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# Economic Letter

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## Globalization and the Changing Nature of the U.S. Economy's Influence in the World

by *Adriana Z. Fernandez and Alex Nikolsko-Rzhevskyy*

*Global economic integration may have made other countries more dependent on each other and weakened their initial responses to U.S. economic fluctuations.*

As the U.S. economy started its downward slide in the summer of 2007, the rest of the world showed few signs of distress. Other countries' seeming immunity to U.S. troubles evoked the theory of decoupling. It holds that many nations now depend less on the U.S. for growth, insulating them to some extent from our business cycles.

A year later, the theory has lost some of its punch. Most economies now face threats to growth, leaving little doubt that the U.S. slowdown has spread to the rest of the world. A number of countries are suffering from decreasing U.S. consumer demand, and the U.S. mortgage sector's credit problems have spilled across borders, ensnaring financial institutions worldwide.



*Looking at nearly five decades of business-cycle patterns, we find a gradual decrease in how well current U.S. fluctuations explain changes in other countries' current economic activity.*

Today's desynchronization may signal that the nature of U.S. influence over other economies is changing, notably in terms of timing. In the past, when the U.S. sneezed, the rest of the world caught a cold almost immediately. This time, it took months for the U.S. sneeze to produce symptoms in other countries.

The timing change may be the product of globalization. The past few decades have brought reductions in trade barriers, increases in capital flows and surges in labor migration. In addition, financial deregulation, financial innovation and changes in the conduct of monetary policy have gradually multiplied many countries' economic ties to the rest of the world.

A more integrated world economy decreases other nations' direct or immediate—but not necessarily their longer term—dependence on the U.S. Increasingly complex linkages may have, in fact, made countries respond to U.S. fluctuations with longer delays.

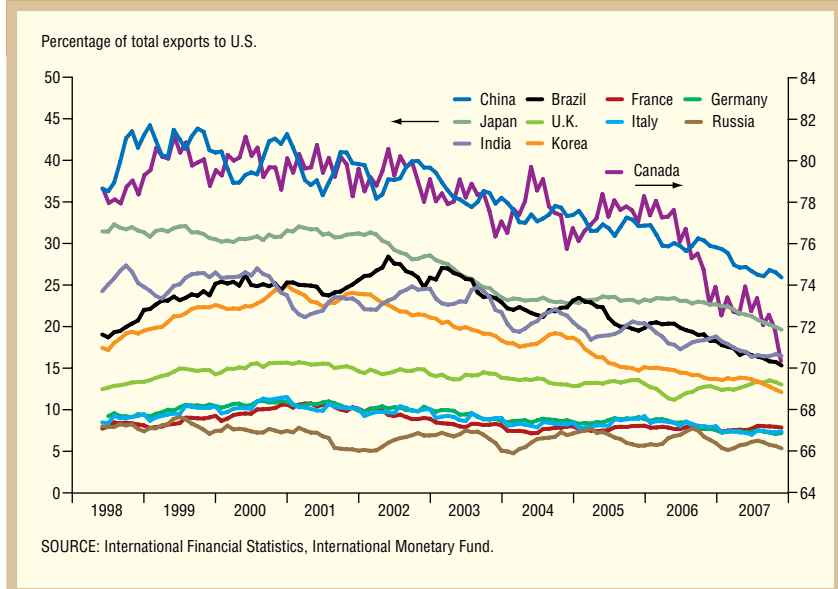
Take China. The country has gradually increased exports to the European Union at the expense of

sales to the U.S. However, China may not necessarily be less vulnerable to U.S. fluctuations because it might still be indirectly influenced by how U.S. trends affect the EU. These indirect effects, of course, would take longer to show up. The same pattern could hold for other countries that have diversified their trade ties (*Chart 1*).

Trade is only one factor in overall economic fluctuations. We use a broader perspective to determine whether U.S. influence now takes longer to manifest itself. Looking at nearly five decades of business-cycle patterns, we find a gradual decrease in how well current U.S. fluctuations explain changes in other countries' current economic activity. We also find that U.S. cyclical movements since the early 1980s have affected other economies with a lag, rather than contemporaneously, suggesting it now takes longer for U.S. trends to spread around the world.

