

Global Uncertainty and U.S. Exports

By Nicholas Sly

Exports of goods and services account for a substantial share of total U.S. economic activity, with a total value upward of 13 percent of GDP since the year 2000. With so much production, investment, and employment concentrated in the export sector, changes in foreign demand for U.S. goods have important implications for domestic growth. For example, in the early years of the current recovery, exports were a key driver of economic growth; in recent years, however, declining net exports have been a drag on economic growth. Recognizing the importance of the export sector to the U.S. economy, policymakers pay close attention to global factors that influence the demand for goods produced domestically.

In recent years, key factors such as foreign income levels and the value of the dollar have changed dramatically with clear consequences for the demand for U.S. goods. Another, less obvious factor that influences demand for U.S. exports is uncertainty about global growth and related financial volatility. In 2015, economic growth slowed in several emerging markets, with spillovers to their trading partners that are difficult to forecast. The fog does not seem to have cleared much in the beginning of 2016. Movement in oil prices, volatility in equity and bond markets, and changes in monetary policy environments across

Nicholas Sly is a senior economist at the Federal Reserve Bank of Kansas City. William Xu, a research associate at the bank, helped prepare the article. This article is on the bank's website at www.KansasCityFed.org.

countries have all contributed to uncertainty about future economic growth. Regardless of the total size or income of foreign economies, greater uncertainty about their expected growth path may deter resident consumers and firms from ordering goods and components produced in the United States. Likewise, greater certainty about future economic conditions may boost demand for U.S. goods even if foreign incomes and exchange rate levels remain unchanged.

In this article, I estimate how changes in global uncertainty influence foreign demand for U.S. exports. Evidence from 2002 to 2015 across the overwhelming majority of U.S. trading partners suggests periods of greater uncertainty are associated with substantially lower foreign demand for U.S. goods. Specifically, I find that a 1 percentage point increase in the spread between reported high and low foreign GDP growth forecasts, my preferred measure of economic uncertainty, is associated with 2.8 percent lower U.S. export activity on an annualized basis. Volatility in financial conditions within foreign countries, which often portends future volatility in real economic conditions, is also associated with substantially lower demand for U.S. exports, distinct from the role of global uncertainty. The evidence suggests that changes in global uncertainty and financial volatility have been relatively important determinants of U.S. exports in recent years.

Section I presents the empirical model I use to study the role of uncertainty in determining demand for U.S. exports. Section II explains how I measure economic uncertainty across countries and provides information about the trade and income data used in the analysis. Section III presents estimates of both the negative effect of global uncertainty on the demand for U.S. exports and the drag from heightened periods of financial volatility among U.S. trading partners.

I. A Model of U.S. Export Demand

Much like the forces of gravity, the economic forces that determine global trade flows correspond to size and distance, in this case the size of trading nations' economies and the distance between their borders. Just as large physical bodies attract one another, large economies attract substantial trading activity from one another. In addition, faraway nations tend to attract fewer exports from one another: higher shipping costs make the goods of distant countries more expensive than goods

of nearby countries. While seemingly simplistic, the gravity model of international commerce has widespread empirical success in explaining cross-border trade flows. An additional benefit of using the gravity model to study international trade flows is that it allows potential determinants of demand other than size and distance—such as measures of global economic uncertainty—to be included.

Furthermore, the gravity model is consistent with theories of consumer behavior and firm production. Several standard models of international trade imply that demand for U.S. exports within another country has a simple (log) linear relationship with the country's national income and the relative prices of goods from the United States compared with other potential exporters.¹

As a first step toward estimating the demand for U.S. exports, I take the benchmark empirical gravity model given by

$$Exports_{it}^{US} = \alpha + \beta GDP_{it} + \gamma \rho_{it}^{US} + \varepsilon_{it},$$

where $Exports_{it}^{US}$ denotes purchases of U.S. goods by country i observed in period t , GDP_{it} is the importing nation's GDP at time t , ρ_{it}^{US} captures the relative price difference importer i must pay to purchase U.S. goods at time t , and ε_{it} is variation in importing activity due to other factors not correlated with incomes and relative prices. The term α is a constant capturing the average level of exports observed across countries due to other factors, and β is an estimated parameter reflecting the effect of greater foreign GDP on demand for U.S. goods. Conventional wisdom holds that large economies attract trade from one another and that distance between countries reduces trade. Hence, the estimate of β is expected to be positive, while the estimate of γ is expected to be negative, reflecting that higher relative prices of U.S. goods will lead to lower export activity.

