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Migration Fears, Policy Uncertainty and Economic Activity*

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Migration Fears, Policy Uncertainty and Economic Activity*

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Abstract

Motivated by the recent European migrant crisis, Brexit, and President Trump's immigration priorities, we provide new evidence into how migration fears and migration policy uncertainty affect macroeconomic outcomes across France, Germany, the United Kingdom, and the United States. We investigate the impact of immigration-related fear and uncertainty on economic activity via vector autoregression models. Our findings indicate that both indices are associated with decreases in industrial production in all countries except Germany. Surprise increases in immigration-related fears have negative influence on unemployment rates in these four countries too. We also show that innovations in the migration related uncertainty indices do not foreshadow significant declines in output.

JEL classification: E23, E24, F22.

Keywords: Migration policy uncertainty, migration fear, economic activity, VAR.

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1 Introduction

The topic of international migration and its consequences has come into vogue in policy circles recently, particularly in Europe and the United States (US). Between 2015 and 2016, the European Union (EU) experienced a massive influx of refugees, commonly known as the “European refugee crisis”. This marked the biggest wave of migrants entering Europe since World War II, and more than 1.3 million refugees crossed the Mediterranean and Aegean Seas trying to reach Europe (Trines, 2017). Some argue that terrorists were able to enter EU territory by taking advantage of the European refugee crisis (Nabeel and Bhatti, 2016). Migrants started to be associated as a threat to security following the terror attacks in Paris on November 2015, Brussels on March 2016, Nice on July 2016, Berlin on December 2016, Stockholm on April 2017, London on March/June 2017, and Manchester on May 2017, as well as other incidents in various European countries. Public anxiety over immigration was also at the center of discussions concerning the withdrawal of the United Kingdom (UK) from the EU (popularly known as ‘Brexit’). On 23 June 2016, the British public made a decision via referendum to leave the EU. Some studies find that immigration concerns strongly influenced voters’ decisions (Arnorsson and Zoega, 2018; Clarke et al., 2017; Meleady et al., 2017). The US presidential debates have focused over time on all issues related to migration (Mayda et al., 2016), and immigration-related debates have been becoming more and more heated since Donald Trump announced his candidacy for the White House in June 2015.

Motivated by the recent European migrant crisis, Brexit, and President Trump’s immigration priorities, we provide new evidence into how (i) migration fears and (ii) migration policy uncertainty affect macroeconomic outcomes across France, Germany, the UK, and the US. We use the text-based immigration-related indices developed by Scott R. Baker, Nick Bloom, and Steven J. Davis (see Baker et al., 2015) which are maintained at www.policyuncertainty.com. The indices represent intensity of migration-related fears and of migration-related policy uncertainty for France, Germany, the UK, and the US. These four countries are among the largest migrant recipients in the world; in 2017, the largest number of migrants resided in the US, Germany hosted the third largest, the UK hosted the fifth largest, and France hosted the seventh largest. Moreover, these countries experienced large increases in migration between 1990 and 2017 (United Nations, 2017). By using these measures, we investigate the impact of immigration-related fear and uncertainty on economic activity via vector autoregression (VAR) models. We also explore the relationship between the migration related uncertainty indices and other economic policy uncertainty indices.

The empirical analysis yields an interesting set of findings. Firstly, both migration related indices are associated with decreases in industrial production in all countries except Germany.

A surprise increase in the migration economic policy uncertainty (hereafter referred to as ‘MEPU’) index or the migration fear index (hereafter referred to as ‘MFI’) leads to a drop of industrial production, followed by a rebound towards the pre-shock levels in France, the UK, and the US. This decline and rebound effect is more pronounced in France. This finding is consistent with the literature that establishes that empirical measures of general economic uncertainty or policy uncertainty behave countercyclically to aggregate economic activity in many industrialized countries (including Germany). Alexopoulos and Cohen (2008, 2009) find that output, employment, productivity, consumption and investment all decrease in response to an unanticipated rise in uncertainty. Baker et al. (2016) find that increases in a news-based index of policy uncertainty are negatively correlated with aggregate employment, output, and investment in the US and a number of other industrialized countries. In the case of Germany, Bachmann et al. (2013) plot impulse responses of manufacturing production to surprise increases in different uncertainty measures and find that there is a decline in manufacturing production followed by a relatively quick and rebound. While we find such decline and rebound behavior for France, the UK, and the US; Germany stands as an outlier. We discuss in Section 3 that robust economic performance of Germany, which includes reforms that have targeted the system of industrial relations, and dispersion of industrial production can explain to some extent why surprise increases in the MEPU index or the MFI do not foreshadow industrial production.

