Does Uncertainty over Economic Policy Harm Trade, Foreign Investment, and Prosperity?

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ABSTRACT

This paper examines the impact of uncertainty about economic policy on US exports, imports, and direct foreign investment inflows. Uncertainty over domestic and international economic policy adversely affects the international flow of goods, services, and investment. When sunk costs are associated with acting, uncertainty about expected profits leads entrepreneurs to wait rather than act, reducing commerce domestically and internationally. A solution is for governments to commit to a set of rules that provides businesses with a predictable economic environment, reducing policy uncertainty. International organizations such as the World Trade Organization and agreements such as the North American Free Trade Agreement reduce policy uncertainty. The resulting positive effect on international commerce raises living standards in the United States and abroad.

JEL codes: F1, F2

Keywords: economic policy uncertainty, trade policy, exports, imports, foreign direct investment

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Americans are more engaged in international trade today than they have ever been. In 1992, the sum of exports and imports as a percentage of GDP was 19.5 percent. By 2016 that figure had increased to 26.4 percent.[1] The increase is attributed to several factors, including reductions in trade barriers, global economic growth, and technological change.[2] Gary Hufbauer and Zhiyao Lu estimate that the expansion in trade has increased US GDP per person by $7,014 (2016 dollars) since the end of World War II.[3]

International investment has expanded along with the growth in trade. The real level of foreign direct investment into the United States reached $11.8 billion by the end of 1992. By 2016, it totaled $67.5 billion.[4] Foreign investment increases labor productivity, wages, and national income.[5]

Despite those gains, there are adjustment costs for workers displaced by imports.[6] President Trump has been critical of the North American Free Trade Agreement (NAFTA) and the World Trade Organization (WTO). By creating

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1. Bureau of Economic Analysis, "U.S. Economic Accounts," accessed January 3, 2018, http://bea.gov/index.htm. Because of changes in measurement methods, 1992 serves as the starting date to ensure consistent data on exports and imports. The North American Free Trade Agreement (NAFTA) began in January 1994, and the General Agreement on Tariffs and Trade (GATT) transitioned into the World Trade Organization (WTO) in January 1995, so the data coversthe post-NAFTA and post-WTO period.
2. Robert Krol, "Trade, Protectionism, and the U.S. Economy" (Trade Briefing Paper, Cato Institute, Washington, DC, 2008).
3. Gary Hufbauer and Zhiyao Lu, "The Payoff to America from Globalization: A Fresh Look with a Focus on Costs to Workers" (Policy Brief, Peterson Institute for International Economics, Washington, DC, 2017).
4. Source: Bureau of Economic Analysis, "International Economic Accounts," accessed January 3, 2018, https://bea.gov/international/index.htm. The figures also begin in 1992 for ease of comparison with the trade data. The figures are estimated at market value. The raw data were converted into real terms using the GDP price deflator.
5. Theodore Moran and Lindsay Oldenski, "The Economic Impact of Inward FDI on the U.S.," VoxEU, Centre for Economic Policy Research, March 4, 2014.
6. Hufbauer and Lu, "Payoff to America"; International Monetary Fund, World Bank, and World Trade Organization, *Making Trade an Engine of Growth for All: The Case for Trade and for Policies to Facilitate Adjustment*, 2017.

uncertainty about future international economic policies, his statements have the potential to lower international trade and investment, along with related gains.[7]

Economic policy uncertainty can be defined as a lack of clarity about the future course of taxes, regulation, monetary policy, or trade policy. That uncertainty makes estimating the return on business decisions more difficult. Because investment and market entry decisions have nonrecoverable costs, when policy uncertainty is high, businesses and entrepreneurs are likely to delay those decisions. Uncertainty over US international economic policies may already be having an impact. Even though the president has toned down his rhetoric, Mexico is moving to diversify its sources of agricultural imports away from the United States. Plans to expand its new port in Lázaro Cárdenas may also be put on hold.[8] When uncertainty increases, so does the value of waiting. That is true for both domestic and international decisions.[9]

This paper examines the adverse effect that economic policy uncertainty has on the cross-border flow of goods, services, and investment. One way to reduce uncertainty about international economic policy is to enter into international organizations and agreements, such as the WTO and NAFTA. Those agreements establish international rules of the game, reducing uncertainty about future economic and trade policies and promoting economic prosperity.

This paper begins by defining economic policy uncertainty and explaining how it can be measured. That definition is followed by a discussion of the value of external commitments and preferential trade agreements for expanding trade. Previous findings, along with new evidence on the United States presented in this paper, confirm that economic policy uncertainty reduces trade and foreign direct investment. The paper concludes that, while policymakers need to get policy right, lack of clarity during the policy-making process can have a depressing impact on economic growth.

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7. Damian Paletta and Ana Swanson, "Trump Suggests Ignoring World Trade Organization in Major Policy Shift," *Washington Post*, March 1, 2017.
8. Jacob Bunge, "U.S. Exports to Mexico Fall as Uncertainty over NAFTA Lingers," *Wall Street Journal*, June 16, 2017; Robbie Whelan, "US Plans Put Mexico Port at Risk," *Wall Street Journal*, Business News, B3, April 17, 2017.
9. Robert Pindyck, "Irreversibility, Uncertainty, and Investment," *Journal of Economic Literature* 29, no. 3 (1991): 1110–48; Robert Higgs, "Regime Uncertainty: Why the Great Depression Lasted So Long and Why Prosperity Resumed after the War," *Independent Review* 1, no. 4 (1997): 561–90.

ECONOMIC POLICY UNCERTAINTY

What Is Economic Policy Uncertainty and What Are Its Effects?

The future course of economic policy is always difficult to forecast. This is especially true during elections and in the early stages of a new administration. In the policy-making process, there are different views, even within the same administration, as to the best policy options. Because of that process, the future course of taxes, regulation, monetary policy, and trade policy is unclear. Economic policy uncertainty measures the degree and variation over time in these policy differences. It differs from general economic uncertainty, which captures the unpredictable future course of an economy caused by changes in technology and consumer tastes.

Economic policy uncertainty is closely related to Robert Higgs's notion of regime uncertainty. Higgs argues that government actions (threats) can weaken private property rights, thereby influencing the expected return on an investment or business venture. In this setting, less money will be invested.[10] Uncertainty over international economic policy can have similar effects. There are irreversible or sunk costs, such as introductory marketing or capital investments, associated with entering a foreign market for the first time.[11] With uncertain trading rules, a shift in a country's trade policies can result in retaliation or an increase in policy uncertainty for its trading partners. Entrepreneurs considering entering those markets face a less certain return. In those circumstances, there is value in waiting until the uncertainty is reduced. The predictable result is a reduction in investment and trade.[12]

Measuring Economic Policy Uncertainty

A number of approaches are used to measure economic policy uncertainty. First, researchers use surveys that ask business leaders or voters about their sense

10. Higgs, "Regime Uncertainty."
11. Mark J. Roberts and James Tybout, "The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs," *American Economic Review* 87, no. 4 (1997): 545–64; Mark J. Roberts and James Tybout, "Market Entry Costs, Producer Heterogeneity, and Export Dynamics," *Econometrica* 75, no. 3 (2007): 837–73.
12. The idea that there is value in waiting to invest when uncertainty is high comes from Ben S. Bernanke, "Irreversibility, Uncertainty, and Cyclical Investment," *Quarterly Journal of Economics* 97, no. 1 (1983): 85–106. The theory also applies to policy uncertainty: see Nancy L. Stokey, "Wait-and-See: Investment Options under Policy Uncertainty," *Review of Economic Dynamics* 21 (2016): 246–65.

of the direction of policy.[13] Second, historical information can be used to link political events to policy changes; for example, one might examine the amount of business investment before and after an election.[14]

Work by Scott Baker, Nicholas Bloom, and Stephen Davis offers researchers a quantitative measure of economic policy uncertainty.[15] The index is regularly updated, giving analysts up-to-date information on policy uncertainty. I use this index in an effort to examine the effect this uncertainty has on US international trade and investment over the past 25 years.