The next step in estimating demand for U.S. exports is incorporating measures of global economic uncertainty about future economic conditions into the model. Leibovici and Waugh provide a simple trade model that accounts for the fact that exporting is time intensive and thus incorporates the potential role of uncertainty about future economic conditions into contemporaneous export decisions.² They argue that the current delivery of imports depends on the importers' national income (GDP) from the previous period (when orders for the delivery

were made) as well as their willingness to substitute directly between domestic purchases, which can be ordered and delivered immediately, and imported goods that arrive later from the United States.

Several potential factors may affect the trade-off between current and future consumption. As uncertainty about global economic conditions has heightened in the last few years, I focus on uncertainty about future growth expectations as one such potential factor. Regardless of the expected level of future income, risk-averse importers may respond to changes in uncertainty about their own future levels of consumption. Specifically, greater uncertainty about future economic growth reduces the expected benefit of future consumption, making consumers less willing to sacrifice resources today for U.S. exports that will arrive tomorrow. Given the time intensiveness in international trading activity, consumers' responses to more uncertain environments may manifest as lower demand for U.S. exports that will arrive in a later period.

To empirically evaluate this prediction, I build on Leibovici and Waugh by incorporating measures of uncertainty about future GDP growth into the simple gravity equation and estimate the following:

$$Exports_{it}^{US} = \alpha + \gamma Uncertainty_{it-1} + \beta GDP_{it-1} + \gamma \rho_{it-1}^{US} + \varepsilon_{it}.$$

The time subscripts $t-1$ on the right-hand side explicitly highlight that the delivery of exports at time t is determined by factors that affect demand at the time orders are placed.³

II. Measuring Export Activity and Global Economic Uncertainty

The sample used in the empirical analysis is an unbalanced panel covering 26 countries with quarterly observations from each country over the period 2002:Q1 to 2015:Q4. Together, the sample of countries accounts for approximately 85 percent of total U.S. export activity.

A key data requirement is constructing a measure of uncertainty about aggregate economic growth. My approach to measuring global economic uncertainty is to use information derived from a range of forecasts for annual GDP growth reported each month by Consensus Economics. These reports include several independent forecasts of the current and next calendar year's GDP growth across countries. I measure uncertainty about GDP growth as the difference between the

highest and lowest forecast reported for each country within each quarter. Given that Consensus Economics reports monthly observations, while trade and income data are available only quarterly, I take the quarter average of the highest and lowest GDP forecasts before calculating the difference. For example, observed uncertainty for Argentina in 2005:Q3 is calculated as $1.33=7.63-6.5$, where 7.63 is the three-month average of the highest 2005:Q3 GDP forecast over the quarter, and 6.5 is the three-month average of the lowest 2005:Q3 GDP forecast over the quarter. This measure of economic uncertainty increases as high and low forecasts diverge.

One issue with using spreads between forecasts of annual growth to measure uncertainty is the annualized horizon for each forecast may not correspond exactly to the planning horizon of the foreign firms and consumers ordering U.S. goods. Early in the year, forecasts for annualized growth look ahead several periods and are more likely to reflect the perspective of those demanding exports that will arrive several periods later. Hence, the gap between high and low forecasts of the current calendar year should have a larger effect on the demand for U.S. exports early in the year. In contrast, later in the year, the gap between high and low forecasts of the next calendar year better reflects uncertainty about the future and thus influences demand for exports. To account for these effects, I estimate regression models that allow the role of uncertainty in determining export demand to vary across quarters within a given year.

As many countries have more volatile GDP series on average than others, I include country-specific fixed effects to account for differences in the average level of uncertainty within countries over time. Including country-specific fixed effects is consistent with gravity models of export demand, as it accounts for average differences in relative prices between countries due to the costs of transporting goods across fixed distances. While theoretically consistent with gravity models, and empirically justified by differences in average levels of uncertainty, including country-specific fixed effects implies that identifying the effect of uncertainty relies on variation in the spread between high and low forecasts within specific countries over time.

Global financial conditions are often a harbinger of future economic conditions. As a result, volatility in financial conditions within U.S. trading partners may reflect an alternative source of global

uncertainty affecting demand for U.S. goods. To investigate this alternative channel, I calculate the standard deviation of interday yields of 10-year sovereign bonds within each quarter for each country. Greater variation in day-to-day bond yields within a quarter indicates greater financial volatility, which may then reflect greater uncertainty about real economic conditions within each country. Unlike other common measures of financial volatility, such as the VIX, the prices of government debt issuances are available for a wide set of countries (although this measure includes fewer countries than the previous measure).⁴ These data are taken from Bloomberg.

Chart 1 plots the time series of measured uncertainty and volatility for each country in the sample. Panel A illustrates variation in uncertainty and bond prices for G-7 export destinations, which make up the bulk of U.S. export activity, while Panel B plots uncertainty and financial volatility for all other countries in the sample. Although the panels display clear differences in the average levels of economic uncertainty across countries, no significant trends within countries are apparent over time, alleviating concerns about spurious trends driving results.