At the same time, U.S. shocks' cumulative effects have tended to increase over time and take longer to dissipate. This suggests U.S. economic

**Chart 1**  
**Key Exporting Countries Depend Less on U.S.**





influence may not be decreasing in the long run. Instead, the delay between U.S. fluctuations and their full manifestations abroad seems to be increasing.

### Current and Past Cycles

Business cycles are temporary deviations from an economy's long-term growth path. We track these short-term fluctuations for the U.S. and 11 other countries, using quarterly data from the beginning of 1960 to the end of 2007.<sup>1</sup>

To measure output, we use real gross domestic product for the U.S., Canada, Japan and the U.K. Industrial production indexes provide the long data series for Belgium, Denmark, France, India, Italy, Korea, the Netherlands and Spain. Data limitations preclude tracking two major trading partners, China and Mexico.<sup>2</sup>

In studying business cycles, we believe it's important to use real-time data because firms and individuals base decisions about inward capital flows and investments on the growth expectations, recession announcements and other factors available at the time. Both private and federal agencies—for example, the National Bureau of Economic Research, the entity that dates U.S. recessions—operate with real-time data only.<sup>3</sup>

How well do current U.S. cyclical movements explain other countries' current economic fluctuations? We conduct simple pairwise correlations of real-time business cycles, making estimates for moving windows of 80 quarters, or 20 years.<sup>4</sup> This technique allows us to track the correlations' long-term evolution, giving a good idea of how U.S. influence has changed over time.

Among a group of EU members—Belgium, Denmark, France, Italy, the Netherlands, Spain and the U.K.—the correlations show a slow but steady decrease in U.S. business cycles' immediate impact (*Chart 2A*). The decline is more pronounced after the 1981–2001 window; even then, it's undeniable

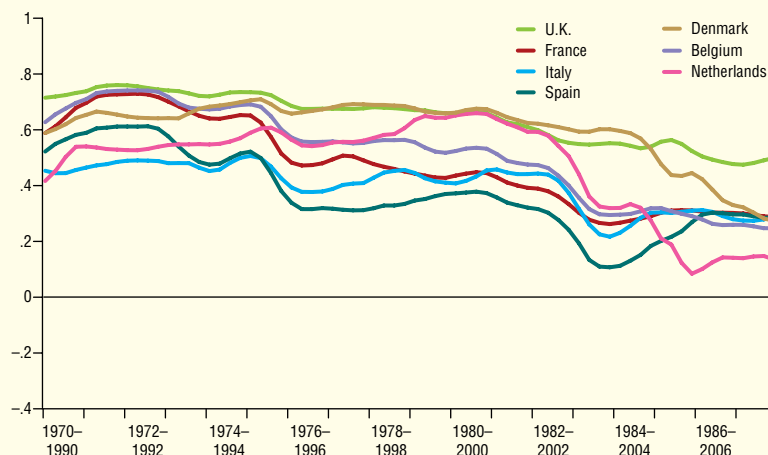
Chart 2

## Impact of Current U.S. Business Cycles Diminishes Overseas

Values closer to 1 indicate strong contemporaneous responses to changes in the U.S. economy; lower values suggest weaker links. In recent decades, other nations have become less sensitive to U.S. trends.

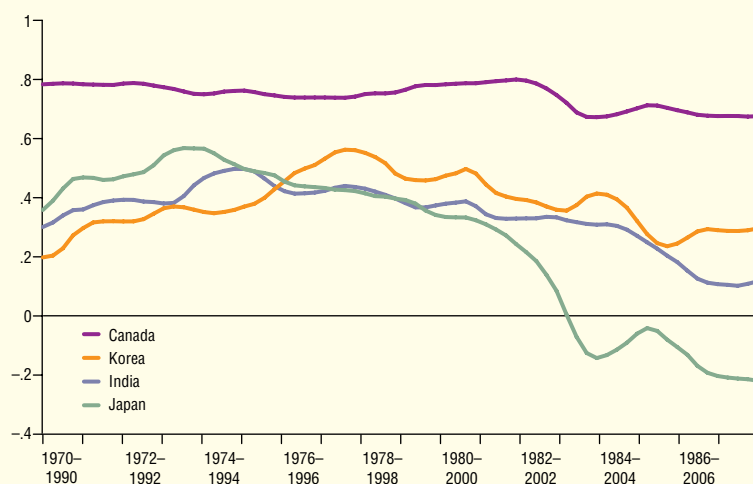
### A. European Union Nations

Correlation with U.S. business cycles (percent)



### B. Other Trading Partners

Correlation with U.S. business cycles (percent)



SOURCES: International Financial Statistics, International Monetary Fund; authors' calculations.

that the U.S. still exerts significant influence over most EU members, especially the U.K.

