processing provided the impetus for the Industrial Revolution.

Cotton Textile Production—One-Time Wonder Industry

The Industrial Revolution was a period of accelerated structural change in world economies, involving a rapid, technology-driven increase in industrial output and factory-based activity.

Chart 1

The Travels of a T-Shirt in the Global Economy



SOURCE: ©2005 National Public Radio, Inc. Illustration from NPR® news report titled "Behind Shanghai's Boom Is A Simple T-shirt," originally published on April 27, 2005, and used with permission by NPR.

From its roots in Britain, this transformation spread to the European continent, North America, Japan and, ultimately, the rest of the world. The textile industry played an important role in development of key industrial innovations that transformed cotton manufacturing. In 1733, John Kay invented the flying shuttle, a machine used to weave cloth. This was accompanied by the improvement of yarn production using James Hargreaves' 1764 invention of the spinning jenny, allowing more than one ball of yarn or thread to be spun. The jenny relied on manpower, and it wasn't long before Richard Arkwright's creation of the water frame in 1769 introduced water as an alternate energy resource. The steam engine, which provided yet another source of power, enabled rapid development of factories in places where water power was unavailable. This greatly increased the output, quality and efficiency of textile production. Mills sprang up throughout Britain, and the factory system—the first successful network of mass production—was created.

Rising textile production brought with it increased demand for raw cotton, which came from Britain's colonies in India, Africa and the southern U.S. Raw cotton consumption jumped to 267,000 metric tons in 1850 from just over 1,000 tons in 1750. Consumption peaked at 988,000 tons in 1913. Related data indicate that in 1764, the import of cotton wool (raw cotton) into Britain totaled 3.9 million pounds; by 1833, it had risen to 303.7 million pounds (Baines 1965).

The early success of the cotton industry and its contribution to the Industrial Revolution were highlighted in a British print publication appearing on Sept. 5, 1739 (Baines 1965, pp. 108–09):

"The manufacture of cotton, mixed and plain, is arrived to so great perfection within these twenty years, that we not only make enough for our own consumption, but supply our colonies, and many other nations of Europe. The benefits arising from this branch are such as to enable the manufacturers of Manchester alone to lay out thirty thousand pounds a year for many years past on additional buildings. 'Tis computed that two thousand new houses have been built in that industrious town, within these twenty years."

The cotton industry created forward and backward linkages to other industries that collectively contributed to the Industrial Revolution's progress. The advances in cotton textile manufacturing required coal for fuel and iron for new machinery; the increase in coal and iron mining dictated improvements in transportation; and the transportation enhancements, in turn, hastened development of railroads and steamships. By the end of the 18th century, the various specializations had coalesced, with the achievements of one contributing to the success of the other, and gradually the world's first Industrial Revolution took root.

Industries Spread Beyond Britain

The industrial achievements of Great Britain extended to Europe and the U.S. in the 19th century. The first American mills lined the banks of rivers around Massachusetts and New Hampshire, and by the late 1800s, the world's largest textile mills were in New England.[2] In the early 1900s, U.S. cloth production surpassed that of Britain, whose dominance ended (*Chart 2*).

The New England mills' labor force, like that in Britain, was drawn from women, children and, later, immigrants with few other work alternatives. As labor costs rose, the industry's prosperity in the region did not last, and between 1880 and 1930, cotton textile production gradually shifted to the lower-wage southern Piedmont region of the U.S. Pay in North Carolina during this period was generally 30–50 percent less than what Massachusetts textile workers received (Wright 1979). Southern mills adopted a strong export-oriented market, and exports to China provided an important engine of growth for the regional industry before 1900.[3]

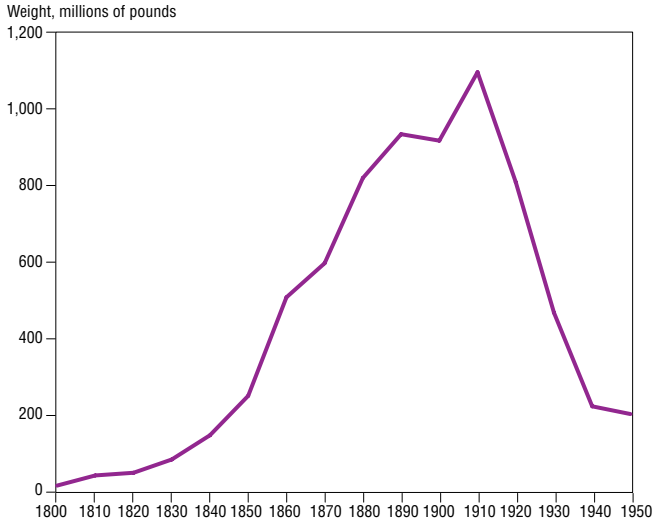
By the mid-1930s, Japan produced about 40 percent of the world's exports of cotton goods. Its industry leadership, based on low labor costs and the prevalence of "night work," doubled textile machinery productivity. Research on Japanese wages in the early 1900s found mill worker pay 20–47 percent below pay in the U.S. and England (Moser 1930, p. 13).

Japan's leadership in textile production weakened in the 1950s as new players offered yet-lower labor costs (*Chart 3*). By the 1970s, members of the Asian "tiger" economies (Hong Kong, South Korea, Taiwan) passed Japan in textile and apparel exports. They were subsequently supplanted by less-developed countries and regions with still cheaper costs—China, Southeast Asia, Sri Lanka and the Caribbean.

Chart 2

The Rise and Fall of Britain's Cotton Industry

(Exports of cotton goods, 1800–1950)

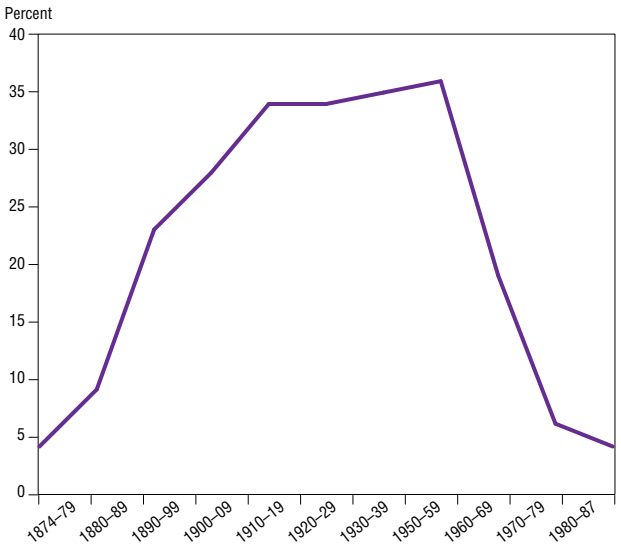


SOURCES: Ellison's *Cotton Trade of Great Britain*; Liverpool Cotton Association and the Cotton Board as reported in Robson (1957), pp. 331–33.

Chart 3

The Rise and Fall of Japanese Textile Industry

(Textile and clothing share of exports)



NOTE: Data for 1940-49 are unreported, coinciding with the war period.
SOURCES: Yearbook of National Accounts Statistics, United Nations, and others as reported in Park and Anderson (1991).

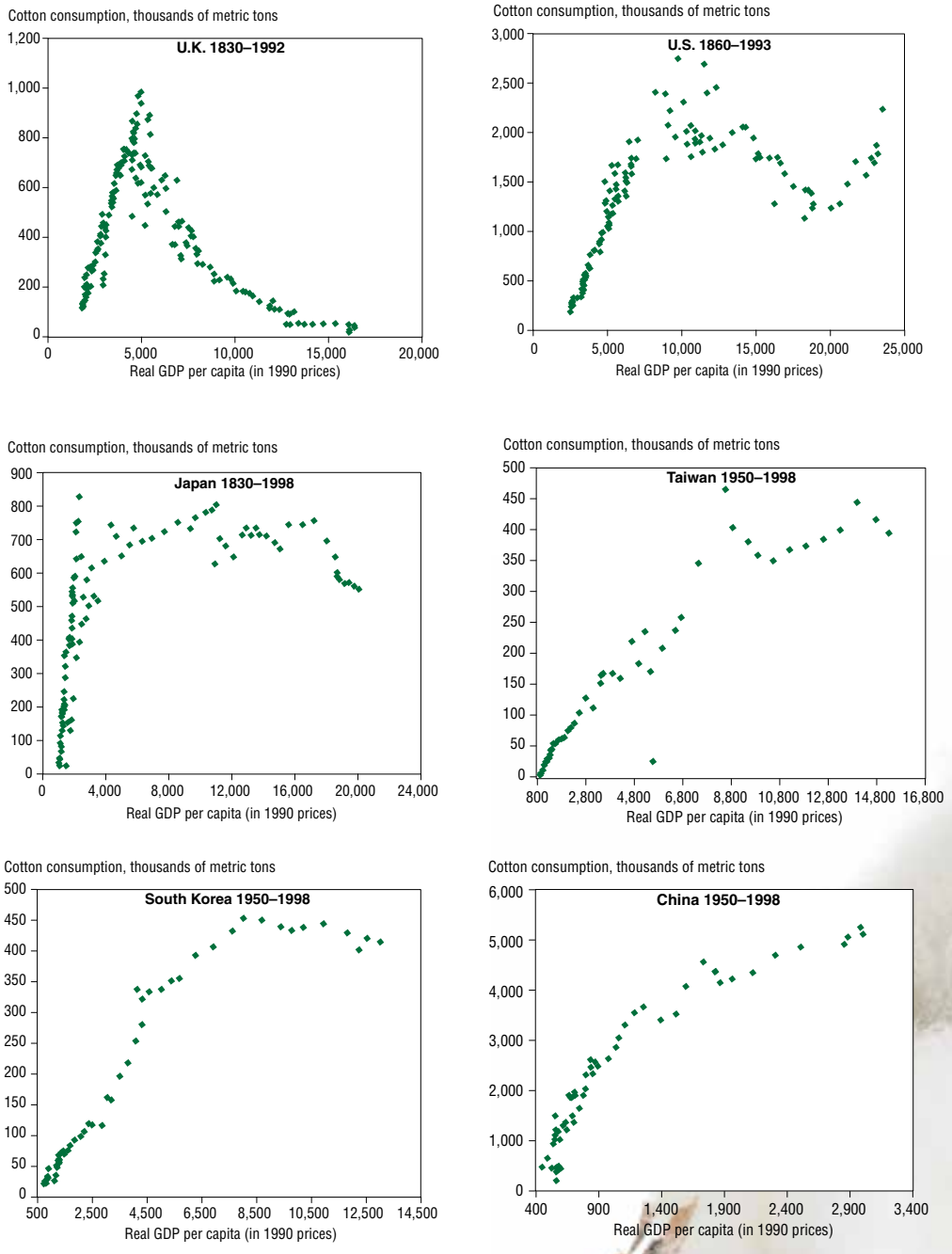
Flying-Geese Paradigm and Textile Production Shifts