The Baker, Bloom, and Davis index is constructed using a computer-based search that quantifies the frequency of articles dealing with economic policy uncertainty in 10 leading newspapers.[16] An article is considered to deal with economic policy uncertainty if it contains triple combinations of words, such as *uncertainty*, *economy*, and a policy term such as *deficit*. Figure 1 plots the index value on the vertical axis from January 1985 to June 2017. The figure shows clear spikes around the two Gulf Wars in 1990–1991 and 2003, the presidential elections in 1992 and 2002, the Asian financial crisis in 1997, and the Great Recession of 2008 and subsequent slow recovery.

Baker, Bloom, and Davis find that increases in their economic policy uncertainty index are associated with significant reductions in employment and output. They control for general economic uncertainty using the Chicago Board of Options 30-day volatility index (VIX, or "fear index") for Standard & Poor's (S&P) 500 options.[17] They also provide evidence that although the index is correlated with measures of general economic uncertainty, it provides "distinct variation" apart from the VIX.[18]

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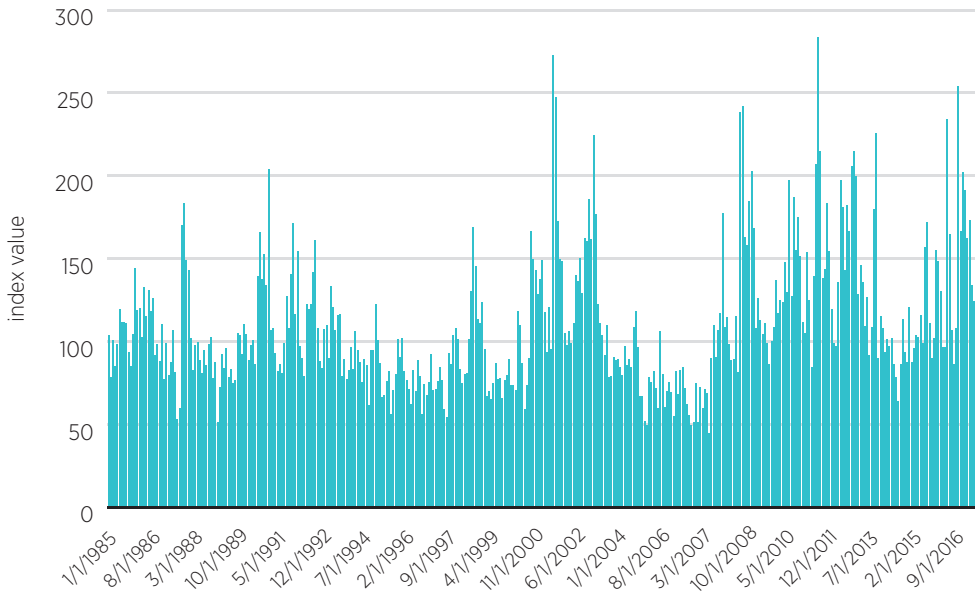
13. Wolf von Laer and Adam Martin, "Regime Uncertainty and the Great Recession: A Market-Process Approach," *Independent Review* 20, no. 4 (2016): 547–68.
14. Brandon Julio and Youngsuk Yook, "Political Uncertainty and Corporate Investment Cycles," *Journal of Finance* 67, no. 1 (2012): 45–83; Brandon Julio and Youngsuk Yook, "Policy Uncertainty, Irreversibility, and Cross-Border Flows of Capital," *Journal of International Economics* 103 (2016): 13–26.
15. Scott Baker, Nicholas Bloom, and Steven Davis, "Measuring Economic Policy Uncertainty," *Quarterly Journal of Economics* 131, no. 4 (2016): 1593–636.
16. The papers include *USA Today*, the *Miami Herald*, the *Chicago Tribune*, the *Washington Post*, the *Los Angeles Times*, the *Boston Globe*, the *San Francisco Chronicle*, the *Dallas Morning News*, the *New York Times*, and the *Wall Street Journal*.
17. The VIX uses the Black–Scholes option pricing model to estimate the expected variability in stock prices. Option prices are higher when volatility in the stock market is high as a result of uncertainty about the economy. That implies that the VIX will be higher when there is greater economic uncertainty. See Chicago Board Options Exchange, "The CBOE Volatility Index–VIX" (White Paper, CBOE, Chicago, IL, 2014).
18. Baker, Bloom, and Davis, "Measuring Economic Policy Uncertainty," 1613.

FIGURE 1. ECONOMIC POLICY UNCERTAINTY INDEX FOR THE UNITED STATES, JANUARY 1985 THROUGH JUNE 2017



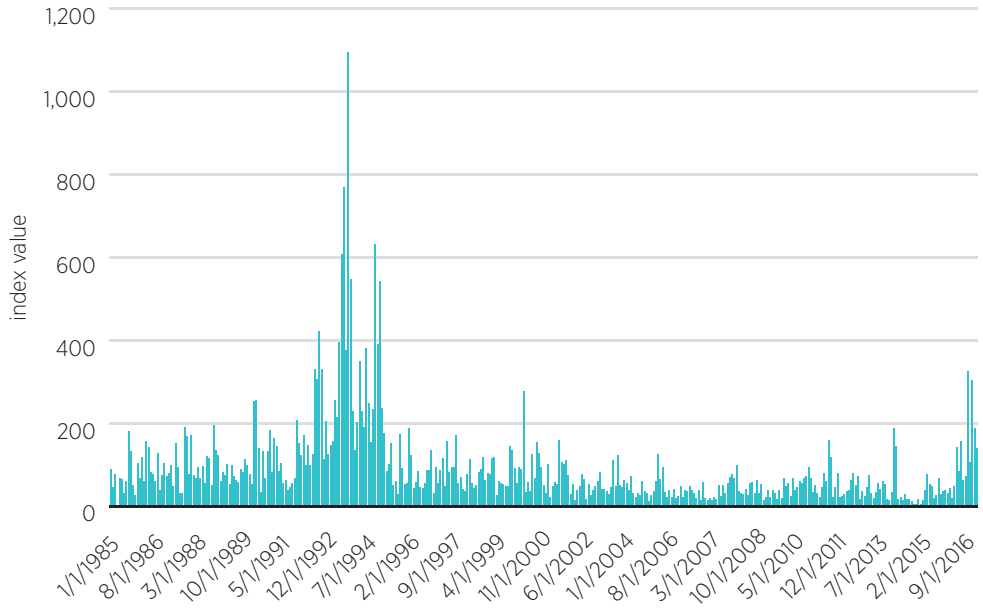
Source: Scott Baker, Nicholas Bloom, and Steven Davis, "Measuring Economic Policy Uncertainty," *Quarterly Journal of Economics* 131, no. 4 (2016): 1593–636.