Secondly, innovations in the MFI, in every case and for every country, are associated with decreases in unemployment. Put plainly, increases in immigration-related fears are associated with higher employment levels. This finding does not support the popular belief that there are adverse effects on employment from immigration and related concerns.¹ It is important to emphasize that we are studying the effects of the increases in immigration-related fears not the actual immigration flows. With this in mind our findings provide additional evidence to studies that have found no positive correlation between unemployment and the share of immigrants in a country.² We also find that unemployment exhibits a weak hump-shaped impulse response to an innovation in MEPU in France and the US. This result can also be reconciled with findings of some studies that show adverse effects from immigration to the

¹For example, at a Marine Le Pen’s far-right National Front campaign, a retired worker stated “they are going to invade us. Then, there really will be unemployment.” (Nossiter, 2015). Edo et al. (2017), using panel data on presidential elections from 1998 to 2017, estimate the impact of immigration on voting for far-left and far-right parties in France and find that immigration increases support for far-right candidates and has no robust effect on far-left voting.

²The impact of immigration on the labor market outcomes of native-born workers has been a central issue of public debate in traditional receiving countries, such as France, Germany, the UK, and the US. The main concern is that immigration can reduce the employment opportunities of native workers. Many studies conclude either very moderate effects or a lack of effect of immigration on unemployment. See Friedberg and Hunt, 1995; Okkerse, 2008; Constant, 2014; Edo et al., 2018 and the references therein.

labor market in the short to medium term (see Gross, 2002).³

Thirdly, for each country, our findings indicate that a relatively significant fraction of the movements in unemployment at long horizons are due to migration-related ‘fear’ shocks as opposed to migration-related ‘uncertainty’ shocks. The MFI dominates the forecast error variance decomposition at the forecast horizon (of 40 quarters) in each country for unemployment, meaning that it explains far more of the variance in unemployment than the MEPU index. On the other hand, the MEPU index dominates the forecast error variance decomposition at the forecast horizon (of 40 quarters) for industrial production in every country except Germany.

Finally, we look at the relationship between the migration related indices and (i) economic policy uncertainty (EPU) index of Baker et al. (2016) and (ii) the recently developed World Uncertainty Index (WUI) à la Ahir et al. (2018). Our analysis shows that the level of migration related uncertainty is positively associated with the EPU and the WUI. We also study the impulse responses of the EPU index to surprise increases in MEPU and MFI in our four country sample and note the significant and sizeable responses for France and the UK. For example, we find that innovations in the MEPU index account for more than 60% of the variance in the EPU in France and in the UK. We also run panel regressions between stock market volatility and quarterly GDP growth rates against different uncertainty indices. Both EPU and WUI are statistically significantly correlated with stock market volatility and economic growth, and these associations are more pronounced when we use the WUI as a measure of economic uncertainty. However, we do not find such significant correlations between the migration related indices and economic growth. Our panel regressions results show that the innovations to the migration related uncertainty indices do not foreshadow weaker economic performance.

To the best of our knowledge, our paper is one of the first attempts to characterize the dynamic economic consequences of unexpected changes in intensity of migration-related fears and of migration-related policy uncertainty. The economics of migration has been a burgeoning field of academic research (see, among many others, the edited volumes by Constant and Zimmermann, 2013; Chiswick and Miller, 2015) and there are many studies in applied microeconomics and labor economics, which analyze the effects of immigration flows on employment and wages. There are, however, relatively fewer studies that focus on unanticipated increases in immigration on the macroeconomy (see, for example, Liu, 2010; Kiguchi and Mountford, 2017; Furlanetto and Robstad, 2019 and the references therein). In addition, our paper adds to the growing literature on the quantitative assessment of the role exerted by a given uncertainty measure in explaining macroeconomic dynamics (see,

³In the long term, however, labor markets adjust and unemployment rates are brought down.

among many others, Alexopoulos and Cohen, 2009, 2015; Bloom, 2009; Bachmann et al., 2013; Baker et al., 2016; Charles et al., 2018; Born et al., 2018). There are also studies that explicitly study the relationship between uncertainty (or economic policy uncertainty) and unemployment (see, for example, Caggiano et al., 2014, 2017; Leduc and Liu, 2016; Netšunajev and Glass, 2017).