The catch-up process of industrialization in laggard economies where industrial development is transferred from the leader to the next tier of followers, and then to the next, resembling an inverted formation of flying geese, was dubbed the "flying geese model" by Kaname Akamatsu in the 1930s (Akamatsu 1962). This theory refers to industry and product life cycle from origination, growth and decline and the shift from one country or product to another.

A scatter plot showing changes in consumption of textile production input (raw cotton) as countries' income levels advance, with resulting

Chart 4

Flying Geese Paradigm Illustrates Production Relocation

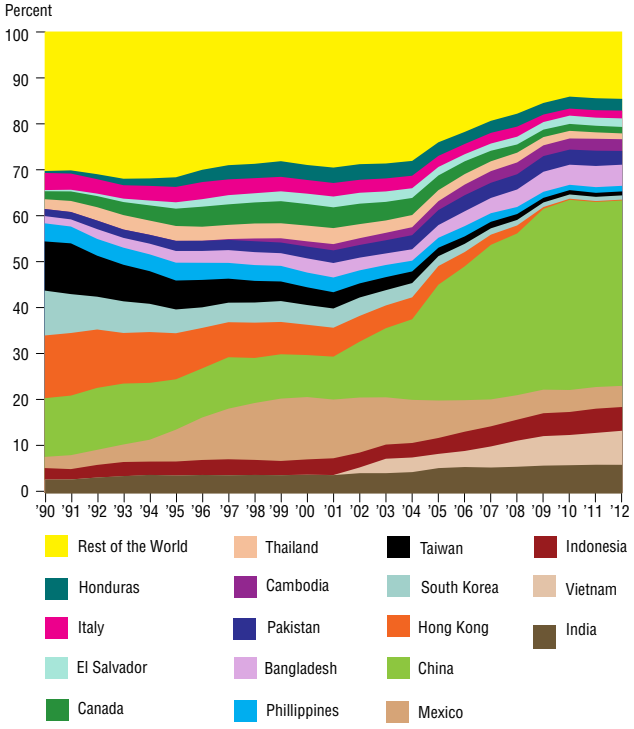


SOURCES: *International Historical Statistics: Europe, 1750–2000*, by B.R. Mitchell, Palgrave Macmillan, 2003; *International Historical Statistics: Africa, Asia and Oceania, 1750-1988*, by B.R. Mitchell, Palgrave Macmillan, 1995; *Historical Statistics of the World Economy: 1–2008 AD*, by Angus Maddison.

industry shifts, is indicative of the flying-geese paradigm (*Chart 4*). The model helps explain the growth, decline and shift of textile and apparel industries from developed to developing countries. When nations produce for export, consumption of raw materials increases, and over time export earnings translate into higher incomes and greater capital accumulation. Production inputs such as labor become more skilled and more expensive relative to other nations with cheaper inputs, thus,

Chart 5

U.S. Textile and Apparel Sourcing Shifts Over Time



NOTE: The yellow area represents other countries from which the U.S. imports textiles and apparel. This group,which accounts for 30 percent or less of U.S. textile and apparel imports, consists of over 180 countries, each accounting for a small portion of U.S. imports.

SOURCE: U.S. Department of Commerce's Office of Textiles and Apparel.

leading to a loss of comparative advantage in textile production. These countries then move to the next tier of manufactured goods requiring more capital and skilled labor (up the industrial ladder), and consumption of textile production inputs drops. Another country embarks on textile production until it loses comparative advantage to others that produce cheaply.

U.S. Textile and Apparel Sourcing Patterns

The production shift from developing to developed countries is evident in U.S. textile and apparel sourcing patterns. Hong Kong, Taiwan and Korea make the top 10 list of suppliers in the 1990 to 2000 period, but drop out after 2000, with China, Vietnam and India taking the lead since 2008 (*Chart 5*). In the U.S., falling employment in these industries also illustrates movement of production offshore. Textile mill employment peaked at about 1.4 million in 1941, while apparel industry employment topped out in 1973 at 1.5 million workers. Today, these sectors each employ fewer than 250,000 people, with their shares of total manufacturing similarly declining. In 1939, textile and apparel employment represented about 10 percent of total U.S. manufacturing. Today, their share has dropped to around 2 percent (*Chart 6*).

Surviving industries in the U.S. include the manufacture of articles for armed forces personnel and certain high-end items. To remain competitive, enterprises must be extremely labor-efficient. The use of advanced machinery—computers and computer-controlled equipment in designing, patternmaking and cutting—helps boost productivity. The industry also benefits from procurement regulations mandating that U.S. military clothing be produced in the United States—a requirement subsequently extended to cover the Transportation Security Administration (Bureau of Labor Statistics 2011).

Behind Global Shifts

The U.S., as one of the largest importers of textiles and apparel, significantly influences world markets. U.S. sourcing patterns have changed over time (see Chart 5), owing to such traditional considerations as labor, transport and procurement costs, and trade policies. There also are new factors—speedy product delivery and flexibility to adapt to changing market demand.

Labor costs have driven relocations of textile and apparel production—from Britain to the U.S., to Japan, to the Asian Tigers and, finally, to China and other developing nations. Government and trade policies also help determine industry location. As the newly manufactured T-shirts in Rivoli's narrative return to the U.S. via the Pacific, the economist notes that they enter the most complex and most challenging part of their existence: accessing U.S. markets. Trade decisions in the U.S. significantly influence world markets; conversely, international trade policies impact U.S. sourcing decisions.

As globalization of textiles and apparel has accelerated, countries have sought to protect their domestic industries. Textiles and apparel are among the most heavily protected sectors in industrialized countries, with the average tariff as

high as 32 percent on clothing, according to the United Nations (UNDP 2005).

One of the most influential government policies was the Multi-Fiber Agreement (MFA), established in 1974 to help manage market disruptions in developed countries while allowing growth of textile and apparel exports from developing countries. The agreement consisted of bilateral arrangements establishing quotas for certain product lines. In 1995, the Agreement on Textiles and Clothing (ATC), a 10-year transitional program for quota removal under the World Trade Organization (WTO), replaced the MFA. The ATC regulated quotas until it expired on Dec. 31, 2004.

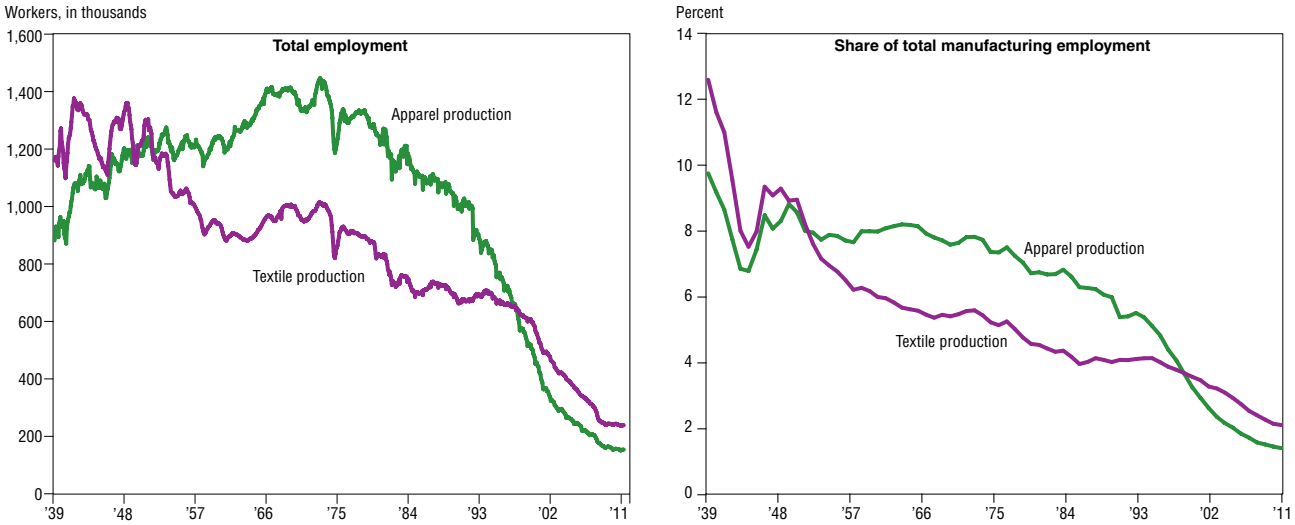
Under the quota system, a firm's purchases from one country were limited, forcing companies to buy where quota slack existed, not necessarily where goods were most efficiently produced. This system shielded many developing countries from large-supplier competitors, such as China. After the ATC expired, competition became fierce and some countries benefited by freely trading their goods, particularly those nations that could produce additional product at low cost and gain market share.