The U.S. Bureau of Economic Analysis reports quarterly exports to each country in millions of U.S. dollars, with separate series reported for exports in goods only and exports of both goods and services.⁵ My preferred measure of export activity is trade in goods, both because more countries are available in the sample, and because uncertainty has a more ambiguous effect on services trade due to the variable time it takes to deliver specific services to foreign consumers.⁶ I present estimates using detrended series of quarterly exports, taken from a Hodrick-Prescott (HP) filter that accounts for secular growth in trade flows over time.

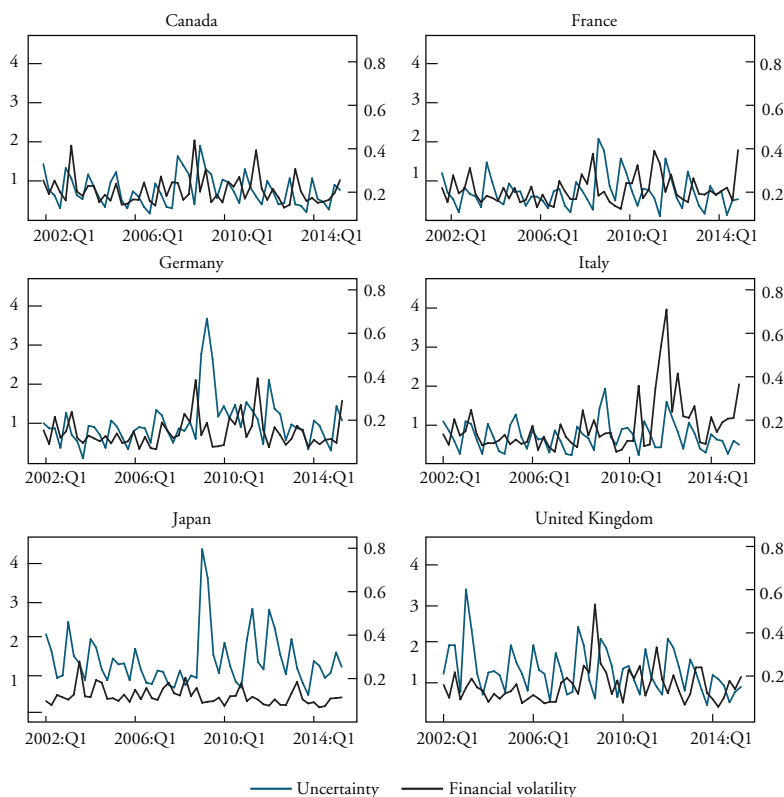
The final data requirements are national income levels and exchange rates, which independently affect export demand. I take quarterly GDP levels in billions of seasonally adjusted U.S. dollars from Haver Analytics. I report results obtained using detrended GDP series taken from an HP filter, which correspond to the measure of exports used throughout the analysis. I take exchange rate data from *The Wall Street Journal* and report values for the number of local currency units per U.S. dollar. Hence, higher values of the variable *ForEx* reflect a higher cost to purchase U.S. goods. Summary statistics for the sample are reported in Table 1.

Table 1
Summary Statistics

Variable	Mean	Number of observations	Standard deviation	Maximum	Minimum
Detrended ln(Exports)	0	1,375	0.094	0.347	-0.511
Uncertainty (current year)	1.385	1,375	0.971	8.567	0.133
Financial volatility	0.166	1,138	0.135	2.181	0.013
ln(ForEx)	0.055	1,375	0.196	0.000	1.381
Detrended ln(GDP)	0	1,375	0.016	0.053	-0.098