U.S. influence also ebbs for a group of non-EU countries—Canada, Japan, India and Korea (*Chart 2B*).

Canada remains a top U.S. trading partner, but its economic synchronization with its southern neighbor has eroded slightly. In this group, the correlations show bigger declines after the 1981–2001 window, especially for

Japan. This is most likely due to the country's severe recession throughout the 1990s and into the 2000s.

The correlations' faster decline after the 1981–2001 window suggests that the effect of current U.S. fluctuations on other economies' contemporaneous performance is gradually diminishing. This decline may reflect a higher degree of countries' exposure to outside economic forces.

The 1970s saw the end of the Bretton Woods system's fixed exchange rates as well as global events like oil shocks and financial crises. These developments set the stage for a step-up in the pace of globalization in the 1980s, with notable increases in the international trade of goods and services and in cross-border capital flows.

Overall, the analysis suggests a gradual decrease in the ability of current U.S. economic conditions to explain other countries' current fluctuations. If U.S. fluctuations had affected other countries only contemporaneously, the results could have been interpreted as a decrease in U.S. impact on economies abroad. However, the latest episode shows delays in U.S. influence, suggesting that it may now take time for U.S. trends to manifest themselves in other countries' economies.

A correlation analysis of the world's reaction to the latest U.S. economic slowdown would have underestimated U.S. influence in the beginning of the crisis. To overcome this problem, we apply a different technique that allows past U.S. fluctuations to affect current fluctuations in other countries.<sup>5</sup> We use four quarters to capture the possibility that the effects may take up to a year to surface. To determine how past U.S. business cycles have affected other countries over the years, we use an 80-quarter moving window starting in the fourth quarter of 1969, just as we did with the correlations.<sup>6</sup>

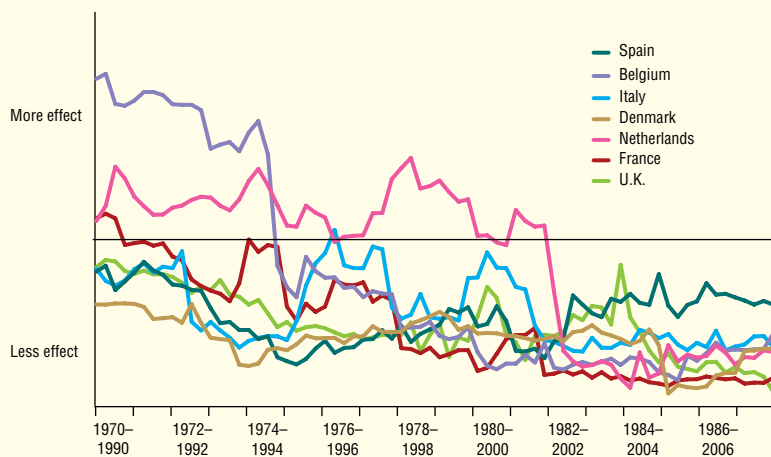
Our findings show an overall downward drift for both the EU mem-



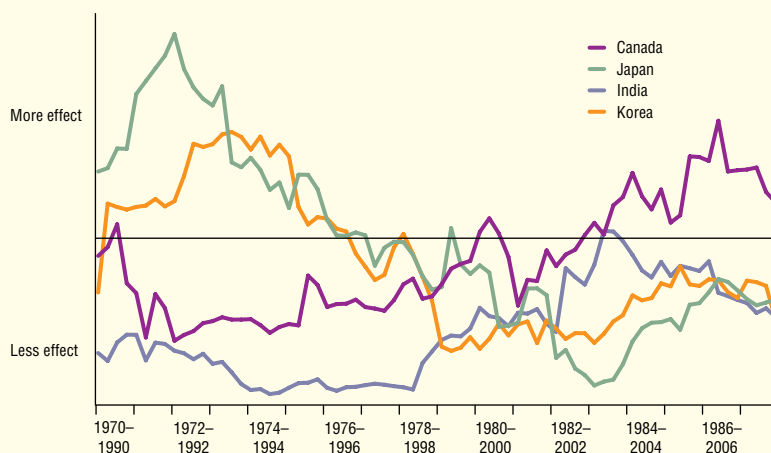
Chart 3

Impact of Past U.S. Business Cycles Weakens, Then Stabilizes

A. European Union Nations



B. Other Trading Partners



NOTE: Results are based on Granger causality, which measures whether past U.S. business cycles affect current business cycles in other countries.