The remainder of the paper is organized as follows. Section 2 presents information for MEPU and the MFI for Germany, France, the UK, and the US. Section 3 provides baseline quantitative analysis. Section 4 presents a detailed robustness analysis of our findings. Section 5 explores the correlations between the migration related uncertainty indices and the general uncertainty indices. Section 6 provides further discussions of our results. Section 7 concludes.

2 Immigration fears and policy uncertainty

2.1 Constructing migration-related indices

Over the past decade, the role of uncertainty and its relationship with economic activity have taken the spotlight among policymakers and economists alike. There is a growing literature on developing text-based⁴ indicators that can be useful proxies for uncertainty, given uncertainty is not directly observable. In one of the earliest contributions, Alexopoulos and Cohen (2008, 2009) propose a new index of general economic uncertainty using the number of articles that appear in the New York Times. The index uses the terms ‘uncertain’ and/or ‘uncertainty’ and ‘economic’ and/or ‘economy’.⁵ This approach has been well received and expanded in a variety of ways by number researchers, most notably by Baker et al. (2016).

Baker et al. (2016) measure economic policy uncertainty (EPU) across countries by counting the number of occurrences of specific words or a sequence of words in certain newspapers. The indices are updated regularly and are available publicly on the EPU website.⁶ On their website they frequently update a monthly global index as well as monthly indices for more than 20 major world economies. Using similar methods to their EPU index, they also provide two new quantitative indicators for the intensity of migration-related fears and

⁴Interest in text mining, i.e., the extraction of facts and opinions from a body of text, has gained momentum in economics in recent years. See Dyas-Correia and Alexopoulos (2014) and Gentzkow et al. (2017) for comprehensive reviews.

⁵The empirical literature on uncertainty measures discusses various other measures. See, among many others, Bloom, 2009; Bachmann et al., 2013; Jurado et al., 2015. Bloom (2014) provides a survey of the main facts, recent contributions, and open questions about uncertainty.

⁶There are several other indices, in addition to the EPU indices, which are available on their website.

migration-related policy uncertainty in France, Germany, the UK, and the US. The indices are quarterly and extend back to 1990. To construct the migration fear and policy uncertainty indices, Baker et al. first define the following term sets:

- Migration (M): border control, Schengen, open borders, migrant, migration, asylum, refugee, immigrant, immigration, assimilation, human trafficking;
- Fear (F): anxiety, panic, bomb, fear, crime, terror, worry, concern, violent;
- Economy (E): economic, economy;
- Policy (P): regulation, deficit, white house, legislation, congress, federal reserve;
- Uncertainty (U): uncertainty, uncertain.

The number of newspaper articles with at least one term from each of the M and F term sets is then divided by the total count of newspaper articles (in the same calendar quarter and country). They construct their migration policy uncertainty index (MEPU) in the same way, except they instead count articles with at least one term from each of M, E, P and U term sets. The indices are normalized to a mean value of 100 from 1995 to 2011 (Baker et al., 2015).

2.2 What do the migration indices tell us?

Figure 1 plots the MEPU index and the MFI for France between 1990:Q1 and 2019:Q1. The correlation between these two series is 0.77. According to Baker et al. (2015) the spikes in both indices around 1999 can be attributed to the Kosovo war refugees, and the volatile period shortly after this captures uncertainty generated by 9/11 and the 2002 French elections. The period between 2005 and 2007 is likely to have been influenced by the implementation of a new immigration and integration law. The aim of the law was to better regulate and promote selective immigration (Chou and Baygert, 2007). The 2007 French election of Nicolas Sarkozy also may have played a role in heightening migration uncertainty around this period. Uncertainty levels then remained relatively elevated until the 2012 French Elections where we see a large spike in the migration policy uncertainty index yet no major movements in the fear index. The period from 2014 onwards can be explained by the European refugee crisis and terror attacks in 2015 and 2016.⁷

⁷On Nov 13, 2015, Paris was the scene of multiple mass casualty terrorist attacks, resulting in the deaths of 137 people and injuring 413. On July 14, 2016, France was targeted again in the attack on Nice, resulting in the deaths of 87 people and injuring 458 (Carli et al., 2017).