Chart 1
Uncertainty and Financial Volatility over Time

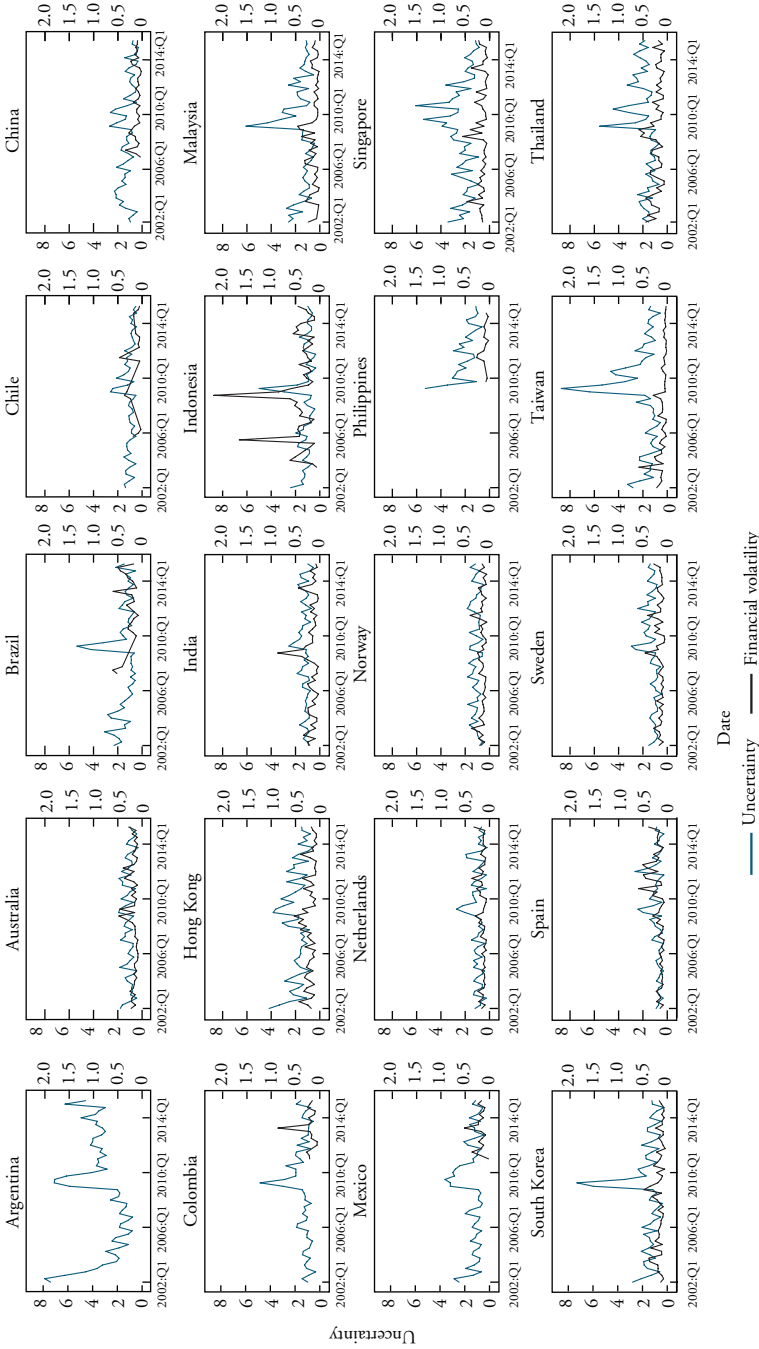
Panel A: G-7 Countries



Notes: Left scale measures uncertainty in GDP growth for each country in percentage point differences in forecasts observed each quarter. Right scale measures financial volatility as the standard deviation in interday bond prices (yields) over each quarter.

Sources: Bloomberg, Consensus Economics, and author's calculations.

Panel B: Non-G-7 Countries



Notes: Left scale measures uncertainty in GDP growth for each country in percentage point differences in forecasts observed each quarter. Right scale measures financial volatility as the standard deviation in interday bond prices (yields) over each quarter.
 Sources: Bloomberg, Consensus Economics, and author's calculations.

III. The Relationship between Uncertainty and Export Activity

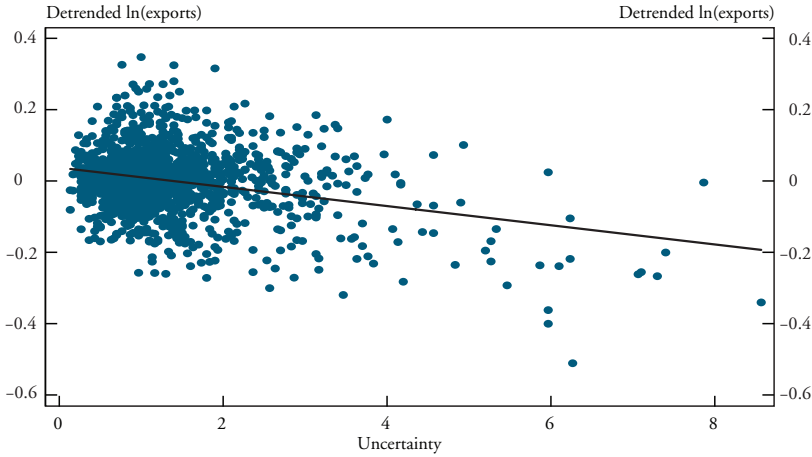
Before turning to the results of the regression exercise, I examine the relationship between uncertainty and exports without accounting for other factors. Chart 2 plots the preferred measure of uncertainty, the gap between high and low forecasts of GDP in the current quarter, against detrended quarterly exports of U.S. goods to each country. Even without considering any other potential determinants of foreign demand for U.S. goods, the negative correlation illustrated in Chart 2 indicates that higher levels of uncertainty about global growth are indeed associated with lower demand for U.S. exports.