SOURCES: International Financial Statistics, International Monetary Fund; authors' calculations.

bers and the other countries, indicating a weakening of U.S. cyclical movements' lead over fluctuations in most other countries (Charts 3A, B). The statistics above the black line represent instances in which some or all of the four previous quarterly U.S. cyclical movements do affect current cycles in other countries with 95 percent prob-

ability. Statistics below the black line indicate that all of them do not.

The downward drift is especially pronounced prior to the 1981–2001 window, which suggests past U.S. fluctuations had rapidly decreasing importance for other countries' current activity in the earlier part of the sample. After 1981–2001, the downward



drift gets smoother and stabilizes or, in some cases, reverses.

It's possible that the global interaction of demand, potential supplies and expectations began to truly open national economies to influences from abroad in the early 1980s, challenging traditional U.S. preeminence. With a higher and broader degree of exposure to the rest of the world, countries wouldn't react exclusively nor immediately to U.S. developments. In this setting, however, past U.S. fluctuations would regain their importance and increase their impact on other countries' business cycles. This would be consistent with previous results that show U.S. economic fluctuations affect other countries with a delay rather than contemporaneously.

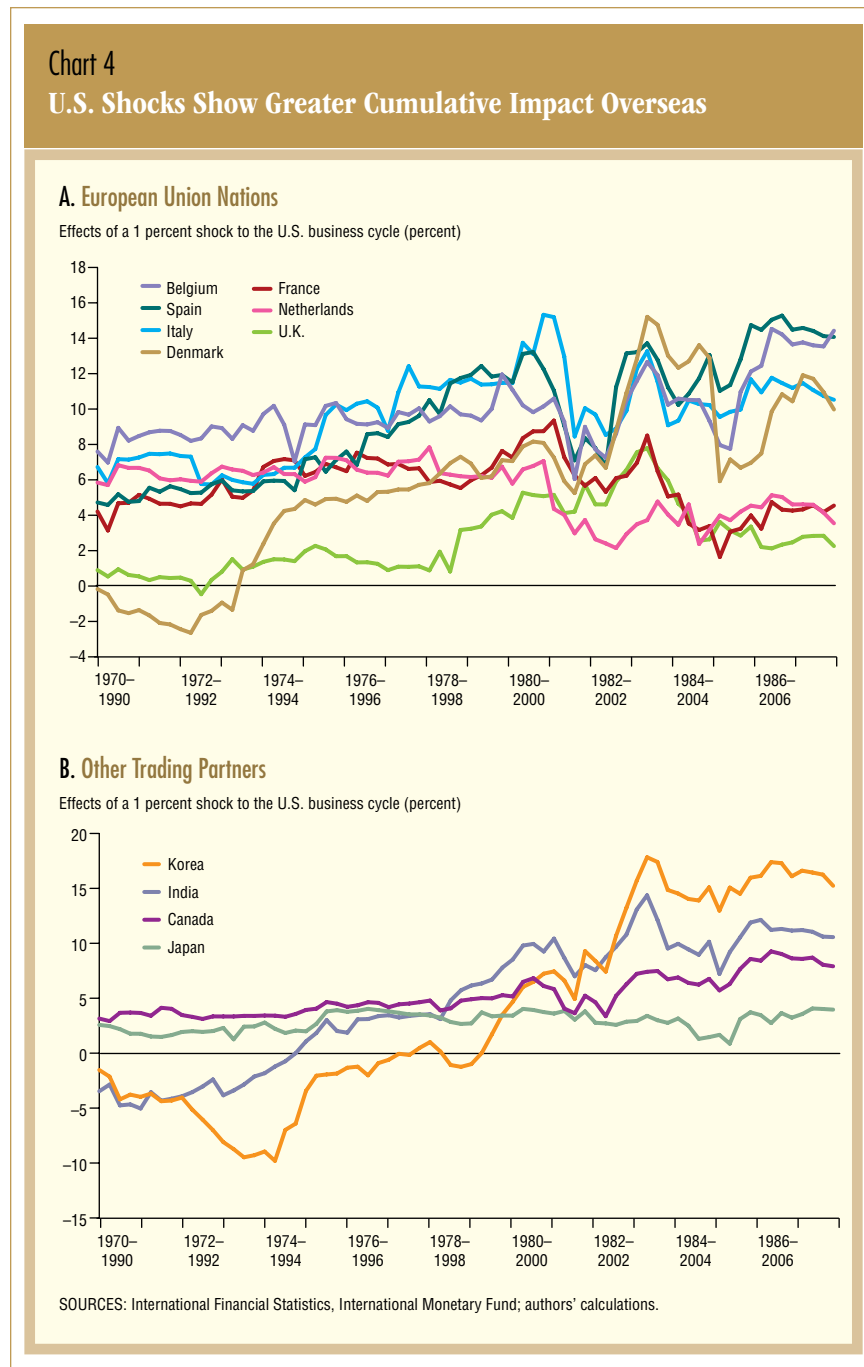
### Shocks and Their Ripples

Unexpected events—for example, the current financial crisis—often send ripples through the global economy. For a broader perspective, we focus on how shocks to current U.S. business cycles impact other countries' fluctuations and consider the duration of these effects.