Figure 2 plots the MEPU index and the MFI for Germany from 1990:Q1 to 2019:Q1. The correlation between these two series is 0.73. We observe a series of significant spikes in the MEPU index and the MFI which are likely to capture contentious migration related events. The steady stream of East Germans migrating to West Germany in the 1980s rose significantly in the early 1990s and after an immigration law amendment in 1993, the number dropped off completely (Solsten, 1995, Chapter 3). In 1993 Germany amended its Basic Law to restrict the right to asylum. Themes such as asylum, xenophobia and citizenship were among the most controversial issues and topics debated in the 1990s (Koopmans, 1999). The German Nationality Act of 2000 was approved in 1999 and came into force in 2000. This expanded citizenship opportunities for long-term immigrants. The 2005 Immigration Act was Germany's first comprehensive law for managing continuing immigration, and extended and simplified residency rights (Crage, 2016). In 2012, Germany simplified the process for immigrants from outside the EU and in 2013, the government launched a special program aimed at young, unemployed Europeans ages 18 to 35, covering their travel, language courses and living costs while offering them vocational training in Germany (Faiola, 2014). Many European countries have now anti-immigrant parties in their parliaments and Germany is no exception. The right-wing populist party 'Alternative for Germany' (AfD), founded in 2013, was elected into the national parliament for the first time and promptly secured more than 12% of the seats, making it the third largest party after the general elections in September 2017.⁸

Figure 3 plots the MEPU index and the MFI for the UK between 1990:Q1 and 2019:Q1. There is a high correlation between these two series of 0.90. At a glance, both series seem to be less volatile than Germany, although both indices may be trending upwards, especially after 2000. The first grouping of major spikes comes from the fear index (around 1999) which can be attributed to the Kosovo War refugees. According to Baker et al. (2015), the spikes in both indices in 2003 may be due to Prime Minister Tony Blair promising tougher immigration.⁹ The following upward trends in both indices could be due to an accumulation of factors: the Criminal Justice and Immigration Act 2008, the 2010 General Election of the Conservative party led by David Cameron, the success of the UK Independence Party (Ukip) in the 2014 European Parliament elections,¹⁰ the European migrant crisis and 2015 Paris terror attacks. On the 23rd of June 2016, the UK held a nationwide referendum on its membership in the EU, and a majority of 51.9% voted to leave the EU. Immigration played

⁸<https://globalriskinsights.com/2018/02/elections-political-insecurity-germany/>

⁹In February 2003, Blair promised on live television to reduce the number of asylum seekers by half within 7 months (Mann, 2003).

¹⁰Ukip claimed nearly 28% of the vote share with its main agenda focused on migration reform (Kirkup and Swinford, 2014).

a central role in the Brexit campaign: Goodwin and Heath (2016) report 88% of people who thought the UK should admit fewer immigrants supported Brexit. Meleady et al. (2017) discuss that prejudice against immigrant from the EU was a major deciding factor in the Brexit referendum and provide empirical support for the presumed role of anti-immigrant prejudice in Britain's decision to leave the EU.¹¹

Figure 4 plots the MEPU index and the MFI for the US between 1990:Q1 and 2019:Q1. The correlation between these two series is 0.69. Appointed by Bill Clinton the U.S. Commission on Immigration Reform ran from 1990 to 1997 and recommended reducing legal immigration from about 800,000 people per year to approximately 550,000 (Jones, 2004, p.153). This may explain some of the volatility in the indices during 1990-1997. The initial spikes around 1995 capture policy changes to address the mass exodus of people from Cuba in the summer of 1994.¹² The large spike in the fear index in 1999 represents the Kosovo war refugees, followed closely by another spike during 9/11. Both indices spike together during the comprehensive immigration reform act, and a large spike in the MEPU in 2012 stems from an Arizona law change which increased deportations. We see a few more spikes around the 2012 elections and the comprehensive immigration reform act, before further spikes representing the European refugee crisis, the Paris attacks in 2015, the 2015 San Bernardino attack,¹³ 2016 Orlando nightclub shooting,¹⁴ and the period leading up to the 2016 US election, in which strict promises of migration control and debates around migration levels were frequent. In January 2017, newly elected President Trump signed an executive order temporarily suspending entry to the US by nationals of certain Muslim majority countries.¹⁵ Another migration related executive order from President Trump recently called for the immediate construction of a wall across the US-Mexico border. This also called for the hiring of 5,000 new border patrol agents and 10,000 new immigration officers (Korte and Jackson, 2017).