While the pattern in Chart 2 is clear and in line with expectations, the simple negative correlation fails to account for the timing of export activity as well as differences in income and the relative cost to deliver U.S. goods across countries. As these are known to be important determinants of demand for U.S. exports, I turn next to the regression analysis, which takes such factors into account.

The effect of foreign economic uncertainty on U.S. exports

Looking across several models of the demand for U.S. goods, I find that heightened uncertainty about growth in foreign countries exerts a substantial drag on U.S. export activity. Table 2 reports results from the baseline gravity specification of export demand that includes lagged measures of GDP, relative prices as measured by the value of the dollar relative to countries' local currencies, and measures of uncertainty about future economic growth. Column 1 reports estimates from a regression of U.S. exports to each country on measured uncertainty, (lagged) GDP level in logs, the (lagged) foreign exchange value of the dollar, and country-specific fixed effects. In line with expectations, the coefficient on measured uncertainty about future aggregate growth indicates that higher economic uncertainty within the economies of U.S. trading partners is a drag on U.S. export demand. Specifically, the coefficient on uncertainty of -0.020 implies that a 1 percentage point increase in the gap between the highest and lowest forecasts results in approximately a 2 percent reduction in demand for U.S. goods. Put simply, the effect of uncertainty on import demand appears substantial in economic magnitude and is significant at high degrees of statistical confidence.

Chart 2

Correlation between U.S. Exports and Foreign Growth
Uncertainty across Countries and Time

Note: Each dot represents the value of U.S. exports to a specific country at a particular quarter in the sample. These values of U.S. exports are plotted against measured uncertainty about the respective foreign country's GDP growth. The line illustrates a fitted linear regression across the whole sample.

Sources: U.S. Bureau of Economic Analysis, Consensus Economics, and author's calculations.

As in prior analyses of export activity, higher levels of national income (GDP) are associated with a higher demand for U.S. goods. Given that the model is estimated in logs, the coefficient on $\ln(\text{GDP})$ can be interpreted as the observed income elasticity of demand. Hence, the point estimate of 2.761 on GDP in column 1 implies that a 1 percent increase in aggregate income results in a 2.761 percent increase in demand for imports from the United States, although these estimates fail to take into account time-specific effects across years or quarters. Not surprisingly, increases in the value of the dollar relative to local currencies reduce the demand for U.S. exports.

The results in column 1 use the preferred measure of uncertainty, which considers spreads between forecasts for current year GDP growth among importers of U.S. goods. However, as the year progresses and new data become available, the typical spread between forecasts will naturally fall. If trade flows also exhibit systematic variation within a year, spurious correlations may contaminate the estimates in column 1. Moreover, common global factors that vary year to year may also affect each country's individual demand for U.S. exports. To account for such issues, column 2 introduces quarter- and year-fixed effects into the analysis.

Table 2

Effect of Foreign Economic Uncertainty on Demand for U.S. Exports

Variables	(1) ln(Exports)	(2) ln(Exports)	(3) ln(Exports)	(4) ln(Exports)
Current-year uncertainty	-0.020*** (0.003)	-0.016*** (0.003)	-0.024*** (0.007)	-0.031*** (0.008)
Current-year uncertainty×Q2			0.010 (0.006)	0.016* (0.009)
Current-year uncertainty×Q3			0.011 (0.010)	0.021** (0.010)
Current-year uncertainty×Q4			0.018 (0.012)	0.049*** (0.017)
Next-year global uncertainty				0.006 (0.006)
Next-year global uncertainty×Q2				-0.008 (0.007)
Next-year global uncertainty×Q3				-0.013 (0.009)
Next-year global uncertainty×Q4				-0.035*** (0.010)
Lagged ln(GDP)	2.761*** (0.210)	1.517*** (0.239)	1.529*** (0.239)	1.454*** (0.226)
Lagged ln(ForEx)	-0.090** (0.035)	-0.047 (0.028)	-0.046 (0.029)	-0.041 (0.032)
Constant	0.244*** (0.085)	0.151* (0.076)	0.163* (0.081)	0.152* (0.088)
Observations	1,349	1,349	1,349	1,349
R ²	0.362	0.449	0.452	0.464
Country fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	No	Yes	Yes	Yes
Year fixed effects	No	Yes	Yes	Yes

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Notes: Standard errors are in parentheses.

In column 2, the point estimate on uncertainty, -0.016, is only slightly different from the -0.020 point estimate obtained in column 1. However, accounting for year- and quarter-specific factors appears important to the estimates of the role of income fluctuations. Including time-specific effects, I find the coefficient on GDP growth, at 1.5, is more in line with standard estimates and remains both economically and statistically significant.