Impulse-response analysis explains the initial impact of current U.S. shocks on other economies. We look at a 1 percent U.S. shock and measure the percent change in other countries' current cyclical movements. Generally, impulse responses take some time before they disappear. The cumulative response can be derived by adding up the effects until they die out. Once again, we use 80-quarter windows to capture changes over time.

For the seven EU countries, the cumulative effects rise, particularly after the 1981–2001 window (*Chart 4A*). Other key U.S. trading partners show similar patterns (*Chart 4B*). This suggests that U.S. shocks now have greater impact on other economies and, therefore, may take longer to dissipate. The full effect isn't seen immediately; instead, it shows up over time.

Overall, U.S. influence isn't neces-



sarily decreasing but taking longer to fully appear. That may help explain the delayed response of the rest of the world to the latest U.S. economic slowdown. To understand this timing change, we calculate how long it takes for the effects of a U.S. shock to disappear in other countries.

We measure the duration in other

countries of a 1 percent shock to U.S. economic activity by calculating half-lives, or half the time it takes for an impulse response to dissipate. Rolling 80-quarter windows allow us to catch timing changes in impulse responses over the years.

For the EU countries, the half-life for a U.S. economic shock increases



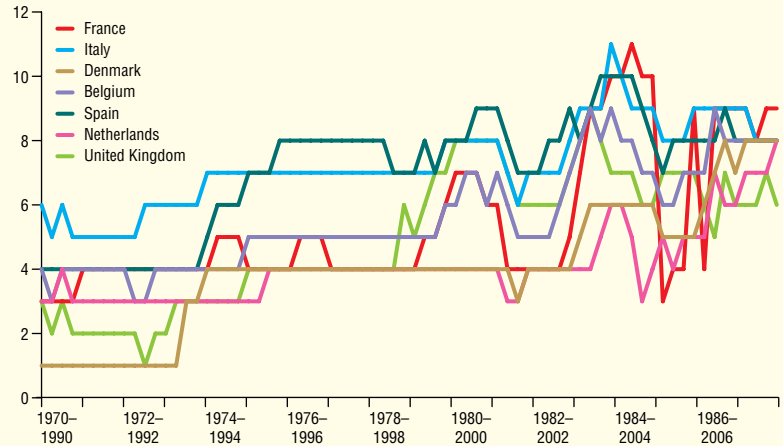
Chart 5

Half-Lives Show U.S. Shocks Felt for Longer Time Abroad

*We conclude that spillovers, on average, are larger and more delayed than in previous decades. At the same time, we find that spillovers are less predictable today.*