In previous work, I used the Baker, Bloom, and Davis index to examine the effect economic policy uncertainty has on small business activity.[19] I found that an increase in the index was associated with a reduction in plans on the part of small businesses to hire and invest. Small businesses were less inclined to expand when economic policy uncertainty was high, and therefore such uncertainty has an adverse effect on economic growth.

The economic policy uncertainty index is also available for 11 US subcategories, including a measure of trade policy uncertainty. Other categories include tax, monetary policy, regulation, and healthcare policy uncertainty. The calculation process is similar to the one used to compute the economic policy uncertainty index. In addition to the triple combination of words used to construct the basic index, additional words that are relevant to a category are added to derive the subcategory index, such as *import tariff*, *WTO*, *General Agreement on Tariffs and Trade (GATT)*, *trade policy*, or *dumping*, for the trade

19. Robert Krol, "Economic Policy Uncertainty and Small Business Decisions," *Cato Journal* 37, no. 1 (2017): 59–68.

FIGURE 2. TRADE POLICY UNCERTAINTY INDEX FOR THE UNITED STATES, JANUARY 1985 THROUGH MARCH 2017



Source: Scott Baker, Nicholas Bloom, and Steven Davis, "Measuring Economic Policy Uncertainty," *Quarterly Journal of Economics* 131, no. 4 (2016): 1593–636.

policy uncertainty index. Although the subcategories' indices are calculated in a manner similar to the basic index, the source of articles for them is the online database NewsBank, which provides a broader group of articles for each category.[20] Figure 2 plots the value of the trade policy uncertainty index from January 1985 to March 2017.

The highest levels of the trade policy uncertainty index occur during the period of NAFTA negotiations and implementation in the early 1990s. Other spikes occur during periods of financial turbulence in the late 1990s and surrounding the election of President Trump in 2016.[21]

20. NewsBank covers approximately 1,500 US newspapers. As a check, Baker, Bloom, and Davis reconstruct their basic index using that source. The two indices are highly correlated.
21. The trade policy uncertainty index (mean of 415.96 and standard error equal to 82.5) is more variable than the economic policy uncertainty index (mean of 464.3 and standard error equal to 33.7).

THE ROLE OF TRADE AGREEMENTS

Governments can change international economic policies after businesses make decisions to invest or enter a market, affecting profits.[22] Trade agreements can help reduce the uncertainty surrounding trade and economic policies—uncertainty that puts a damper on exports, imports, and international investment. Preferential trade agreements and trade organizations such as the WTO allow governments to commit to a set of rules, in a sense to tie their policy-making hands, reducing policy uncertainty and resulting in higher levels of international commerce.[23]

Economists argue that the free international movement of goods and assets maximizes a country's well-being. Suppose today's government announces it will follow a free trade policy to maximize the country's well-being. Under that free trade regime, domestic and foreign businesses make profitable investments that expand their engagement in the international economy. A few years down the road, a new government argues it can raise economic well-being by imposing import tariffs in selected industries. The industry choices may reflect who supported and did not support the new government in the election that brought it to power.

With the tariffs in place, past business investment decisions may become unprofitable, but they cannot be changed or are costly to change. If businesses

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22. This problem is referred to as the "time inconsistency" problem. See Finn E. Kydland and Edward C. Prescott, "Rules Rather than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy* 85, no. 3 (1977): 473–92.

23. The basic theory for this view comes from Giovanni Maggi and Andres Rodriguez-Clare, "The Value of Trade Agreements in the Presence of Political Pressure," *Journal of Political Economy* 106, no. 3 (1998): 574–601. Papers that provide evidence in support of this approach include Nuno Limá and Patricia Tovar, "Policy Choice: Theory and Evidence from Commitment via International Trade Agreements," *Journal of International Economics* 85, no. 2 (2011): 186–205; and Xuepeng Liu and Emanuel Ornelas, "Free Trade Agreements and the Consolidation of Democracy," *American Economic Journal: Macroeconomics* 6, no. 2 (2014): 29–70.

Another reason for international trade agreements is that large countries may try to use tariffs to improve their terms of trade. Governments that set tariffs unilaterally in an environment without any international agreements may act in that manner, which results in more trade restrictions. That is the optimal tariff argument. I ignore that argument for trade agreements because, if such tariffs were applied, they would result in trade wars that reduce a country's well-being compared with free trade or trade under WTO rules. See Kyle Bagwell, Chad P. Bown, and Robert Staiger, "Is the WTO Passé?," *Journal of Economic Literature* 54, no. 4 (2016): 1125–231. Also, maximizing a country's welfare does not mean that everyone is better off, but only that the gains outweigh any losses, resulting in a net welfare gain. Countries generally set up programs to compensate displaced workers. See Robert C. Feenstra, *Advanced International Trade: Theory and Evidence* (Princeton, NJ: Princeton University Press, 2015); or Paul R. Krugman, Maurice Obsfeld, and Marc J. Melitz, *International Economics: Theory and Policy*, 10th ed. (Upper Saddle River, NJ: Pearson Education, 2015).

had known about this change in trade policy at the time they made their decisions, they may have made different choices. In this uncertain environment, in which domestic and foreign businesses are unsure about a country's future international economic policies, global business expansion will decline. The result is depressed exports, imports, and investment, which lowers the country's standard of living. What is needed is a credible way to commit the country to a long-term free trade policy, which will reduce international economic policy uncertainty.[24]

One way to reduce uncertainty about international economic policies is to form international associations and agreements. The WTO requires a member country to commit not to raise tariffs above a certain level set by the organization. In return, the other members of the WTO agree to keep their tariffs at or below the same binding levels. WTO membership imposes policy discipline and a set of rules to resolve international policy disagreements. Those rules serve as a device to commit to a policy of lower trade restrictions. They are binding commitments about the future course of trade policy. These commitments should promote more credible international economic policies, which would lower economic policy uncertainty and lead to greater trade and prosperity.[25] Such commitments can also weaken protectionist political pressures in a country. Whereas import-competing industries are politically well organized, consumers are not. The potential for such commitments is likely to increase the political involvement of export industries that support a more open trading system, thereby benefiting consumers.[26]

Agreements that lower barriers to trade can be expected to expand trade through the usual channel of greater specialization based on comparative advantage.[27] Countries specialize in goods and services they produce at a lower cost and import goods or services that would be costlier for them to produce.[28] Trade

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24. This analysis is based on Finn E. Kydland, "On Policy Consistency," in *Economics for the Curious*, eds. Robert M. Solow and Janice Murray (London, UK: Palgrave Macmillan, 2014), 80–95. Kydland's example targeted a domestic case, not international trade and investment.

25. Maggi and Rodriguez-Clare, "The Value of Trade Agreements in the Presence of Political Pressure"; Bagwell, Bown, and Staiger, "Is the WTO Passé?"; and Robert Staiger and Guido Tabellini, "Do GATT Rules Help Governments Make Domestic Commitments?," *Economics and Politics* 11, no. 2 (1999): 109–44.