Trade agreements provide an advantage to suppliers operating in duty-free environments. The North American Free Trade Agreement (NAFTA), signed in 1994, is one such arrangement affecting the U.S. textile and apparel industries. NAFTA eliminated quotas and tariffs on goods produced in member countries: Mexico, Canada and the U.S. The Caribbean Basin Preferential Trade Act, enacted in 2000, is a production-sharing arrangement linking U.S. market access to the Caribbean Basin with duty- and quota-free products if they are made of U.S. yarns and textiles. The Dominican Republic–Central America Free Trade Agreement offers favorable trade policies and expansion of regional trade involving Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, the Dominican Republic and the U.S. The African Growth and Opportunity Act is a U.S. agreement with African countries for tariff-free trade if production inputs are sourced from the U.S. or African countries covered under the agreement.

Such trade arrangements have impacted U.S. sourcing decisions. For example, China's integra-

Chart 6

U.S. Textile and Apparel Employment Declines Along with Employment Share

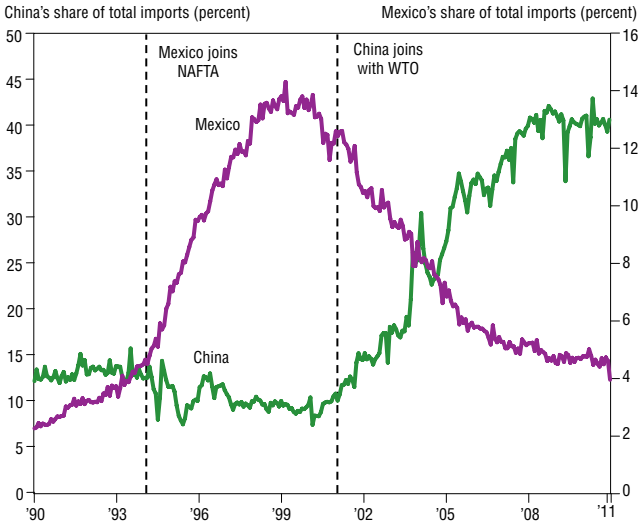


SOURCES: Bureau of Labor Statistics' Current Employment Statistics Survey reported in *Employment, Hours and Earnings, United States*, 1909–1990, Volume II, Bulletin 2370 and 1991–1993, Bulletin 2429; Haver Analytics; author's calculations.

Chart 7

U.S. Imports of Textiles and Apparel Shift

(Impact of trade policies on manufacturing)



SOURCE: U.S. Department of Commerce's Office of Textiles and Apparel.

tion into the world trading system through its accession to the WTO at the end of 2001 diminished Mexico's textile and apparel industry, which greatly expanded following NAFTA's enactment (*Chart 7*).

Retailers' Preferences Dictate Sourcing

Often, discussion of apparel and textile industries shifts focus to national trade flows. These movements reflect decisions of private parties and supply chains (retailers and producers of textiles and apparel) operating within the constraints of national and international policies. More recently, retailers' preferences increasingly dictate national sourcing patterns.

With new technologies enabling retailers and suppliers to efficiently track products and consumer demand, suppliers confront demands to quickly replenish products and adopt efficient inventory management while maintaining low costs. Bar coding and point-of-sale scanning provide real-time information on product sales; electronic data interchange tells retailers what inventory to replenish; and automated distribution centers handle small orders, replacing traditional warehouse systems used for large bulk shipments (Abernathy et al. 1999). This deployment of technology to capture information on consumer demand, reduce inventory surplus, and improve operations efficiency and profitability is known as *lean retailing*.

Lean retailing allows department stores, mass merchandisers and other retailers to minimize exposure to demand uncertainty while restraining inventory costs. Widespread adoption of these strategies means that suppliers must invest in basic technologies providing information links necessary for rapid replenishment to retailers. Additionally, apparel suppliers must devote resources for capital improvements to package, label, route and quickly move products from their production centers directly to retailers. The lean strategy requires frequent shipments sent from suppliers on the basis of continuous replenishment orders.

For example, an order may be placed with a manufacturer on a Sunday, after a week's retail sales have been tallied. Typically, it might specify a number of men's jeans of a given style, color, fabric weight and finishing treatment and size. The manufacturer's computer receives the order stipulating the jeans be placed in particular cartons for each of the retailer's stores. The cartons bear bar codes identifying the specific location where each will go. The product must be ready for placement on sales displays with the appropriate price marked.[4]

The jeans most likely won't be touched from the time they leave the manufacturer until they go on sale Thursday morning. The processes and associated documentation must be fully understood by the manufacturer and retailers and conform to industrial standards (Abernathy et al. 1999). These are significant new costs for suppliers, in essence shifting the risk of added variability and quickly changing fashion trends from the retailers to suppliers. Manufacturers that haven't adopted the new technology may end up holding retailer inventory—a particularly common occurrence with high-fashion and seasonal items.

Replenishment considerations and the need for speed to market arising from the new economics of distribution and production explain an important portion of sourcing shifts during the past decade. As lean retailing becomes even more widespread and suppliers more adept at managing risk, sourcing decisions increasingly include replenishment considerations. This heightens

competitiveness among countries able to help manage retailer inventories.

"In the new quota-free environment, we will have no choice but to be very discriminating about our suppliers, selecting only those who can provide real value to our customer," said Janet Fox, then-senior vice president and director of sourcing for J.C. Penney, during congressional testimony in 2004. "Value does not mean the product with the cheapest price. It means a supplier that is able to provide a quality product and service, including speed to market and supply chain efficiency and reliability."

The Next Destination

As production and labor costs inch higher in China, the primary textile and apparel supplier to the U.S., global winds may shift, possibly sending the industry to yet other destinations, including ones in Africa.[5] Indeed, Rivoli's T-shirt tale ends up in Africa, as do many articles of clothing and textiles. Salvation Army and Goodwill stores in the U.S. take in donations of old clothes. The charities' stores once sold or gave away much of this inventory, but the domestic supply has grown so large that only a fraction of the clothing stays in the U.S. America's castoffs have therefore found customers elsewhere in the world.

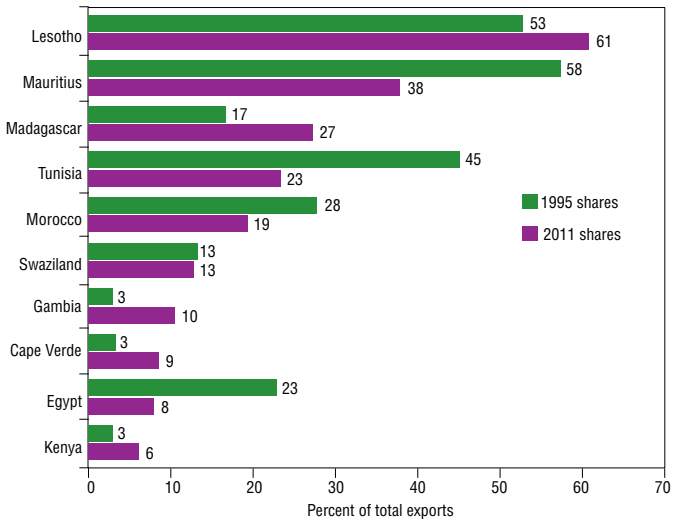
The U.S. exported nearly 5.5 billion tons of used clothing and textiles between 2000 and 2010, becoming the largest used-clothing seller over the period. Rivoli's T-shirt arrives in Tanzania, a big beneficiary; used clothing was Tanzania's no. 1 import from the U.S. in 2010 and its no. 2 U.S. import in 2011. Critics charge that an influx of used clothing has kept Africa from ascending the traditional development ladder via textile and apparel manufacture (Frazer 2005). Other studies show that producing for export rather than for domestic consumption is the more effective development path (Ekanayake 1999) and that imports of used clothing present no threat to African exports (Rivoli 2009). Nonetheless, Africa's share of world textile and apparel exports has stagnated at around 2 percent from 1995 to 2011, even as other developing countries' share increased to 58 percent in 2011, from 52 percent in 1995. Developed economies' share declined to 38 percent from 44 percent over the same period.

Textiles and apparel were responsible for 61 percent of Lesotho's total exports in 2011, up from 53 percent in 1995 (*Chart 8*). These sectors accounted for 20 percent or more of total exports for four countries—Lesotho, Mauritius, Madagascar and Tunisia—in 2011, down from five nations in 1995. The sector's performance across the continent has been mixed, with export shares for previous major exporters, such as Egypt and Morocco, dropping in 2011 from 1995 levels.