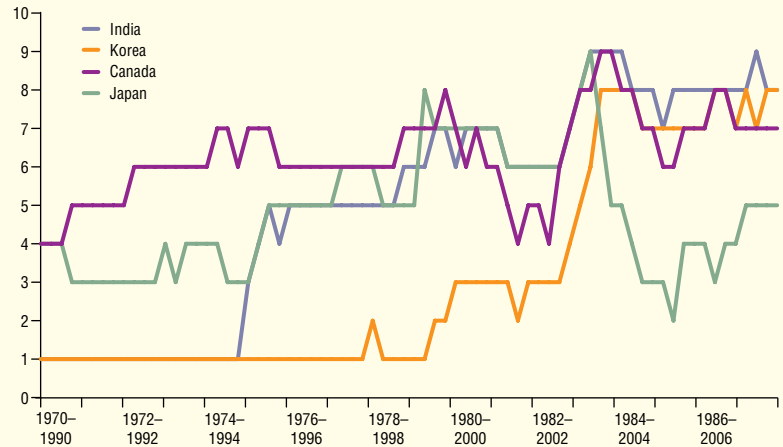
A. European Union Nations

Half the time it takes for a 1 percent U.S. shock to dissipate (quarters)



B. Other Trading Partners

Half the time it takes for a 1 percent U.S. shock to dissipate (quarters)



SOURCES: International Financial Statistics, International Monetary Fund; authors' calculations.

over the years. It takes one to six quarters for the first-window estimation and six to nine quarters for the last window (Chart 5A). The same occurs with the four other U.S. trading partners; half-lives range from one to four quarters in the first window and five to eight quarters in the last (Chart 5B).

The cumulative impact of U.S.

output shocks grows over time, and half-lives reveal longer lags in other countries' responses to those shocks. We conclude that spillovers, on average, are larger and more delayed than in previous decades. At the same time, we find that spillovers are less predictable today.

Globalization means countries are



more exposed than ever to outside economic forces and noneconomic developments in other nations. A shock in any given country has the potential of rippling through all the nations it interacts with, making the shock larger and more delayed.

In a more integrated economy, the increased probability of unexpected swings in supply or demand abroad, variations in exchange rates and social or political disturbances add to global uncertainty. In this context, U.S. output shocks are likely to have magnified downstream consequences. If the U.S. has a cumulatively larger and more delayed response to its own output shocks, these tendencies in other countries become less of a mystery.<sup>7</sup>

We look at the cumulative U.S. impact of a 1 percent shock and the shock's half-life. The results point to a cumulatively larger but not necessarily more delayed response in the U.S. economy (Chart 6). The greater cumulative response within the U.S. may partly explain why other countries' responses are also larger. However, the relative stability of the half-life may indicate that the other economies' delayed responses come from increased complexity in the avenues of transmission of U.S. influence, notably the multiplication of international trade links and the development of more sophisticated financial markets.

### Globalization's Role

Our results show that cyclical movements in the U.S. economy affect other economies with a lag, rather than contemporaneously. This is especially true after the early 1980s, when a clear acceleration in the pace of global integration took place. U.S. influence seems to show up gradually now, taking longer than it once did for the full effects of a shock to the U.S. business cycle to manifest in other economies. This suggests the U.S. may have less short-term impact over other economies, but it continues to exert strong longer-term influence over busi-

ness cycles worldwide.

The failure to appreciate these changes in the nature and timing of U.S. influence led some analysts to the theory of decoupling to explain the performance of other countries at the beginning of the U.S. slowdown in 2007. In light of our findings, decoupling doesn't describe the current relationship between the U.S. and foreign economies.

Global economic integration may have made other countries more dependent on each other and weakened their initial responses to U.S. economic fluctuations. This could help explain the delays seen in the worldwide response to the U.S. slowdown.

No longer do other countries catch a cold the moment the U.S. sneezes. They do catch a cold, but the onset is much slower and the effect is longer lasting.

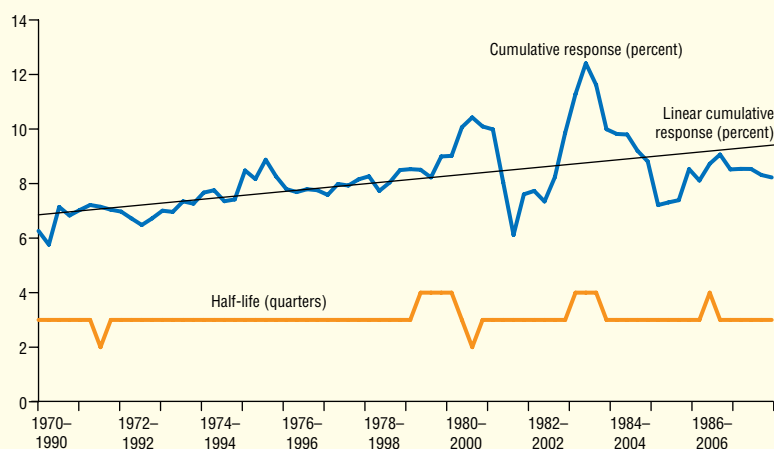
Understanding the changing nature of the U.S. economy's influence in the world and the global forces behind it decreases uncertainty and allows economic agents to make more informed