One issue with measuring uncertainty using spreads in current year growth forecasts is that Consensus Economics does not report growth forecasts for the same horizon across quarters, nor do these horizons correspond exactly to the time it takes to deliver exported goods. To account for these facts, the specifications in columns 3 and 4 investigate how the effect of uncertainty on export activity evolves within a calendar year. Measured uncertainty—the gap between high and low forecasts of the current calendar year—is expected to have a relatively larger effect on export activity within the first few months of a year; in contrast, in later months of a year, the gap between high and low forecasts of the next calendar year should have a larger influence on export activity.

The preferred specification in column 4 includes the forecasts for both the current and next calendar years as well as estimates of their differential effects across quarters. Consistent with expectations, the coefficient of -0.031 on uncertainty indicates higher uncertainty about a country's economic growth in the first quarter of the year reduces U.S. exports to that country by approximately 3 percent. In line with expectations, the positive coefficient on uncertainty for the second quarter of the year, 0.016 , suggests that the drag on U.S. exports is smaller, though the difference is only marginally statistically significant. The even larger positive estimate of 0.021 for the third quarter suggests that uncertainty about the current year's growth exerts even less drag on U.S. exports. A statistical test confirms the estimated negative net effect of uncertainty on U.S. exports in the third quarter remains statistically significant.

By the fourth quarter, however, uncertainty about the current year's economic growth is no longer a drag on a country's demand for U.S. exports. The estimated effect of uncertainty about the current year within the fourth quarter ($-0.31+0.5=0.2$) is statistically indistinguishable from zero. Instead, uncertainty about economic growth in the next calendar year affects decisions to purchase U.S. exports. The coefficient on uncertainty about next year's growth in the fourth quarter is approximately -0.035 , which is statistically significant at high degrees of confidence. On an annualized basis, the estimates in column 4 imply a 1 percentage point increase in the spread between reported high and low foreign GDP growth forecasts is associated with 2.8 percent lower demand for U.S. exports. In line with expectations, I find that uncertainty about next year's growth has no statistically discernable effect on demand for U.S. exports in the first three quarters of each year.

Table 3
**The Effect of Global Uncertainty and Financial Volatility
on U.S. Exports**

Variables	(1) ln(Exports)	(2) ln(Exports)	(3) ln(Exports)	(4) ln(Exports)
Lagged financial volatility	-0.078*** (0.012)	-0.071*** (0.010)	-0.064*** (0.012)	-0.059*** (0.013)
Current-year uncertainty	-0.020*** (0.004)	-0.016*** (0.004)	-0.027*** (0.008)	-0.031*** (0.008)
Current-year uncertainty×Q2			0.013 (0.008)	0.015 (0.010)
Current-year uncertainty×Q3			0.020** (0.009)	0.023** (0.010)
Current-year uncertainty×Q4			0.026* (0.014)	0.057*** (0.019)
Next-year uncertainty				0.003 (0.008)
Next-year uncertainty×Q2				-0.004 (0.008)
Next-year uncertainty×Q3				-0.006 (0.007)
Next-year uncertainty×Q4				-0.033*** (0.011)
Lagged ln(GDP)	2.631*** (0.212)	1.548*** (0.269)	1.562*** (0.275)	1.494*** (0.258)
Lagged ln(ForEx)	-0.120*** (0.019)	-0.068*** (0.024)	-0.069*** (0.023)	-0.070*** (0.025)
Constant	0.292*** (0.043)	0.198*** (0.057)	0.217*** (0.056)	0.221*** (0.063)
Observations	1,114	1,114	1,114	1,114
R ²	0.357	0.435	0.440	0.453
Country fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	No	Yes	Yes	Yes
Year fixed effects	No	Yes	Yes	Yes

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Notes: Standard errors are in parentheses.

The effect of foreign financial volatility on U.S. exports

Volatility in financial markets may also inhibit foreign consumers from ordering exports of U.S. goods, as real economic strife often follows bouts of financial stress. Table 3 shows the additional influence that variation in nations' sovereign bond prices, a measure of financial volatility, may have on their demand for exports of U.S. goods. The

specifications in Table 3 are identical to those reported in Table 2, with the addition of measures of financial volatility. As data on financial availability are not available for a small number of countries, the number of observations differs between Tables 2 and 3.

The estimates in column 1 reveal that uncertainty stemming from foreign financial volatility is also a significant drag on U.S. export activity. The estimated coefficient of -0.078 implies that a one standard deviation increase in financial volatility within a foreign country decreases its demand for U.S. exports by nearly one standard deviation. Put simply, the effect of financial volatility is economically substantial. The effect of financial volatility is stable across specifications, dipping only to 0.059 in column 4—though this difference is not statistically different from the point estimate in column 1.