26. See Krol, "Trade, Protectionism, and the U.S. Economy"; Krugman et al., *International Economics: Theory and Policy*, 252–54.

27. In the case of a preferential trade agreement among a limited group of countries, trade creation (importing from the low-cost member) must outweigh trade diversity (importing from a higher-cost member that does not have a tariff). See Krugman et al., *International Economics*; Feenstra, *Advanced International Trade*.

28. In reality, individuals and businesses are the economic agents that specialize.

agreements also expand trade by increasing market size, which allows firms to take advantage of economies of scale in selling differentiated products. Consumers benefit from the wider array of product choices.[29] If trade agreements reduce trade and economic policy uncertainty, they generate a third channel by which trade flows should expand.[30]

Economists have examined the effect of trade agreements on trade and investment flows using a gravity-model framework. Those models use the relative size of the economies, distance between the countries, common land borders, common languages, and policy variables to explain trade and investment flows. Countries with similarly sized economies that are geographically close with common borders and languages tend to trade more.[31]

Using gravity models, early researchers were unable to find evidence of a positive effect of free trade agreements on trade flows.[32] Economists Scott Baier and Jeffrey Bergstrand reexamine that issue using a larger dataset, which includes 96 bilateral trading partners from 1960 through 2000.[33] That large data set allows them to correct a number of statistical problems present in earlier studies.[34] Their results suggest that bilateral trade flows double in the 10 years following a free trade agreement, providing convincing evidence that trade agreements do increase trade flows.

In some cases, agreements also take aim at nontrade restrictions that hamper trade flows. Man-Keung Tang and Shang-Jin Wei argue that accession into the WTO includes other reforms beyond reductions in restrictions on trade. For example, membership can require giving up the right to impose capital controls or can require privatization of government monopolies. Tang and Wei find evidence that WTO membership promotes both economic growth and investment.[35]

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29. See Krugman et al., *International Economics;* Feenstra, *Advanced International Trade*; and Christian Broda and David E. Weinstein, "Globalization and the Gains from Variety," *Quarterly Journal of Economics* 121 (2006), 541–85.
30. International trade agreements help to prevent trade wars as well. See Bagwell, Bown, and Staiger, "Is the WTO Passé?"
31. See Feenstra, *Advanced International Trade*.
32. Jeffrey Frankel, *Regional Trade Blocs* (Washington, DC: Peterson Institute for International Economics, 1997); Andrew Rose, "Do We Really Know That the WTO Increases Trade?," *American Economic Review* 94, no. 1 (2004): 98–114.
33. Scott Baier and Jeffrey Bergstrand, "Do Free Trade Agreements Actually Increase Members' International Trade?," *Journal of International Economics* 71 (2007): 72–95.
34. These problems include failure to control for unobserved factors that can influence the results and the simultaneous relationship between trade and GDP.
35. Man-Keung Tang and Shang-Jin Wei, "The Value of Making Commitments Externally: Evidence from WTO Accessions," *Journal of International Economics* 78, no. 2 (2009): 216–29.

THE EFFECT OF ECONOMIC POLICY UNCERTAINTY ON INTERNATIONAL TRADE AND INVESTMENT

There is evidence that exchange rate volatility affects trade flows and that economic policy uncertainty affects exchange rate volatility. Marc Auboin and Michele Ruta present evidence of a negative relationship between exchange rate volatility and trade flows.[36] My previous research focused on the effect of economic policy uncertainty in the United States and abroad on exchange rate volatility in industrialized and emerging countries.[37] For industrialized countries, higher economic policy uncertainty from the United States and at home increases exchange rate volatility. For less open, emerging economies, only economic policy uncertainty in the country itself increases volatility. Taken together, those findings show that higher economic policy uncertainty raises exchange rate volatility, which can adversely affect trade flows.

New research focuses on the direct effect of trade policy uncertainty on trade flows. Lack of clarity surrounding a country's trade policies can have adverse economic effects, even when no actual policy changes occur. Take the case of Chinese exports into the United States. Before WTO accession in 2001, China's most-favored-nation status with the United States was temporary rather than permanent. At the time, Congress repeatedly threatened to end China's most-favored-nation status for political reasons, such as the events surrounding Tiananmen Square. Trade policy uncertainty was high. Kyle Handley and Numo Limão find that the reduction in trade policy uncertainty after 2001 that accompanied China's accession into the WTO played an important role in the increase in US imports from China.[38] The authors find that lower trade policy uncertainty increased Chinese exports to the United States by about one-third. The resulting lower prices were equivalent to a permanent 13 percentage point reduction in tariffs, increasing consumer welfare. Results such as these suggest trade policy uncertainty can have a large effect on trade flows.

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36. Marc Auboin and Michele Ruta, "The Relationship between Exchange Rates and International Trade: A Literature Review," *World Trade Review* 12, no. 3 (2013): 577–605.
37. Robert Krol, "Economic Policy Uncertainty and Exchange Rate Volatility," *International Finance* 17, no. 2 (2014): 241–56.
38. Kyle Handley and Numo Limão, "Policy Uncertainty, Trade, and Welfare: Theory and Evidence for China and the United States," *American Economic Review* 107, no. 9 (2017): 2731–83. Other papers that examine the Chinese case are Ling Feng, Zhiuan Li, and Deborah Swenson, "Trade Policy Uncertainty and Exports: Evidence from China's WTO Accession," *Journal of International Economics* 106 (2017): 20–36; and Yingxin Du et al., "Bilateral Trade and Shocks in Political Relations: Evidence from China and Some of Its Major Trading Partners, 1990–2013," *Journal of International Economics* 108 (2017): 211–25. The last paper suggests the effect is transitory.

Handley finds that growth in the variety of Australian exports would have been 7 percent lower without the 1996 WTO commitments, which would have decreased consumer welfare in countries buying those goods.[39] Handley also estimates that if Australia eliminated all tariffs, more than one-half of the resulting trade growth would be the result of reduced uncertainty over policy. In yet another paper, Handley and Limão get similar results for when Portugal joined the European Union in 1986.[40]

Economic policy uncertainty can also influence foreign direct investment. Economists Brandon Julio and Youngsuk Yook examine the effect of elections on investment flows.[41] They argue that international investment flows are likely to be highly sensitive to economic policy uncertainty because foreign investors typically have weaker protections from the legal systems of the countries where they invest.[42] If firms have fewer options when economic conditions change, that would be expected to affect the timing of investment choices.[43]

Julio and Yook assume political or policy uncertainty is higher around elections. They compare investment flows in the two quarters before and after an election (essentially an election year) with nonelection years. Their sample includes 183 elections that occurred in 44 countries from January 1994 to June 2010. After controlling for country characteristics, they find a 13 percent drop in foreign investment during election periods, compared with a 4.8 percent drop in domestic investment during election years, which they estimated in previous research.[44]

THE IMPACT OF ECONOMIC POLICY UNCERTAINTY IN THE UNITED STATES

President Trump has said that US trade agreements harm the economy. The president canceled US participation in the Trans-Pacific Partnership agreement once he took office in January 2017, increasing uncertainty over the future course