¹¹Sampson (2017) provides an overview of the available studies and argues that “support for Brexit came from a coalition of less-educated, older, less-economically successful and more socially conservative voters who oppose immigration and feel left behind by modern life” (Sampson, 2017, p.164).

¹²See Bruno (2016) for details regarding the Cuban Migration Accords of 1994 and 1995.

¹³14 people were killed and 22 others were injured in a shooting rampage in San Bernardino, California on December 2, 2015. The gunmen were motivated by radical Islamist beliefs, according to the FBI (<http://www.chicagotribune.com/news/nationworld/ct-california-shootings-20160104-story.html>).

¹⁴49 people were killed and more than 50 others were injured at a nightclub in Orlando, Florida, on June 12, 2016, by a gunman who pledged loyalty to the Islamic State (<https://www.businessinsider.com.au/omar-mateen-orlando-nightclub-shooting-pulse-2016-6>).

¹⁵<http://www.bbc.com/news/world-us-canada-38781302>

3 Baseline results

3.1 Data and empirical strategy

Our sample is quarterly and runs from 1991:Q1 to 2018:Q3 for each country.¹⁶ Both immigration-related uncertainty indices, which are available at a quarterly frequency, are taken from the migration fears and EPU website.¹⁷ We study two main economic activity variables: (i) industrial production index (seasonally adjusted, 2010=100) and (ii) harmonized unemployment rate (percentage). Both series are from the OECD’s “Key Short-Term Economic Indicators.”¹⁸ All variables are expressed in logs except the unemployment rates.

Our quantitative analysis is based on reporting impulse response functions (IRFs) and forecast error variance decompositions (FEVDs) from recursively-identified bivariate VARs featuring an uncertainty index and a measure of economic activity. In the words of Blanchard (1987, p.450): “In traditional VARs, individual equations are of no particular interest; only the system of equations as whole is. Impulse responses and variance decompositions more or less exhaust the description of the dynamics properties of that system.” We opt for the Choleski decomposition, which delivers orthogonal shocks in a recursive structure that is determined by the order in which the variables are listed in the VAR, in a way consistent with Bloom (2009), Bachmann et al. (2013), Baker et al. (2016), Girardi and Reuter (2017), Charles et al. (2018). We order the immigration-related uncertainty indices first in a recursive identification, which implies that a shock to the index will effect the measure of economic activity contemporaneously, while the movement in the activity variable will not effect the uncertainty index contemporaneously.

3.2 Impulse response functions

Figures 5-8 plot impulse responses of economic activity variables (industrial production and unemployment) to surprise increases in migration EPU (hereafter referred to as MEPU) and migration fear in France, Germany, the UK, and the US, respectively. The impulse responses of industrial production are expressed in percent and the unemployment rate is expressed in percentage points. The VARs are estimated with 4 lags, and all economic activity variables enter the systems in levels. The sample period for all VARs is common from 1991:Q1 to 2018:Q3. The shaded areas represent one-standard-error bias-corrected bootstrap confidence

¹⁶Migration related uncertainty indices start from 1990. Data for economic activity variables for Germany start from 1991 due to the unification of Germany. That’s why we start our sample from 1991 in our main quantitative exercises.

¹⁷http://www.policyuncertainty.com/immigration_fear.html

¹⁸<http://stats.oecd.org/Index.aspx?DataSetCode=KEI>

bands of Kilian (1998) and obtained using the MEPU index as the uncertainty measure.^{19,20} Sizes of all shocks are one standard deviation.

Panel (a) in Figure 5 shows that industrial production responds very quickly to an increase in immigration-related uncertainty in France. It starts declining almost immediately and, depending on the uncertainty index used to identify the corresponding shock: it is 0.65% below the pre-shock level about 7 quarters after the impact of the MEPU shock, and it bottoms at 0.4% below the pre-shock level about 20 quarters after the impact of the MFI shock. Panel (b) in Figure 5 shows that unemployment exhibits a weak hump-shaped response to an innovation in MEPU, but the results are not statistically significant. An MFI shock leads to a drop in the unemployment rate, which reaches a peak fall of 0.11 percent points below trend at around 9 quarters after the impact of the MFI shock, and then is followed by a rebound.