The effect of foreign financial volatility appears largely independent of the effect of uncertainty in economic growth forecasts. Both are significant at high degrees of confidence, and the estimates on uncertainty are unchanged when financial volatility measures are included. This suggests that financial volatility and uncertainty about growth within our trading partners represent distinct risks to U.S. export demand.

The estimates that include measures of foreign financial volatility continue to show a correlation between higher foreign GDP and higher demand for U.S. goods. In addition, higher values of the U.S. dollar relative to foreign currencies appear to deter foreign demand for U.S. exports. The coefficient of 0.078 in column 1 indicates that a 1 percent increase in the value of the dollar against foreign currencies reduces demand for U.S. exports by 0.07 percent on average.

IV. Factors Affecting Demand for U.S. Exports in Recent Years

The evidence in the previous section confirms that foreign economic and financial phenomena affect demand for U.S. exports in addition to conventional factors such as exchange rates and global GDP growth. More precisely, the evidence in the last section demonstrates that such factors tend to affect demand for U.S. exports on average. In this section I take a closer look to see which factors have been most important in explaining recent fluctuations in U.S. exports.

Chart 3 illustrates the estimated contributions of changes in global uncertainty, international financial volatility, foreign income levels, and

exchange rates to changes in U.S. exports over recent time horizons. Panel A shows these contributions over the last decade, while Panel B focuses on the last five years. I calculate the contributions using four-quarter moving averages of each factor and their respective estimated effects from column 4 of Table 3.

The primary determinants of export demand have varied over time. The dark blue bars in Panel A, which chart foreign GDP growth, show that from 2006 to 2008, foreign growth spurred increases in demand for U.S. goods. Then, at the onset of the global financial crisis and subsequent recession in 2007–09, reductions in foreign GDP growth lowered demand for U.S. exports. The light blue bars, which represent financial volatility, show that in the first quarter of 2009, the global financial crisis also pulled down U.S. export activity. And the black bars, which represent uncertainty, show that while some of the global financial stress abated in the second quarter of 2009, uncertainty about foreign economic conditions kept demand for U.S. exports low. However, all three bars climbed during the early parts of the recovery in late 2009 and early 2010 as increases in foreign incomes combined with decreased financial volatility and foreign economic uncertainty to boost demand for U.S. exports.

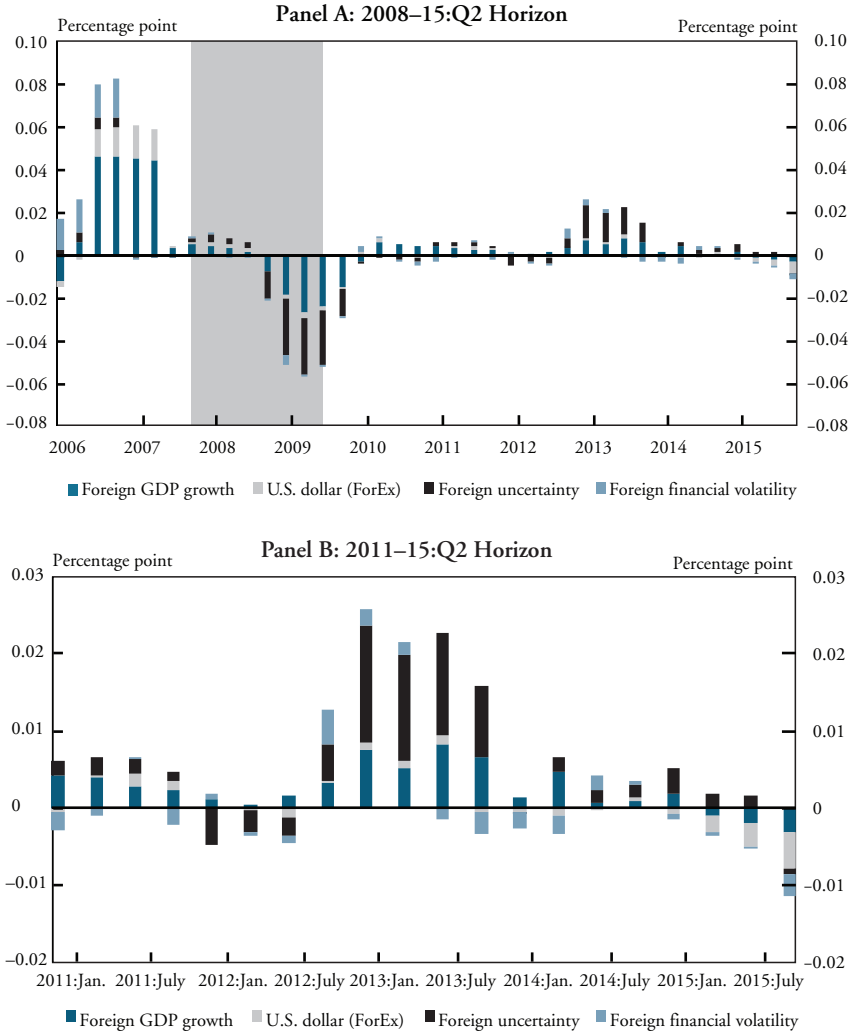
Over the last few years, the value of the dollar and foreign uncertainty have played more prominent roles in U.S. export activity. Panel B of Chart 3 shows relatively large contributions from foreign uncertainty (black bars) and the dollar (gray bars) compared with foreign GDP (dark blue bars) in influencing foreign demand for U.S. goods in 2013. During the last half of 2015, the dollar's rapid rise markedly increased U.S. exports, leading to substantial drag on export demand from 2015:Q2–Q4. The recent episode of heightened global financial volatility associated with China's devaluation of the yuan late in 2015:Q3 also appears to have lowered demand for U.S. goods at year-end. The contrast between Panels A and B suggests global uncertainty and foreign financial volatility have had a larger effect on U.S. exports in recent years, primarily because other factors, particularly foreign GDP growth, have been less volatile.