The continent offers some of the basic ingredients needed for establishment of these industries—cheap and abundant labor, availability of raw materials (cotton) and favorable trade agreements, such as the African Growth and Opportunity Act and the Everything but Arms initiative offering access

Chart 8

Africa's Export Share of Textiles and Apparel Shows Mixed Picture of Sector Dominance



NOTE: Countries are ranked according to their 2011 textile and apparel export shares. The reported figures are all rounded.
SOURCE: United Nations Conference on Trade and Development.

to U.S. and European markets. The sector's growth in Africa has been hindered by the same factors limiting the expansion of all manufacturing—lack of infrastructure, corruption, unstable political environments, inaccessibility to capital and lack of regional and foreign market knowledge. Poor roads, railways and ports create delays, adding to the cost of importing raw materials and exporting finished goods. African countries have been disadvantaged dealing with retailers seeking fast order-to-delivery cycles. Insufficient transportation networks also impede intraregional trade and economies of scale achievable through larger regional production and market centers. Furthermore, the effects of the MFA expiration in 2005 exposed smaller, previously quota-protected economies to fierce competition from large suppliers in Asia. Greater regional integration could bolster competitiveness through improved access to materials, product specialization, production sharing and speed to market.

Competitive Challenges

Textiles and apparel were the starting point of world industrialization. Both industries are viewed as starter endeavors for development efforts. Because apparel and textiles are labor-intensive, their manufacture has migrated from high-income countries to developing economies with relatively lower pay.

The increasing importance of logistic connections between manufacturing and distribution of textiles and apparel means that supply chains must exhibit a blend of considerations reflecting factor prices, transportation costs and adjustment to the risks of sourcing products in various locations. The impact of replenishment and risk-shifting within supply channels alters the traditional role apparel and textiles can play in developing countries. The two sectors remain attractive industries in terms of economic development, but assuring their success has become more complex (Abernathy, Volpe and Weil 2006). It will be difficult for nations with inadequate infrastructure, located far from major consumer markets or plagued by political instability to gain competitive advantage for textile and apparel production even if they have low wage rates.

Notes

[1] The bulk of these donations not sold in stores is sold to textile recyclers, who resell a portion of their purchase to used-clothes merchants around the world.

[2] The Amoskeag Manufacturing Co. in Manchester, N.H., was the largest cotton textile plant in the 19th century.

[3] In the late 1800s, China purchased more than half of U.S. cloth exports, and more than half of U.S. exports to China were cotton textiles. In essence, the Chinese market built Piedmont textile mills. A century later, floods of cheap cotton clothing from China are an almost symmetric reversal of previous trade flows (Rivoli 2009).

[4] Under traditional retailing, retailers prepared items received from manufacturers for display in the stores. They unpacked the items, affixed price tags and put them on hangers. However, lean retailing entails using standards to ensure that products are "floor-ready" on delivery—that is, on hangers and tagged and priced when they arrive in stores.

[5] China's hourly manufacturing costs increased 138 percent from 2002 to 2008, according to estimates by the Bureau of Labor Statistics.

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"In the new quota-free environment, we will have no choice but to be very discriminating about our suppliers, selecting only those who can provide real value to our customer. Value does not mean the product with the cheapest price. It means a supplier that is able to provide a quality product and service, including speed to market and supply chain efficiency and reliability."

—Janet Fox, then-senior vice president and director of sourcing for J.C. Penney, testimony before the Subcommittee on Trade, U.S. House Ways and Means Committee, Sept. 22, 2004.

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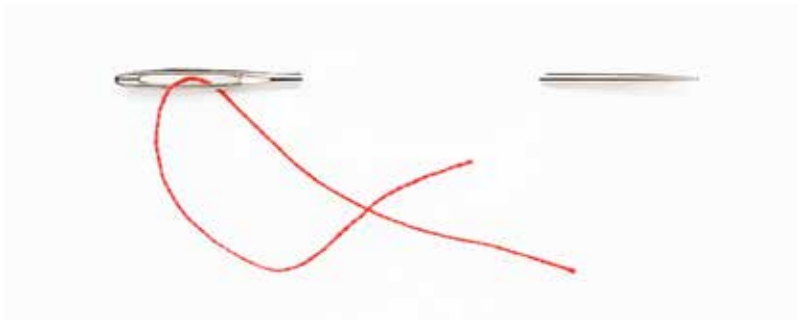

Financial Frictions Conference
Reviews Paths to Monetary Policy Objectives

By J. Scott Davis

The recent financial crisis has precipitated much new research on financial frictions' effects.

The Globalization and Monetary Policy Institute hosted "Financial Frictions and Monetary Policy in an Open Economy," March 16–17, in Dallas. The conference brought together theoretical and empirical researchers to examine how financial frictions—often using models in which company balance sheets appear prominently—affect monetary policy in an open economy.

Michael Devereux of the University of British Columbia and Mark Wynne and Scott Davis of the Federal Reserve Bank of Dallas organized the meeting. Presenters came from the European Central Bank (ECB), the Swiss National Bank, the Federal Reserve Bank of New York and the Dallas Fed as well as from the University of British Columbia, New York University, the University of Houston and the University of Southern California. Paper discussants were also drawn from a wide range of institutions, including the University of Montréal, Georgetown University, the Bank of Canada, Vanderbilt University, the World Bank and the Capital Group, an investment management firm.

The recent financial crisis has precipitated much new research on financial frictions' effects. However, it has been mostly limited to a closed economy framework. While few have studied financial frictions in an open economy setting, even fewer have specifically examined the impact of those frictions on the conduct of monetary policy.

While all papers focused on the conference theme, each employed different methodologies. Some papers were empirical, while others were based on large-scale dynamic stochastic general equilibrium (DSGE) models. In some papers, the equilibrium was the solution to a portfolio choice problem; in some it was the solution to a game theory problem. When discussing optimal monetary policy, some papers considered the optimal interest rate rule; others contemplated the optimal size and frequency of bailouts.

Monetary Transmission

Conference co-organizer Devereux began the conference with his paper "Nominal Stability and Financial Globalization" (coauthored with Alan Sutherland and Ozge Senay of the University of St. Andrews). A remarkable increase in international financial integration has occurred over the past 20 to 30 years, the paper notes. At the same time, a number of countries have adopted monetary policies focused on domestic inflation and have achieved a remarkable degree of price stability.

Many authors have argued that global financial integration has helped produce inflation stability. With such financial integration, domestic factors determine less of a country's income or wealth. A central bank has less ability to use expansionary monetary policy to boost national income, even in the short run, and likely will be less tempted to attempt policies that foster long-run inflation instability.

Does the line of causation run in the opposite direction, Devereux asked. He contended that greater monetary and price level stability in a country attracts investment. Investors are reluctant to invest in the real or financial assets of a foreign country with a highly variable inflation rate. Devereux's paper sought the analytical solution to a portfolio choice problem: A household in one country chooses optimal portions of its asset portfolio for investment in home assets and in foreign assets. Devereux and coauthors showed that the parameters of the central bank's policy function appear in the analytical solution to this portfolio choice problem. As the weight of foreign central bank efforts toward inflation stabilization increase, the domestic household devotes a greater share of its portfolio to foreign assets. In preliminary empirical evidence, Devereux showed that bilateral country

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pairs with more inflation stability exhibit greater bilateral financial integration.

The second paper in the conference, presented by Luca Dedola of the ECB (coauthored with Giovanni Lombardo and Peter Karadi, also of the ECB), also examined cross-border financial integration and looked explicitly at central bank policies in two open economies. The authors sought to learn if there is any gain from international central bank cooperation.

In their model, financial intermediaries hold both home and foreign assets and liabilities. Because of cross-border financial integration, a shock in one country affects balance sheets of financial intermediaries in the other country. Thus, in a model with financial frictions, where the balance sheets of financial intermediaries can have a major macroeconomic effect, cross-border financial integration can serve as a mechanism for international business cycle propagation.

The researchers then use the model to seek a solution under two different assumptions about international central bank cooperation. With the first assumption, central banks in the two countries cooperate and, thus, each takes into account the effect of its actions on the foreign economy and foreign welfare. Under the second assumption, each central bank maximizes welfare in its own country, taking as given the actions of the other central bank. Dedola shows that since the degree of international propagation is high when the balance sheets of financially constrained intermediaries are closely intertwined, there is a large benefit from international central bank cooperation. In the model, when the two central banks cooperate, they will fully offset any financial shocks. However, they find that the noncooperative equilibrium leads to a suboptimal degree of central bank intervention because of large spillovers following a financial shock.

The third paper in the conference, presented by Simone Meier of the Swiss National Bank, also examined the implications of cross-border financial integration, studying its effect on the monetary transmission mechanism. Some policymakers have raised the concern that in a world of highly integrated financial markets, central banks lose the ability to control the domestic real interest rate, and thus, monetary policy would have less impact on domestic output and prices.

To investigate this issue, Meier extends the standard international New Keynesian DSGE model to incorporate a richer asset-trading framework where households own both domestic and foreign assets, with the share of each determined through solution of a portfolio choice problem.