39. Kyle Handley, "Exporting under Trade Policy Uncertainty: Theory and Evidence," *Journal of International Economics* 94, no. 1 (2014): 50–66.
40. Kyle Handley and Numo Limão, "Trade and Investment under Policy Uncertainty: Theory and Firm Evidence," *American Economic Journal: Policy* 7, no. 4 (2015): 189–222.
41. Julio and Yook, "Policy Uncertainty, Irreversibility, and Cross-Border Flows of Capital."
42. Avinash Dixit, "International Trade, Foreign Direct Investment, and Security," *Annual Review of Economics* 3 (2011): 191–213. This is obviously a bigger problem in emerging economies.
43. Ricardo Caballero and Mohamad Hammour, "The Macroeconomics of Specificity," *Journal of Political Economy* 106, no. 4 (1998): 724–67.
44. Julio and Yook, "Political Uncertainty and Corporate Investment Cycles."

of US trade policy.[45] He has repeatedly stated that NAFTA is a bad deal for the United States and that it needs to be changed.[46] Those actions have raised the level of uncertainty about the future of US trade policy. A relevant question is whether this uncertainty will affect international trade and investment. Previous research has not examined the effect of changes in US economic and trade policy uncertainty on US international commerce. In this section, I provide new evidence that policy uncertainty depresses US exports and imports. The effect is especially strong with respect to foreign direct investment into the United States. These findings are based on estimation of a vector autoregression model. In the economics literature, vector autoregression has become a standard statistical tool to examine the dynamic relationship between economic variables.

Model and Data

To examine the effect of policy uncertainty on US international commerce, export supply and import demand functions are modified to include the policy uncertainty indices developed by Baker, Bloom, and Davis.[47]

Model. The US export supply function is influenced by world income and a trade-weighted real exchange rate.48 Higher world income increases world consumption, which raises the demand for US goods and services abroad, increasing exports. A real appreciation of the US dollar makes US goods and services relatively more expensive to buyers outside the United States, lowering exports. Following the economic policy uncertainty literature, the Chicago Board of Options 30-day volatility index for S&P 500 options is used to control for general economic uncertainty.49 The index tends to rise during periods of general

45. Peter Baker, "Trump Abandons Trans-Pacific Partnership, Obama's Signature Trade Deal," *New York Times*, January 23, 2017.
46. Kevin Liptak and Dan Merica, "Trump Agrees 'Not to Terminate NAFTA at this Time,'" CNN Politics, April 27, 2017.
47. Baker, Bloom, and Davis, "Measuring Economic Policy Uncertainty." For the basic theory behind these relationships, see Morris Goldstein and Mohsin S. Khan, "Income and Price Effects in Foreign Trade," *Handbook of International Economics* (Amsterdam: North-Holland, 1985).
48. See Goldstein and Khan, "Income and Price Effects in Foreign Trade"; Robert Stern, Christopher F. Baum, and Mark N. Greene, "Evidence on Structural Change in the Demand for Aggregate U.S. Imports and Exports," *Journal of Political Economy* 87, no. 1 (1979): 179–92; Kevin L. Kliesen and John A. Tatom, "U.S. Manufacturing and the Importance of International Trade: It's Not What You Think," *Federal Reserve Bank of St. Louis Review* 95, no. 1 (2013): 27–49.
49. A drawback in using the VIX to control for general economic uncertainty is that, potentially, some of the movement in the index may reflect factors other than uncertainty. See Geert Bekaert, Marie Hoerova, and Marco Lo Duca, "Risk, Uncertainty, and Monetary Policy," *Journal of Monetary*

economic uncertainty in the United States and also during periods characterized by global financial crisis or war.50 Higher general economic uncertainty in the United States and abroad can be expected to lead consumers to save more and to postpone consumption, causing US exports to decline.

The economic policy uncertainty index and the trade policy uncertainty index are added separately to the model to determine their effect on export supply. Higher economic or trade policy uncertainty is expected to reduce exports. For example, if the United States threatens to restrict imports, its trading partners may issue retaliatory threats. In that situation, US businesses and export entrepreneurs would find it worthwhile to wait before entering or expanding in foreign markets, thereby reducing US exports.[51]

Import demand is modeled in a similar manner. US imports are expected to depend positively on US income, negatively on the real exchange rate, and negatively on the volatility index. Higher policy uncertainty is expected to reduce imports. As explained previously, because of the nonrecoverable fixed costs of selling abroad, the threat of greater trade restrictions lowers foreign sales in the United States.

Foreign direct investment is said to occur when a foreign investor or company purchases 10 percent or more of an existing US company's equity. A purchase of that size suggests that the new investors plan to play an active role in the operation of the acquired company. The tally of foreign direct investment also includes the establishment of a new business or subsidiary by a foreign company or entrepreneur in the United States.

An approach similar to the analysis used to capture the effect of economic policy uncertainty on exports and imports is used to examine the effect it has on foreign direct investment into the United States. The import demand function is modified by replacing imports with investment inflows. Foreign direct investment inflows are thought to increase with US economic activity. Higher GDP in the United States is expected to increase sales and profits, making foreign direct investment more attractive. Because a real appreciation of the dollar raises the cost of foreign direct investment, it is expected to discourage investment. Greater uncertainty about the economy, as measured by the volatility index, is expected to reduce foreign direct investment in the United States because the

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Economics 60, no. 7 (2013): 771–88; or Kyle Jurado, Sydney C. Ludigson, and Serena Ng, "Measuring Uncertainty," *American Economic Review* 105, no. 3 (2015): 1177–216.

50. Jeremy J. Siegel, *Stocks for the Long Run* (New York: McGraw Hill, 2008).

51. Yoko Kubota and William Mauldin, "Japan Slaps 50% Tariff on Some U.S. Beef," *Wall Street Journal*, July 28, 2017.

profitability of the investment is less certain. As with exports and imports, international investment is likely to be sensitive to policy uncertainty. Government actions related to trade, regulation, or taxes can make an attractive investment opportunity potentially unprofitable, reducing investment. As a result, higher levels of economic policy uncertainty are expected to discourage foreign direct investment. The broad economic policy uncertainty index, which captures a wide range of policies, and the narrower trade policy uncertainty index will be included separately to distinguish between the two.

It takes time for trade or investment flows to adjust to changes in the explanatory variables in the model. Because there is a dynamic relationship, vector autoregression is an appropriate econometric estimation technique. A vector autoregression (VAR) is a system of equations that regresses each variable in the model on lagged values of itself and the other explanatory variables in the system.[52] VARs have been shown to be an effective way to capture and explain the dynamic relationship between time-series variables.[53] This approach is the same as that used by Baker, Bloom, and Davis, which enters the logarithm of the level of each variable in the VAR.

Data. Quarterly real GDP for the Organisation for Economic Co-operation and Development (OECD) is used to measure world income. Similarly, quarterly real US GDP is used to measure the level of income in the United States.[54] OECD real GDP captures a little more than 50 percent of world GDP. In addition, OECD countries are major trading partners of the United States. The exchange rate used is the real, trade-weighted rate for the US dollar against 26 industrial and emerging economies' currencies. It is reported on a monthly basis. US exports and imports of goods and services are reported on a monthly basis. The foreign direct investment inflow into the United States is reported on a quarterly basis.[55] The economic policy uncertainty and trade policy uncertainty indices are

52. Because all explanatory variables are predetermined or known at time *t*, each equation can be estimated using ordinary least squares. Those estimates are consistent. See James H. Stock and Mark W. Watson, *Introduction to Econometrics* (Boston, MA: Addison-Wesley, 2003), 534.
53. The classic paper that developed this approach was Christopher Sims, "Macroeconomics and Reality," *Econometrica* 48, no. 1 (1980): 1–49.
54. These data were downloaded from the OECD Quarterly National Accounts, https://stats.oecd.org/index.aspx?queryid=350, accessed September 13, 2017. The data start in the first quarter of 1985 and end in the first quarter of 2017. World GDP is available only on an annual basis.
55. The monthly data series were downloaded from the Federal Reserve Economic Database at the Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/categories, accessed September 13, 2017. The exports and imports data series begins in January 1992 and ends in May 2017. The

reported on a monthly basis.[56] All monthly data are converted to quarterly data by averaging the three monthly observations for each quarter.