V. Conclusion

Sluggish export activity has been a drag on U.S. growth recently. In addition to slowing foreign growth and a high relative value of the dollar, uncertainty in the foreign growth outlook has caused demand

Chart 3

Foreign Factors Affecting Demand for U.S. Exports over Time



Notes: Gray shaded region denotes NBER-defined recession. The bars show the expected contributions of each variable to changes in U.S. export demand around its long-run trend.
 Source: author's calculations.

for U.S. exports to wane. Stress in foreign financial conditions has further contributed to the declining demand for U.S. goods. The propensity for uncertainty to diminish orders of U.S. goods suggests that export activity would likely pick up if foreign growth expectations were to stabilize, even if the expectations for growth remain relatively weak. In the first few months of 2016, global uncertainty and financial volatility surged, potentially dampening export demand. As these forces abate, more certainty and stability in foreign economic and financial conditions will likely contribute to U.S. export growth.

Endnotes

¹See, for example, Krugman; Anderson and van Wincoop; Eaton and Kortum; and Melitz.

²See Hummels and Schaur for evidence about the time intensiveness of international trading activity.

³An alternative specification of the gravity model would include the expected level of future GDP to account for the time intensiveness of international trading activity. I investigate this option and find that the role of measured uncertainty remains qualitatively robust.

⁴One concern is that variation in sovereign security prices is driven by trend movements within a quarter, which would spuriously measure high financial market volatility for relatively stable price movements along a trend path. I investigate measures of financial market volatility that use interday price changes to account for such concerns and find similar results.

⁵These data series are reported without seasonal adjustment. To concord with other data used in the analysis, I seasonally adjust the reported series.

⁶Regardless, I show that the results are quantitatively robust using either measure of trade.

References

- Anderson, James E., and Eric van Wincoop. 2003. "Gravity with Gravitas: A Solution to the Border Puzzle," *American Economic Review*, vol. 93, no. 1, pp. 170–192.
- Bloomberg L.P. 2002–15. Historical 10-year sovereign bond end-of-day day yields based on bid prices in local currencies for select countries, January 2, 2002–December 31, 2015. *Bloomberg Finance L.P.*, accessed March 30, 2016.
- Consensus Economics Inc. 2002–15a. *Consensus Forecasts*, January 2002–December 2015.
- _____. 2002–15b. *Asia Pacific Consensus Forecasts*, January 2002–December 2015.
- _____. 2002–15c. *Latin American Consensus Forecasts*, January 2002–December 2015.
- Eaton, Jonathan, and Samuel Kortum. 2002. "Technology, Geography, and Trade," *Econometrica*, vol. 70, no. 5, pp. 1741–1779.
- Hummels, David L., and Georg Schaur. 2013. "Time as a Trade Barrier," *American Economic Review*, vol. 103, no. 7, pp. 2935–2959.
- Krugman, Paul. 1980. "Scale Economies, Product Differentiation, and the Pattern of Trade," *American Economic Review*, vol. 70, no. 5, pp. 950–959.
- Leibovici, Fernando, and Michael E. Waugh. 2014. "International Trade and Intertemporal Substitution," NBER working paper no. 20498, September.
- Melitz, Marc J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," *Econometrica*, vol. 71, no. 6, pp. 1695–1725.