Meier found evidence that the classic interest-rate channel of monetary policy transmission is reduced with greater international financial integration. Investment is a function of the long-term interest rate, and the central bank controls the short-term rate. Greater financial integration means that global factors rather than shocks to the domestic short-term interest rate influence the long-term interest rate and, thus, aggregate investment.

But while international financial integration should reduce the effectiveness of the interest rate channel of monetary policy transmission, it should increase effectiveness of both the exchange-rate and wealth channels. Since the nominal exchange rate is heavily influenced by the short-term rate, even in a financially integrated world, the central bank through monetary policy has control over the nominal exchange rate. The channel of monetary transmission is enhanced in a highly integrated world economy when, through an expansionary monetary policy, the central bank causes an exchange-rate depreciation and the home country's exports become cheaper in the rest of the world. In addition, when households hold a portfolio of foreign assets, this exchange-rate depreciation in-

Greater financial integration means that global factors rather than shocks to the domestic short-term interest rate influence the long-term interest rate and, thus, aggregate investment.

creases the real value of their foreign asset portfolio, making households feel wealthier and stimulating consumption spending through the wealth effect.

Through simulated impulse responses, Meier found that the diminished role of the interest-rate effect and the enhanced role of the exchange-rate and wealth effects approximately cancel each other out. Thus, increased international financial integration will reduce the effectiveness of monetary policy through the classic interest-rate channel but should not reduce the overall effectiveness of monetary policy.

Optimal Monetary Policy

The conference's second session dealt with optimal monetary policy. The first paper, presented by Davis of the Dallas Fed (coauthored with Kevin Huang of Vanderbilt University), asks whether the central bank should include financial market variables, such as the interbank lending spread, in its optimal simple monetary policy rule (involving application of the Taylor rule for suggested policy rates, for example). The paper looks at this issue in an open economy setting; the question becomes, does the central bank want to include both home and foreign financial market variables in its policy rule?

The answer depends on the source of the financial market imperfection. Specifically, in a model where incomplete information between borrowers and lenders gives rise to interbank lending spreads that depend on variables such as bank debt-to-asset and loan-loss ratios, the authors distinguish between endogenous and exogenous changes in the interbank lending spread. Endogenous changes occur because a real shock, such as a negative productivity shock, adversely affects bank balance sheets, leading to an increased interbank lending spread. The authors call this an endogenous shock because the shock arises in the real sector and affects the financial sector through the endogenous response of real variables. This contrasts with exogenous changes in the interbank lending rate, which arise because of exogenous shocks within the financial markets. These shocks can be interpreted as a sudden increase in financial market uncertainty leading to interbank lending rate spikes.

The authors find that it is optimal for the central bank to respond to exogenous fluctuations in the interbank lending spread but to ignore endogenous movements. The intuition behind this is simple: Endogenous fluctuations in the spread arise because of some shock in the nonfinancial sector that affects the interbank rate through bank balance sheets and loan-loss ratios. If the central bank is already including nonfinancial variables such as the output gap and the inflation rate in its policy rule, then the endogenous fluctuation in the interbank rate contains no new information. When the central bank is already putting the optimal weight on the information contained in the output gap and the inflation rate, putting any weight on a new variable that contains no new information would be suboptimal.

Exogenous fluctuations in the interbank spread arise because of shocks from within the financial sector and contain new information—even when the weights on these nonfinancial variables (for example, output gap and the inflation rate data) have been chosen optimally. Thus, the question of central bank response to financial market conditions is not as simple as it initially appears. If fluctuations in the interbank lending spread arise because of nonfinancial shocks, the central bank should ignore them. If they arise because of financial sector shocks, the central bank should cut the risk-free rate in response to a widening spread.

The second, optimal policy paper was presented by Lombardo of the ECB (coauthored with Marcin Kolasa of the National Bank of Poland and Warsaw School of Economics). The paper, closely related to the first paper in this session, looked at the performance of monetary policy rules in an open economy with financial frictions.

The authors focused on specific trade-offs involved with setting optimal monetary policy and how the presence of financial frictions affects them. The authors compare simple rules (such as Producer Price Index, or PPI, targeting or exchange-rate targeting) to optimal monetary policy. In a model without financial frictions, strict PPI targeting yields nearly the same outcome as Ramsey optimal policy. However, they show that in a model with financial frictions, a trade-off arises between price level stability and financial stability following a productivity shock. Strict PPI targeting would maximize price level stability, but also would exacerbate financial market instability. Thus, a nearly optimal policy when there is no trade-off

between price level stability and financial stability is far from optimal when such trade-off needs to be taken into account.

The authors also examined issues such as the currency denomination of debt and how it might create a trade-off involving price level stability, exchange-rate stability and financial stability. When assets are denominated in one currency and liabilities another, currency fluctuations can significantly affect balance sheets and financial stability, which many eastern European countries discovered during the recent crisis. When liabilities are denominated in a foreign currency, exchange-rate depreciation leads to an increased real value of those liabilities and deteriorating balance sheets. Without financial frictions, this doesn't matter, but in a model with them, deteriorating balance sheets will lead to financial instability and widening credit spreads. In this case, the central bank has an added incentive to target the nominal exchange rate.

Javier Bianchi of the University of Wisconsin and New York University presented the third paper of the session, "Efficient Bailouts?" It asks whether government policy to transfer money to credit-constrained parties can be optimal during times of financial stress, even when taking into account the moral hazard argument that bailouts during a crisis lead to excessive risk taking during normal times.

Bianchi starts with a simple and intuitive way of examining the costs and benefits of such intervention. A bailout—a government policy of transferring funds from non-credit-constrained parties to credit-constrained parties—reduces the severity of a financial crisis. At the same time, bailouts only lead to the expectation of such help in the future. The expectation of bailouts reduces the riskiness of assuming debt; thus, a legacy of bailouts leads to excessive borrower risk taking.

Given that there are costs and benefits to bailouts, there is an optimal size where maximization of benefits minus costs occurs. The point where that occurs depends on whether the government imposes a tax on debt, Bianchi argues. Such a tax will reduce the incentive to hold debt. Thus, if a policy of bailouts during financial crises leads to a moral hazard where credit-constrained parties take on more debt, the tax on debt will temper the incentive to take riskier positions. Quantitatively, Bianchi finds that when a tax on debt limits this incentive, a government policy of bailouts during crises is optimal. Specifically in his model, Bianchi finds that a government bailout equal to about 2 percent of gross domestic product is optimal. However, Bianchi finds that when the bailout policy is not paired with a moral-hazard-inhibiting tax on debt, a government bailout policy is not optimal. The tendency of a policy of bailouts to lead to excessive risk taking—absent a debt tax—is too strong, and periodic instances of financial instability without bailouts are preferable to the moral hazard of regularly bailing out credit-constrained firms.

Banking and International Business Cycle Transmission

The first paper of the third session was presented by Bent Sorensen of the University of Houston (coauthored with Sebnem Kalemli-Ozcan of Hoc University and Harvard University and Sevcan Yesiltas of Johns Hopkins University). The authors present a new set of stylized facts about banking and leverage during the 2000–09 period using internationally comparable firm and bank microdata.

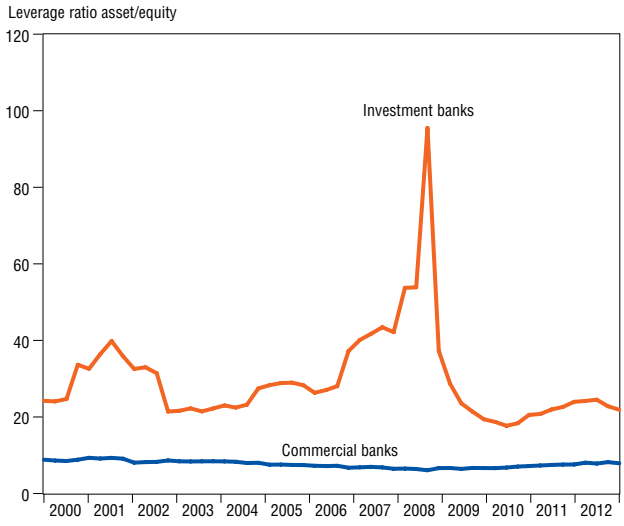
Sorensen documents how in the years prior to the crisis, investment banks in many countries significantly increased their leverage. However, at the same time, leverage ratios for commercial banks or nonfinancial firms didn't notably rise (*Chart 1*). Moreover, Sorensen reported, investment banks' leverage ratio is strongly procyclical. This is also true for the commercial banking sector, though it's driven by procyclical leverage in a few big commercial banks. The median commercial bank did not have a procyclical leverage ratio in the years leading to the crisis, he found.

Given that he is compiling a set of stylized facts from an internationally comparable set of bank- and firm-level microdata, Sorensen could compare the behavior of leverage in different countries with different regulator regimes. Banks in emerging markets with tighter bank regulation did not experience the same buildup of leverage in the years prior to the crisis, he found. Thus, differences in the regulatory regime across countries were important for determining international differences in the debt buildup and procyclicality of leverage in the past decade.