Empirical Results

VAR results are reported as impulse response functions. An impulse response function captures the dynamic effect over time that a one-standard-deviation change in a variable in the model has on other variables in the model. I trace the effect over three years.[57] The graphical representation of the entire impulse response function is a visual representation of how the variable of interest responds over time to a change in policy uncertainty. Each impulse response function includes a 90 percent confidence band.[58] When the confidence band includes zero, the relationship between the two variables cannot be said to differ from zero in a statistically meaningful way.

Each impulse response function is estimated from a VAR that contains one of the two policy uncertainty variables; the VIX volatility index (controlling for general economic uncertainty); the real exchange rate; real GDP; and foreign direct investment inflows, imports, or exports. The model contains five lagged values for each variable to ensure there is no residual serial correlation in each equation's error term. Given data availability, the foreign direct investment VARs are estimated from the second quarter of 1986 to the first quarter of 2017.[59] The export and import VARs are estimated for the second quarter of 1993 to the first quarter of 2017.[60]

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exchange rate series begins in January 1985 and ends in May 2017. The foreign direct investment data series begins in the first quarter of 1985 and ends in the first quarter of 2017.

56. The data are provided by Nicholas Bloom, "Economic Policy Uncertainty," http://www.policyuncertainty.com/, accessed September 13, 2017.

57. To produce the impulse response functions, the changes or shocks must be independent of each other in the period when the change or shock occurs. That is accomplished by using a Cholesky decomposition (see Sims, "Macroeconomics and Reality," or Thomas A. Doan, *RATS Handbook for Vector Autoregressions* (Evanston, IL: Estima, 2010) for the technical details). The order of the variables in the VAR is policy uncertainty; VIX index; exchange rate; GDP; and imports, exports, or foreign direct investment.

58. The 90 percent confidence bands are calculated using Monte Carlo methods (Doan, *RATS Handbook for Vector Autoregressions*) and are the same approach and percentage as those used in Baker, Bloom, and Davis. They can be interpreted to mean that the confidence bands contain the true impulse response function 90 percent of the time. Also see Christopher A. Sims and Tao Zha, "Error Bands for Impulse Responses," *Econometrica* 67, no. 5 (1999): 1113–55.

59. The VAR includes five lags to capture the dynamics; as a result, I lose five observations at the beginning of the sample. Lag selection methods have a tendency to choose too few lags. One year's worth of lags is a safe number of lags to capture the dynamics. The extra lag removes any remaining seasonal influences (see Doan, *RATS Handbook for Vector Autoregressions*).

60. Import and export data begin in 1993. Investment data begin in 1985.

The impulse response function results are presented in figures 3 through 8. The horizontal axis measures the number of periods (in quarters) that have passed since a one-standard-deviation change in a policy uncertainty variable. The vertical axis measures the percentage change or response in each period over three years.[61]

Figures 3 and 4 show the response of foreign direct investment (FDI) inflows to an increase in trade and economic policy uncertainty, respectively. Figure 3 shows the estimated percent change in US foreign direct investment inflow from a one-standard-deviation change in trade policy uncertainty (TPU). The effect of trade policy uncertainty on foreign direct investment inflows in the United States is not immediate but is negative after four quarters. The response becomes significant after about two years. It does produce some volatility in those inflows. Economic policy uncertainty (EPU) changes, shown in figure 4, have a significant negative effect on foreign direct investment after five quarters. Again, uncertainty increases the volatility of foreign direct investment. Over the three-year period, foreign direct investment inflows average 4.8 percent less in response to an increase in economic policy uncertainty. The results show that changes in policy uncertainty have a delayed but significant effect on investment inflows into the United States.

There is a strong difference in the response in foreign direct investment inflows to the two measures of policy uncertainty. The average quarterly effect shown in the broad index is almost 1.7 times larger (−2.8 versus −4.8) than when the narrower trade index is used. The broader economic policy uncertainty measure shows a larger and somewhat more statistically significant effect than does the trade policy uncertainty measure. That result indicates that foreign direct investment inflows are influenced by more than US trade policy. Domestic tax and regulatory policies also affect the profitability of foreign businesses operating in the United States. The evidence presented here indicates that the broader index captures both international and domestic policy uncertainty. It better reveals the broad set of policies that affect an investment's profitability.

Those results suggest that foreign businesses delay direct investment decisions when policy uncertainty is high in the United States. Because expanding capital formation seems to be an important objective of the Trump administration, increasing uncertainty over policy works against a key objective of the administration.[62]