*No longer do other countries catch a cold the moment the U.S. sneezes. They do catch a cold, but the onset is much slower and the effect is longer lasting.*

Chart 6

### U.S. Shocks at Home: Stronger but Not Longer

Cumulative impact and half-life response in U.S. to a 1 percent shock to U.S. output.



SOURCES: International Financial Statistics, International Monetary Fund; authors' calculations.

decisions. If the lags between the economic ups and downs in the U.S. and the rest of the world are, in fact, increasing, other countries can better predict business cycles in their own economies, central bankers abroad can conduct proactive monetary policy in response to U.S. slowdowns and private businesses can better anticipate interest rate swings and demand shocks.

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## Notes

<sup>1</sup> To calculate potential output, we use a relatively recent technique called filtering. It involves filtering the data to remove the growth component, decomposing gross domestic product (GDP) into short-term fluctuations and slowly evolving trends. See "Band Spectrum Regression," by Robert F. Engle, *International Economic Review*, vol. 15, no. 1, 1974, pp. 1–11; "Postwar U.S. Business Cycles: An Empirical Investigation," by Robert J. Hodrick and Edward C. Prescott, *Journal of Money, Credit and Banking*, vol. 29, no. 1, 1997, pp. 1–16; and "Measuring Business Cycles: Approximate Band-Pass Filters for Economic Time Series," by Marianne Baxter and Robert G. King, *The Review of Economics and Statistics*, vol. 81, no. 4, 1999, pp. 575–93. Filtering may become very complex, but it can be regarded as a two-sided moving average of past and future GDP values. For real-time research, the two-sided nature poses problems for measuring the most recent business cycles because current output data points partly depend on future GDP values that aren't available. To overcome this problem, we estimate the series prior to applying the filter. See "How Accurate Are Real-time Estimates of Output Trends and Gaps?" by Mark Watson, Federal Reserve Bank of Richmond *Economic Quarterly*, Spring 2007, pp. 143–61.

<sup>2</sup> Our data come from the International Monetary Fund's International Financial Statistics. However, good-quality data aren't available on China and Mexico for the time span of this analysis.

<sup>3</sup> Real-time data aren't available for all the countries and the time span of this analysis. We reconstruct real-time output gap estimates using the pseudo-real-time approach. See "The Reliability of Inflation Forecasts Based on Output Gap Estimates in Real Time," by Athanasios Orphanides and Simon van Norden, *Journal of Money, Credit and Banking*, vol. 37, no. 3, 2005, pp. 583–601. To extract the cyclical component, we use Watson's (2007) version of the Baxter and King band-pass filter, which fixes the original filter's end-of-sample problem by first extending the series 25 years in both directions using an autoregressive model in annual growth rates. The initial output gap estimate covers the first 40 data points (from 1960:Q1 to 1969:Q4), and the resulting dataset with pseudo-real-time business cycles begins in 1969:Q4.

<sup>4</sup> Starting in 1969:Q4, the first point of our previously estimated real-time business cycles dataset, we calculate the correlation between the U.S. and the other countries from that point to 1989:Q4 (80 quarters later). Then we move the window one quarter ahead and calculate the correlation from 1970:Q1 to 1990:Q1 and so on until the end of the sample, from 1987:Q4 to 2007:Q4.

<sup>5</sup> The technique is called vector autoregressive, or VAR.

<sup>6</sup> We use the VAR framework to perform Granger causality tests and a simple likelihood test with which we essentially investigate whether statistics from the last four quarterly U.S. business cycles have an effect on the current cycles of other countries.

<sup>7</sup> The behavior of the unemployment rate suggests that U.S. growth recessions have been shallower but longer in the Great Moderation period, beginning in the mid-1980s, than they were before.

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