In the second paper in this session, Linda Goldberg from the New York Fed (with Nicola Cetorelli, also of the New York Fed) examined how liquidity management among multinational banks led to the international transmission of the recent

Chart 1

Leverage Diverges at Investment, Commercial Banks at Crisis Onset



SOURCE: Federal Reserve Flow of Funds.

financial crisis (*Chart 2*). Goldberg starts with the simple observation that global intrabank financial flows are as large as global interbank flows. When a large multinational bank experiences funding problems at one of its affiliates, funds are transferred from within. Thus, liquidity is affected at the large multinational bank's other affiliates, leaving reduced funding for their own customers.

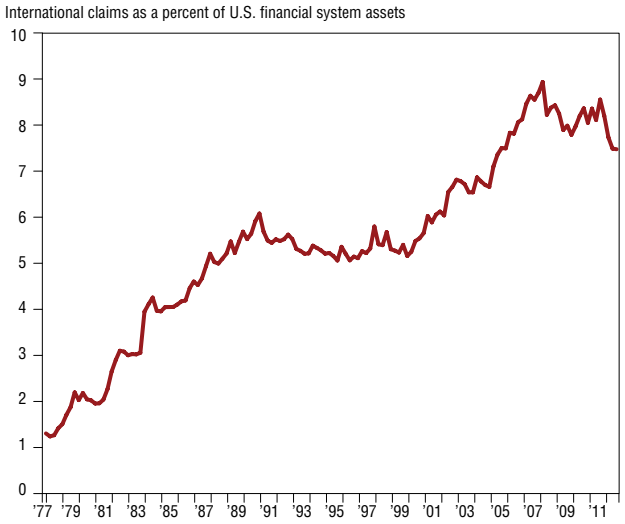
Goldberg looks at large multinational banks with U.S. affiliates. The hypothesis: During the financial crisis, parent banks pulled funds from affiliates in countries unaffected by the crisis. This led to a liquidity shortage in affiliates that the crisis hadn't originally touched, thus leading to rapid international transmission during the crisis. Specifically, Goldberg found that for every $1 that a foreign parent bank pulled out of a U.S. affiliate, the affiliate reduced lending by 40 cents.

The conference's final paper was presented by Vincenzo Quadrini of the University of Southern California (coauthored with Fabrizio Perri of the University of Minnesota and the Federal Reserve Bank of Minneapolis). Quadrini also studied rapid international transmission during the recent financial crisis. He examined various explanations, such as a large global adverse shock or propagation through usual trade and financial channels. None of them, he concluded, offers a satisfactory explanation for the spread of the crisis. Quadrini instead started with the premise that both credit expansions and contractions result from self-fulfilling expectations. Because of these self-fulfilling expectations, credit expansions or contractions are each stable equilibria. If investors start to worry about the creditworthiness of a borrower, they restrict credit, which ultimately leads to bankruptcy. In this way, the economy switches between these two equilibria following a change in investor sentiment.

In a model, Quadrini showed how this process of switching between two equilibria can lead to the rapid international transmission of a crisis. In the model, two countries are linked by integrated financial markets. If investor mood shifts from optimism to pessimism in one country, borrowers there will face a liquidity shortage. They will pull funds from the other country (similar to the way funds are channeled between affiliate banks in Goldberg's paper). This will lead to a drain of liquidity from the second country, and investors there will turn pessimistic and a credit crunch will become self-fulfilling. Given this possibility for multiple equilibria, an exogenous change in investor mood in one country will endogenously lead to a change in investor mood in the other country, and the extent and speed of international transmission of a crisis are far greater than would have been achieved through financial channels alone, Quadrini showed.

Chart 2

Foreign Interest in U.S. Financial System Assets Rises Amid Globalization



SOURCES: Bank for International Settlements Locational Banking Statistics, Federal Reserve Flow of Funds

Conclusion

The recent financial crisis raised many interesting issues related to the role and conduct of monetary policy in an open economy under financial frictions.

A crisis, which began as a housing bubble and subprime crisis in the United States and a handful of other countries, quickly spread worldwide, raising questions about how international financial linkages create a truly global recession. About half the papers in this conference were specifically related to the issue of international financial integration and propagation through integrated financial markets. The role of liquidity, and specifically that of banks in the international propagation of the recent crisis, is not well understood. Goldberg's paper on global banks and the international spread of the crisis helped shed light on this transmission

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mechanism by empirically showing that liquidity transfers between affiliates of large global parent banks were in part responsible for propagation of the recent crisis.

Liquidity, and its larger macroeconomic effect, is a very difficult issue to think about theoretically. Quadrini's paper on international recessions showed that, theoretically, this issue of liquidity can lead to self-fulfilling equilibria, where investors may switch between self-fulfilling moods of optimism and pessimism. In a financially integrated global economy, these self-fulfilling changes in investor mood have global implications. Work in this area still leaves unanswered questions, but it definitely offers an interesting avenue for further research where this abstract notion of a liquidity crisis can potentially explain the rapid international transmission of what began as a U.S. subprime lending crisis.

The beginning of the financial crisis in August 2007 led to an unprecedented series of actions by central banks and policymakers around the world. Since the only historical precedent for a financial crisis of this scale was the Great Depression, policymakers did not have a large menu of tested options from which to choose. Many important responses to the crisis were decided over the weekend and were not tested using formal macroeconomic tools. About half the papers in this conference addressed the issue of optimal monetary policy in a financial crisis. The papers presented by Davis and Lombardo specifically looked at the issue of how the central bank should alter its usual interest-rate rule in the presence of financial frictions. Lombardo showed how incorporating financial frictions into a model opens up a new set of policy trade-offs affecting optimal monetary policy—such as the trade-off between price level stability and financial stability, or the link between exchange-rate stability and financial stability.

The financial crisis also saw an unprecedented degree of international central bank cooperation. As discussed during the conference, past work on central bank cooperation that did not include financial frictions or international financial linkages only found a modest benefit to central bank cooperation. Policy spillovers were not great, so cooperation had only a marginal effect. As shown in the Dedola paper, this finding is reversed when one considers the role of financial frictions and international financial linkages. Here, the international spillovers from monetary policy are so large as to lead to significant benefits from central bank cooperation. And thus, the papers in this conference discussed not only the conduct of optimal monetary policy when a central bank needs to take financial frictions into account, but also the high degree of international transmission and extent of policy spillovers. In a world of increasing financial globalization, future optimal monetary policy will involve not just one central bank reacting to domestic financial matters, but cooperation among policymakers globally.

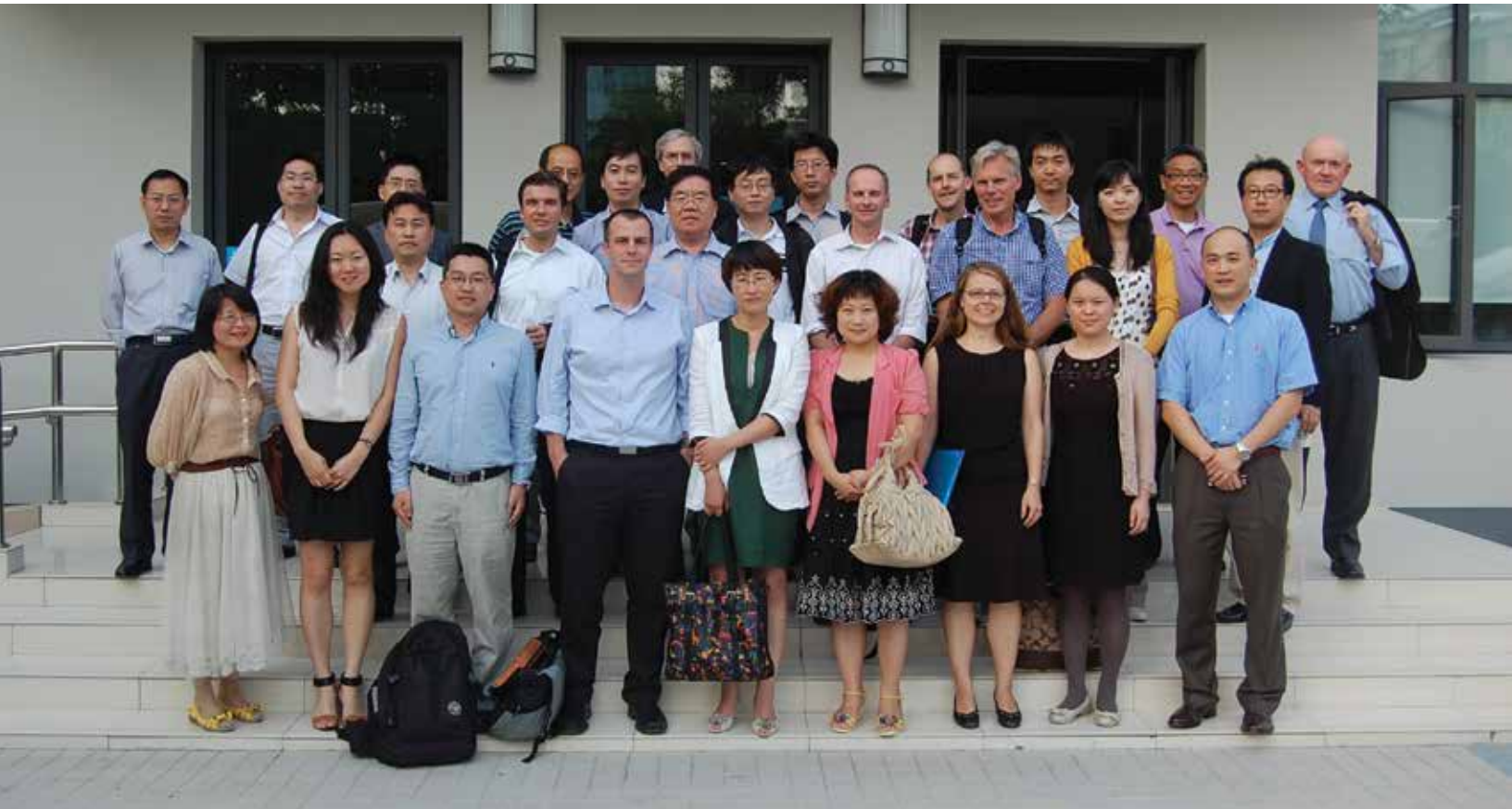
Gauging International Shocks and Their Implications