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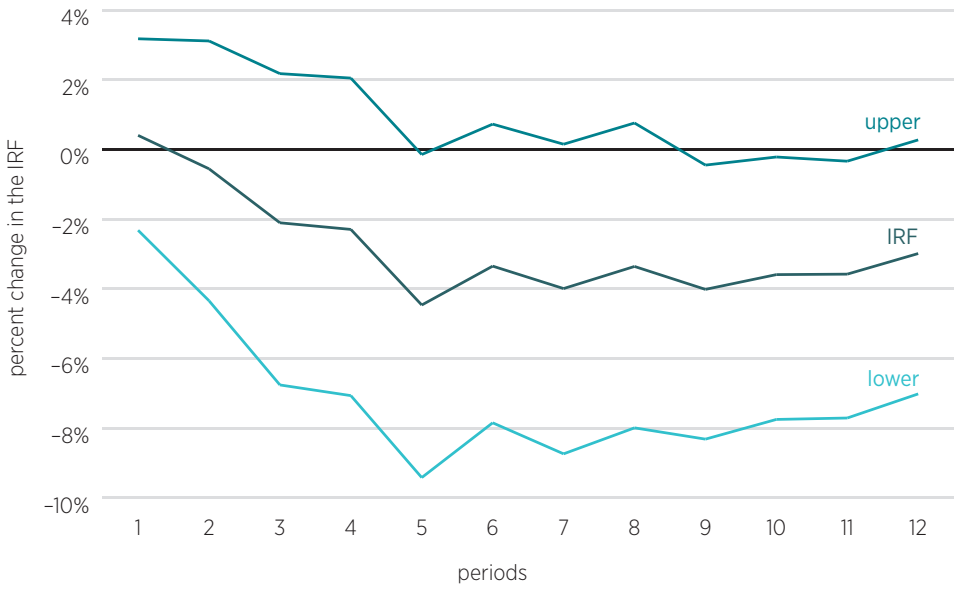
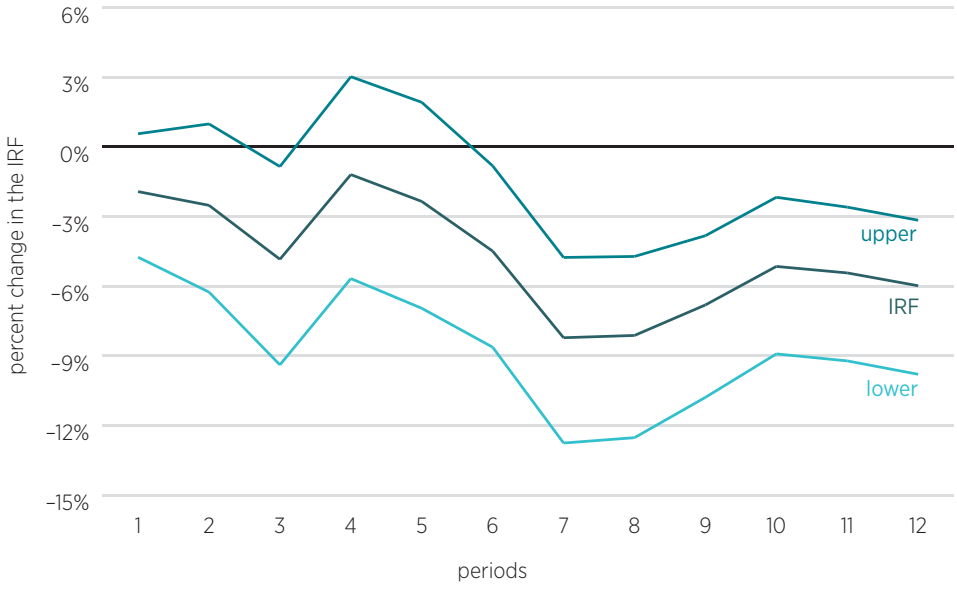
61. Formally, the impulse response function can be interpreted the following way. After two quarters, the value of the impulse response function for foreign direct investment (in period $t + 2$) after a change in economic policy uncertainty (in period t) equals $\partial \log \text{FDI}(t + 2) / \partial \log \text{EPU}(t)$.
62. Tyler Cowen, "Trump's Economic Revolution Is All about Investment" (Federal Fiscal Policy Expert Commentary, Mercatus Center at George Mason University, Arlington, VA, December 4, 2017).

FIGURE 3. IMPULSE RESPONSE OF FDI TO TPU



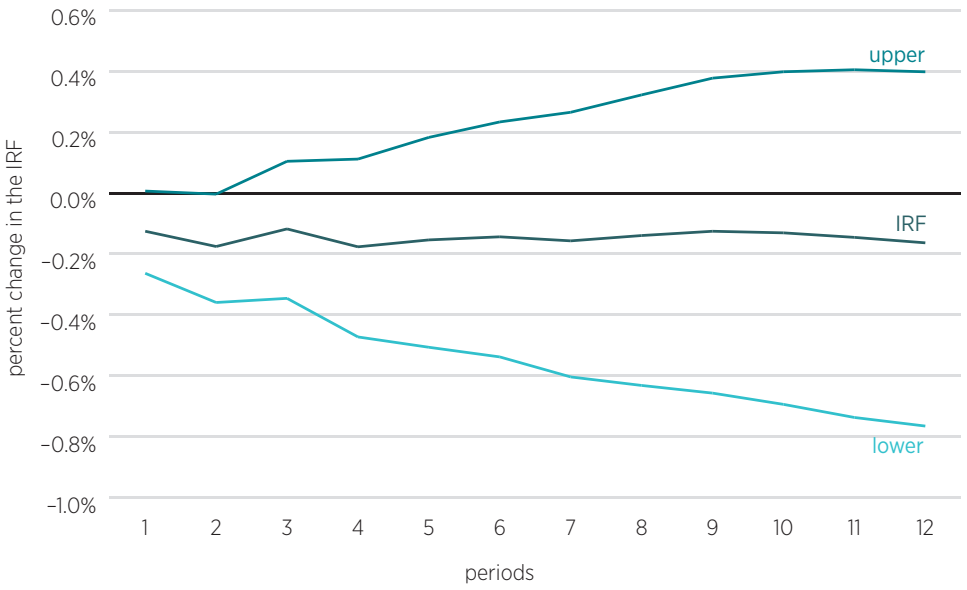
Note: FDI = foreign direct investment; TPU = trade policy uncertainty; IRF = impulse response function.

FIGURE 4. IMPULSE RESPONSE OF FDI TO EPU



Note: FDI = foreign direct investment; EPU = economic policy uncertainty; IRF = impulse response function.

FIGURE 5. IMPULSE RESPONSE OF IMPORTS TO TPU



Note: TPU = trade policy uncertainty; IRF = impulse response function.

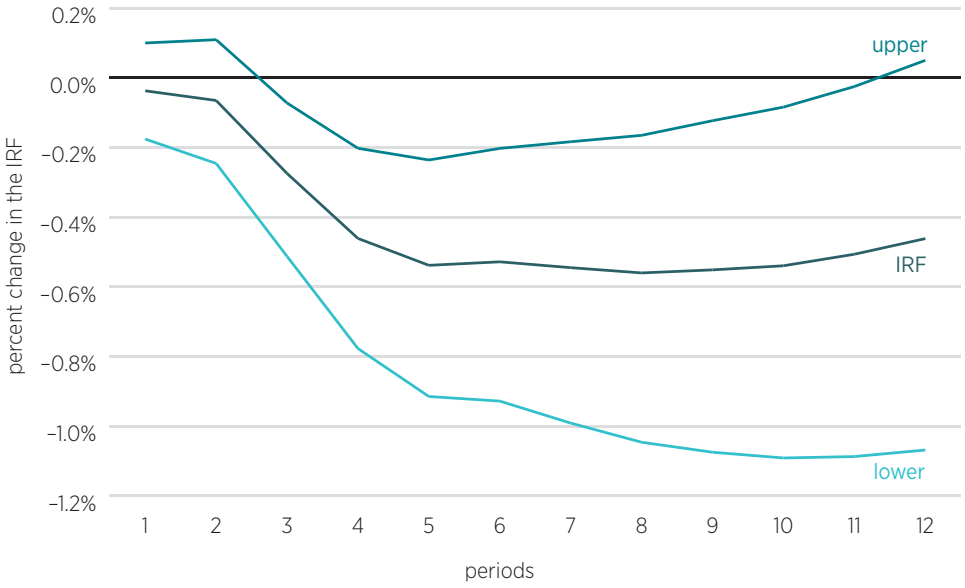
Figure 5 shows that higher trade policy uncertainty has a negative but insignificant impact on imports. When economic policy uncertainty is used, instead, to measure policy uncertainty, as shown in figure 6, there is a persistent and significant negative effect on imports. The average decline over the three-year period equals 0.4 percentage points, or almost one-half of a percentage point. The average impact of the broad index is almost two times larger (−0.2 versus −0.4) than when the narrower trade index is used. Here again, the broader economic policy uncertainty index shows a bigger impact, suggesting that domestic as well as trade policies affect imports. Policies other than trade policy can affect the overall performance of the economy, lowering sales and profits.