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 antidumping 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

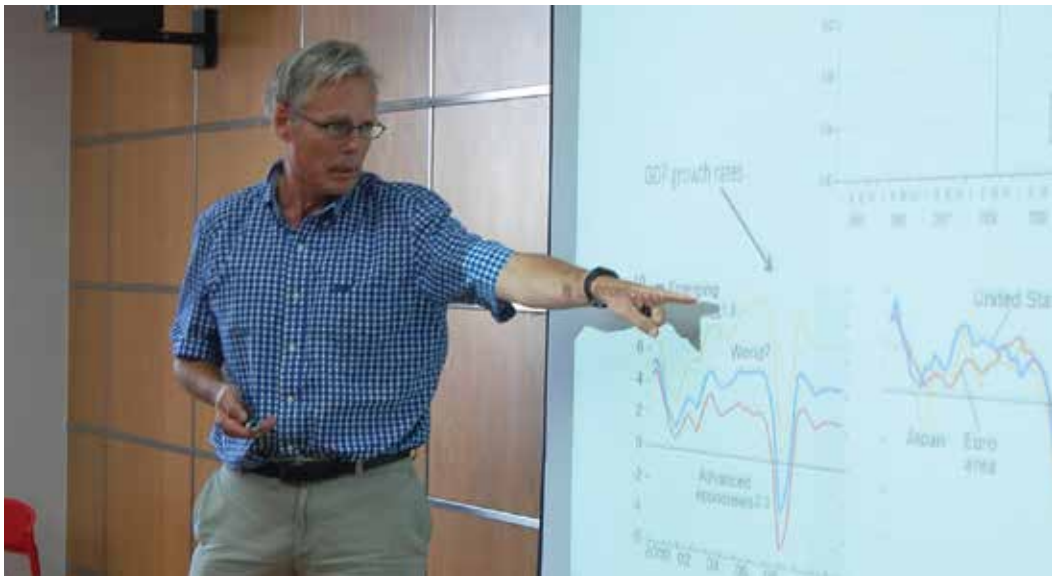
nominal interest rate is at the zero lower bound).

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 the impact or the extent of transmission.

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.



Eric van Wincoop of the University of Virginia.

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?

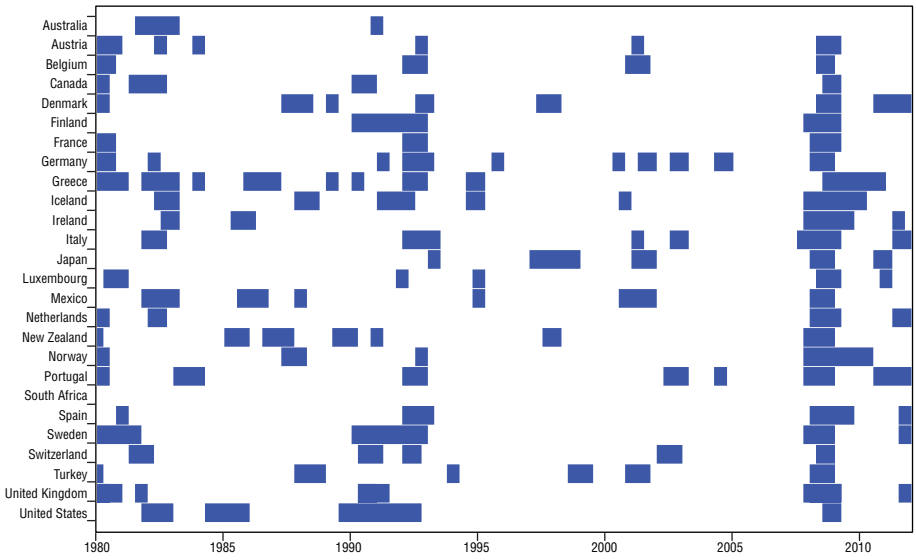
Standard international macro models usually fail to replicate international comovement of investment and output. Unless one assumes an unrealistically high correlation of shocks, these models usually generate small or even negative cross-country correlation of investment and output. By comparison, investment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

Summary of Activities 2012

Since its creation in 2007, the Globalization and Monetary Policy Institute's core activities have been twofold: first, keeping Federal Reserve Bank of Dallas President Richard Fisher and other senior Bank management apprised of world economic developments and their implications for U.S. monetary policy; and second, disseminating cutting-edge research on globalization's impact through the institute's dedicated working paper series. Prior to each regularly scheduled Federal Open Market Committee meeting, institute staff prepare a summary of international economic conditions as part of a larger briefing book. Institute staff also regularly brief the Bank's board of directors, supply speech material to senior management, deliver their own speeches and participate in other ways in the Bank's various economic outreach programs.

On the research front, as of year-end 2012, the institute had circulated 134 papers in its working paper series, and many of these papers have since been published in peer-reviewed journals. The ultimate measure of a paper's quality is whether and where it is published and how frequently it is cited. In the interim, a reasonable proxy for impact is the frequency with which papers are downloaded from the Bank's website. Chart 1 uses data from the RePEc (Research Papers in Economics) database to track abstract views and downloads for the institute's working paper series since the series began in fall 2007. We see a steady growth in both abstract views and downloads (as we might expect, given the steady additions to the series over the years). While total downloads were off slightly in 2012 (1,963 versus 2,246 in 2011), abstract views were up (from 3,991 to 4,653).

We made progress on other fronts as well, with institute staff presenting their work at a variety of research forums, moving papers through the publication process and initiating new projects. We also deepened our global network of research associates.

Academic Research

Alexander Chudik had three papers accepted for publication during the year: "Thousands of Models, One Story: Current Account Imbalances in the Global Economy," (with M. Ca' Zorzi and A. Dieppe) published in *Journal of International Money and Finance*; "Aggregation in Large Dynamic Panels," (with M.H. Pesaran) accepted for publication in *Journal of Econometrics*; and "A Simple Model of Price Dispersion," published in *Economics Letters*. Enrique Martínez-García and Mark Wynne's paper "Bayesian Estimation of NOEM Models: Identification and Inference in Small Samples" was accepted for publication in *Advances in Econometrics*. Janet Koech and Mark Wynne's paper "Core Import Price Inflation in the United States" was accepted for publication in *Open Economies Review*. At year end, staff had papers under review at *Journal of Political Economy, Journal of International Economics, Journal of Monetary Economics, Journal of Applied Econometrics, B.E. Journal of Macroeconomics, European Economic Review* and *Quarterly Journal of Economics*.

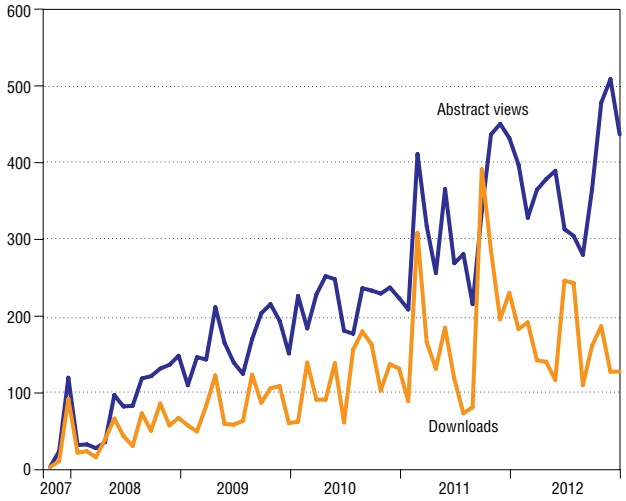
Conferences

The institute organized two conferences during 2012. The first, "Financial Frictions and Monetary Policy in an Open Economy," was organized by Scott Davis, Michael Devereux and Mark Wynne and held at the Dallas Fed in March. The second, "International Linkages in a Globalized World and Implications for Monetary Policy," was jointly organized with Shanghai University of Finance and Economics and Shanghai Institute of Finance and Law, and held in Shanghai in June. Summaries of the papers presented at both conferences are included elsewhere in this annual report.

As in previous years, staff have been active in presenting their work in external forums. Institute staff presented their research at a variety of conferences in 2012, including Bank for International Settlements, Midwest Macroeconomics Meetings,

European meetings of the Econometric Society, Federal Reserve Bank of San Francisco annual Pacific Basin Research Conference, Federal Reserve System Committee on International Economic Analysis, Hong Kong Institute for Monetary Research's Summer Workshop, Southern Economic Association meetings, University of Texas at Arlington, Vanderbilt University, Ohio University and the annual meeting of the Western Economic Association.

Chart 1
Institute Working Papers Draw Increased Attention



SOURCE: Research Papers in Economics (RePEc) database, http://logec.repec.org/scripts/seriesstat.pf?item=repec:fip:feddgw (accessed: Feb. 25, 2013).

Bank Publications

Institute staff contributed six articles to the Bank's *Economic Letter* publication during the year: "Increased Real House Price Volatility Signals Break from Great Moderation" (by Adrienne Mack and Enrique Martínez-García); "Economic Rebounds in U.S. and Euro Zone: Deceivingly Similar, Strikingly Different" (by Anthony Landry and Carlos E.J.M. Zarazaga); "China's Slowdown May Be Worse Than Official Data Suggest" (by Janet Koech and Jian Wang); "One-Size-Fits-All Monetary Policy: Europe and the U.S." (by Mark Wynne and Janet Koech); "Bringing Banking to the Masses, One Phone at a Time" (by Janet Koech); and "Inflation Expectations Have Become More Anchored Over Time" (by Scott Davis). The Bank's *Economic Letter* and this annual report are intended to disseminate research to a broader audience than technical experts in economics. Of particular note in 2012 was the selection of Janet Koech's essay "Hyperinflation in Zimbabwe" (published in the institute's 2011 annual report) for inclusion in the Recommendations for Further Reading section of the spring 2012 edition of the American Economic Association's *Journal of Economic Perspectives*. Finally, Alexander Chudik's paper "How the Global Perspective Can Help Us Identify Structural Shocks" (with Michael Fidora) was published in the Bank's *Staff Papers* series.

People

Two staff members spent the spring semester on leave at academic institutions. Anthony Landry spent the semester at the University of Pennsylvania's Wharton School, and Enrique Martínez-García taught at the University of Texas at Austin. Shushanik Papanyan visited the institute in the spring to work on a project to develop global economic indicators. We also hosted two PhD interns over the summer: Ayse Kabukçuoglu from UT Austin and Sarah Le Tang from Brandeis. Payton Odom left the institute early in the summer to take up a Fulbright scholarship in Mexico. Valerie Grossman—a recent SMU graduate—took his place. A recent University of Iowa PhD graduate, Michael Sposi, joined us as a new staff member at the beginning of September, filling the opening left by the departure of Simona Cociuba last year. Jian Wang joined the editorial board of *Pacific Economic Review*.

This year we recruited 20 new research associates to our network: Javier Bianchi (University of Wisconsin–Madison), Hafedh Bouakez (HEC Montréal), Bo Chen (Shanghai University of Finance and Economics), Hongyi Chen (Hong Kong Institute for Monetary Research), Yin-Wong Cheung (University of California, Santa Cruz/City University of Hong Kong), Dudley Cooke (University of Exeter), Roberto Duncan (Ohio University), Aitor Erce (Bank of Spain), Pedro Gete (Georgetown University), Yi Huang (International Monetary Fund), Charles Ka Yui Leung (City University of Hong Kong), Nan Li (Ohio State University), Shu Lin (Fudan University), Tuan Anh Luong (Shanghai University of Finance and Economics), Césaire Meh (Bank of Canada), Simone Meier (Swiss National Bank), Deokwoo Nam (City University of Hong Kong), Vincenzo Quadrini (University of Southern California), Bent E. Sorensen (University of Houston) and Cédric Tille (Graduate Institute of International Development Studies).

Working Papers Issued in 2012

All institute working papers are available on the Dallas Fed website at www.dallasfed.org/institute/wpapers/.

No. 104
Optimal Monetary Policy in a Two Country Model with Firm-Level Heterogeneity
Dudley Cooke

No. 105
Bayesian Estimation of NOEM Models: Identification and Inference in Small Samples
Enrique Martínez-García, Diego Vilán and Mark Wynne

No. 106
Financial Markets Forecasts Revisited: Are They Rational, Herding or Bold?
Ippei Fujiwara, Hibiki Ichiue, Yoshiyuki Nakazono and Yosuke Shigemi

No. 107
Liquidity, Risk and the Global Transmission of the 2007–08 Financial Crisis and the 2010–11 Sovereign Debt Crisis
Alexander Chudik and Marcel Fratzscher

No. 108
Accounting for Real Exchange Rates Using Micro-Data
Mario J. Crucini and Anthony Landry

No. 109
Policy Regimes, Policy Shifts, and U.S. Business Cycles
Saroj Bhattarai, Jae Won Lee and Woong Yong Park

No. 110
International Reserves and Gross Capital Flows: Dynamics During Financial Stress
Enrique Alberola, Aitor Erce and José Maria Serena

No. 111
The Perils of Aggregating Foreign Variables in Panel Data Models
Michele Ca' Zorzi, Alexander Chudik and Alistair Dieppe

No. 112
A Simple Model of Price Dispersion
Alexander Chudik

No. 113
Hedging Against the Government: A Solution to the Home Asset Bias Puzzle
Tiago C. Berriel and Saroj Bhattarai

No. 114
Are Predictable Improvements in TFP Contractionary or Expansionary: Implications from Sectoral TFP?
Deokwoo Nam and Jian Wang

No. 115
Does Foreign Exchange Intervention Volume Matter?
Rasmus Fatum and Yohei Yamamoto

No. 116
The Few Leading the Many: Foreign Affiliates and Business Cycle Comovement
Jörn Kleinert, Julien Martin and Farid Toubal

No. 117
Central Bank Credibility and the Persistence of Inflation and Inflation Expectations
J. Scott Davis

No. 118
Do Good Institutions Promote Counter-Cyclical Macroeconomic Policies?
César Calderón, Roberto Duncan and Klaus Schmidt-Hebbel

No. 119
Modelling Global Trade Flows: Results from a GVAR Model
Matthieu Bussière, Alexander Chudik and Giulia Sestieri

No. 120
Global Banks, Financial Shocks and International Business Cycles: Evidence from an Estimated Model
Robert Kollmann

No. 121
In the Shadow of the United States: The International Transmission Effect of Asset Returns
Kuang-Liang Chang, Nan-Kuang Chen and Charles Ka Yui Leung

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The Between Firm Effect with Multiproduct Firms
Tuan Anh Luong

No. 123
Global Slack as a Determinant of U.S. Inflation
Enrique Martínez-García and Mark A. Wynne

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Inflation Dynamics: The Role of Public Debt and Policy Regimes
Saroj Bhattarai, Jae Won Lee and Woong Yong Park

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Quality Pricing-To-Market
Raphael A. Auer, Thomas Chaney and Philip Sauré

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Ultra Easy Monetary Policy and the Law of Unintended Consequences
William R. White

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Selective Sovereign Defaults
Aitor Erce

No. 128
Does the IMF's Official Support Affect Sovereign Bonds Maturities?
Aitor Erce

No. 129
Price Equalization Does Not Imply Free Trade
Piyusha Mutreja, B. Ravikumar, Raymond Riezman and Michael Sposi

No. 130
Market Structure and Exchange Rate Pass-Through
Raphael A. Auer and Raphael S. Schoenle

No. 131
Core Import Price Inflation in the United States
Janet Koech and Mark A. Wynne

No. 132
IKEA: Product, Pricing, and Pass-Through
Marianne Baxter and Anthony Landry

No. 133
Efficient Bailouts?
Javier Bianchi

No. 134
The Effect of Commodity Price Shocks on Underlying Inflation: The Role of Central Bank Credibility
J. Scott Davis

New Colleagues at the Institute

New Research Associates

Javier Bianchi
University of Wisconsin–Madison

Hafedh Bouakez
HEC Montréal

Bo Chen
Shanghai University of Finance and Economics

Hongyi Chen
Hong Kong Institute for Monetary Research

Yin-Wong Cheung
UC Santa Cruz/City University of Hong Kong

Dudley Cooke
University of Exeter Business School

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Ohio University

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Césaire Meh
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Simone Meier
Swiss National Bank

Deokwoo Nam
City University of Hong Kong

Vincenzo Quadrini
University of Southern California

Bent E. Sorensen
University of Houston

Cédric Tille
Graduate Institute of International and Development Studies, Geneva

New Staff at the Institute

Michael Sposi joined the Dallas Fed in August 2012. He has previously served as a visiting scholar at the St. Louis Fed. His research explores the role of international trade in explaining international prices, as well as the links between international trade and the process of economic development. He holds a PhD in economics from the University of Iowa.

Valerie Grossman has been a research assistant in the Globalization and Monetary Policy Institute since July 2012. A native of Dallas, she graduated summa cum laude from SMU in May 2012 with a BS in economics and a BA in advertising, receiving both departments' top academic achievement awards. While attending SMU, she was also a research assistant for Dr. Isaac Mbiti's work on Kenyan remittances.

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Mark A. Wynne

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President, Center for Financial Studies (Germany)

Horst Köhler
Former President of the Federal Republic of Germany

Finn Kydland
Jeff Henley Professor of Economics, University of California, Santa Barbara
Recipient, 2004 Nobel Memorial Prize in Economic Sciences

Guillermo Ortiz
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Thomas D. Cabot Professor of Public Policy, Harvard University

Masaaki Shirakawa
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Charles Engel
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Karen Lewis
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Paul M. Hammaker Professor of Business Administration, Darden Graduate School of Business, University of Virginia