The effect of policy uncertainty on exports is shown in figures 7 and 8. Trade policy uncertainty has a negative but statistically insignificant impact on exports. Economic policy uncertainty has a negative and statistically significant impact on exports in quarters three through eight. The average impact of the broad index is three times larger (−0.1 versus −0.3) than when the narrower trade index is used.

POLICY CONCLUSIONS

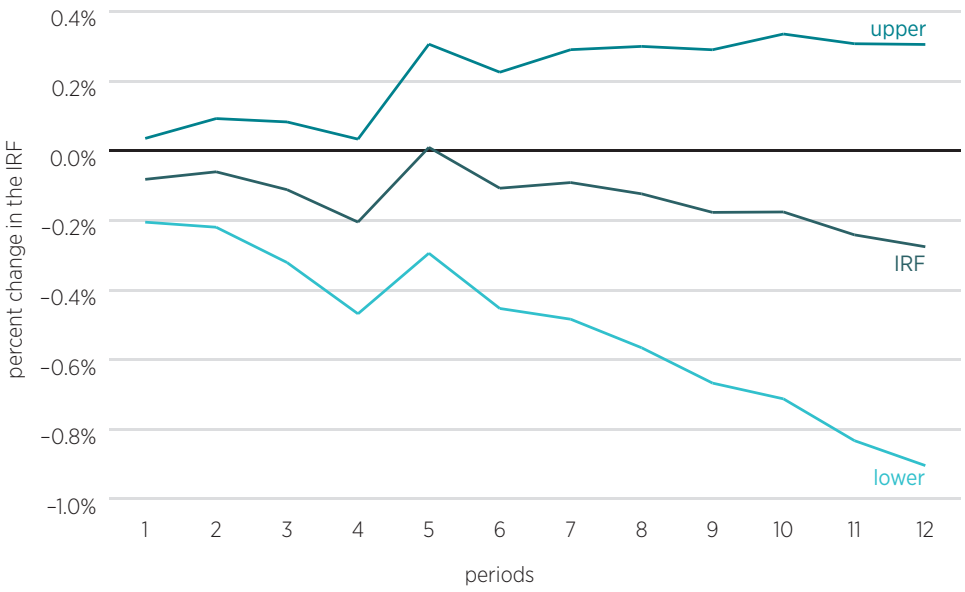
The results reported in this paper and previous research suggest that economic and trade policy uncertainty negatively affects foreign direct investment inflows

FIGURE 6. IMPULSE RESPONSE OF IMPORTS TO EPU



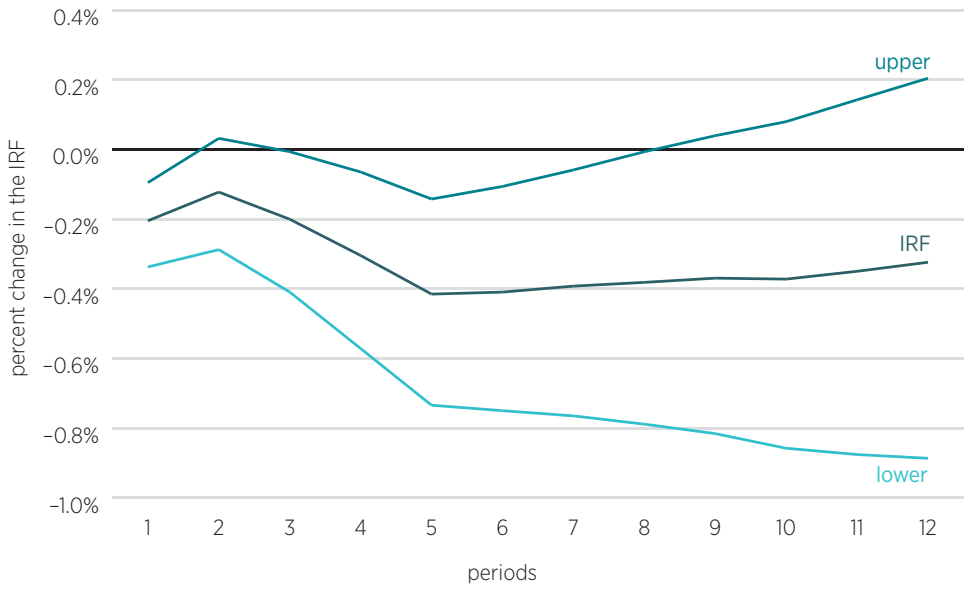
Note: EPU = economic policy uncertainty; IRF = impulse response function.

FIGURE 7. IMPULSE RESPONSE OF EXPORTS TO TPU



Note: TPU = trade policy uncertainty; IRF = impulse response function.

FIGURE 8. IMPULSE RESPONSE OF EXPORTS TO EPU



Note: EPU = economic policy uncertainty; IRF = impulse response function.

into the United States, as well as US imports and exports. When economic policy uncertainty is high, domestic and foreign businesses prefer to wait rather than expend the resources to invest and expand sales in the United States or abroad. Because more than one-half of US imports are intermediate goods, and because lower foreign investment limits capital formation, GDP falls, lowering living standards in the United States.

Since the end of World War II, the United States has been a member of GATT/WTO and has promoted free trade agreements. Those policies have lowered trade restrictions and increased confidence that the policies will remain in place over time. Those actions have benefited the United States, resulting in a higher standard of living.

Policymakers in Washington will disagree about the best way to handle international commerce. Most importantly, President Trump and Congress must get economic policy right, but the way the policy-making process is managed also matters. The research presented in this paper shows that lack of policy clarity can undermine the stated goal of making the economic environment conducive to greater economic growth.

APPENDIX: MODEL SETUP

This paper examines the dynamic relationship between five variables (policy uncertainty; VIX index; real exchange rate; real GDP; and foreign direct investment inflows, imports, or exports) using a vector autoregression (VAR). The VAR model contains five equations, one for each variable in the model. Each equation contains lagged values of itself and of the other four variables in the model. Because each variable is predetermined, known at time *t*, each equation can be consistently estimated using ordinary least squares.[63] Each variable in the model is the level of its logarithmic value. This specification is the same specification used by Baker, Bloom, and Davis.[64] Each variable in the model is lagged five periods to ensure that each equation's residual has no autocorrelation. The fifth lag removes any remaining seasonality in the data. Lag length selection methods are not used because the tendency to choose too few lags is well known.[65]

The results of the estimated model are presented as impulse response functions. The impulse response function shows how a variable in the model responds over time to a change in policy uncertainty. To get the impulse response function, the autoregressive form of the VAR is inverted to get its equivalent moving average representation. To identify the impulse response function, one must ensure that each variable change or shock that starts the impulse response is independent of the other disturbance terms in the model. That is accomplished using a standard Cholesky (or recursive) decomposition.[66] The variable order is policy uncertainty; VIX index; real exchange rate; real GDP; and foreign direct investment inflows, imports, or exports.

The 90 percent confidence bands are calculated using Monte Carlo integration. It is the most common way to calculate the bands.[67] The calculation in this paper used 10,000 replications. The results are graphically presented in figures 3 through 8.

63. Sims, "Macroeconomics and Reality."
64. Baker, Bloom, and Davis, "Measuring Economic Policy Uncertainty."
65. Doan, *RATS Handbook for Vector Autoregressions*.
66. Sims, "Macroeconomics and Reality."
67. Doan, *RATS Handbook for Vector Autoregressions*.

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