Figure 6 shows that an MFI shock has very small immediate implications for both industrial production and unemployment in Germany. The small immediate effects are followed by slow building, significant, and apparently permanent responses of both industrial production and unemployment. A one-standard-deviation innovation to the MFI predicts a level of industrial production that is 1.6% higher after 30 quarters, and predicts a level of the unemployment rate that is 0.30 percent points lower after about 15 quarters. The size of the effects of uncertainty is notably lower with MEPU on both industrial production and unemployment than with the MFI. A one-standard-deviation innovation to MEPU predicts level of industrial production that is 0.49% higher after 5 quarters. Industrial production increases and unemployment decreases as responses to surprise increases in immigration-related indices.²¹ Merging panel data from the German Socio-Economic Panel with detailed information on local labor markets between 1998 and 2009, Akay et al. (2014) find that increases in immigration have a positive and robust effect on natives' well-being. Our findings for Germany abandon traditional uncertainty literature but support the findings of Akay et al. (2014). Both the increases in MEPU and the MFI index are associated with higher economic activity, which in most cases, will lead to higher well-being.

Panel (a) of Figure 7 plots impulse responses of industrial production to positive standard

¹⁹Kilian's method is the bootstrap-after-bootstrap method to derive the confidence intervals (from 2000 bias-corrected bootstrap replications of the reduced form VARs) of the IRFs. These bias-corrected bootstrap confidence intervals explicitly account for the bias and skewness of the small-sample distribution of the impulse response estimator. This procedure also performs well regardless of whether variables are estimated in levels, deviations from a linear trend or first differences.

²⁰Our quantitative strategy is in line with those of Barsky and Sims (2011, 2012), Bachmann et al. (2013), and Charles et al. (2018).

²¹Pischke and Velling (1997) study substitution effects between immigrant and natives across local labor markets in Germany and their results indicate no detrimental effect of immigration.

deviation sized shocks in both the MEPU and the MFI in the UK. Both index-induced paths of industrial production follow a similar path characterized by a small increase on impact, followed by a long decrease over the 5-year forecast horizon. Panel (b) plots impulse responses of unemployment to positive standard deviation sized shocks in both the MEPU and the MFI. Both indices predict a very similar path, decreasing unemployment significantly to a peak decrease of around 0.12 percent points at about 11 quarters for MEPU and of around 0.12 percentage points at about 16 quarters for the MFI. The impact of the MFI shocks is more persistent for unemployment in the UK. Blanchflower and Shadforth (2009) study the hypothesis that higher UK migration inflows increase the ‘fear’ of unemployment and lowers wages. They also study the impact on the UK economy of the flow of workers from ten East European countries after their accession to the EU and argue that this inflow of workers reduced the natural rate of unemployment. Perhaps decreases in unemployment induced by a shock to ‘fear’ is just anticipation of this process. Our findings for unemployment in the UK are consistent with those of several other studies. Dustmann et al. (2005) find evidence that immigration has no effect on unemployment in the UK.²² If immigration truly has no effect on unemployment; neither an increase nor a decrease, then that may explain why our results are relatively insignificant for the UK.

Panel (a) of Figure 8 shows that, for the case of the US, a shock to the MEPU index causes industrial production to decrease, with a peak fall of around -0.38% after three quarters. A one-standard-deviation innovation to the MEPU index predicts a level of industrial production that is 0.41% higher than the pre-shock level after 25 quarters. A shock to the MFI, however, increases the level of industrial production in the very short-run. Industrial production decreases steadily but is still above its pre-shock level of almost 0.05% after 40 quarters. Responses of unemployment to innovations in the immigration-related uncertainty in the US are similar to those of France. Panel (b) of Figure 8 shows the response of unemployment to shocks to the immigration-related uncertainty measures. A shock in the MFI reduces unemployment in the short-run and the contraction in unemployment peaks around two years after the shock (at -0.19 percent points). This is then gradually absorbed, and dies out in the long-run. Unemployment exhibits a hump-shaped response to an innovation in MEPU, peaking around a year (at 0.06 percent points),²³ then gradually declining. After 5 years, unemployment is below its pre-shock level by 0.06 percent points.

²²Portes (2018) also argues that “there is now a clear consensus that even in the short-term migration does not appear to have had a negative impact on the employment outcomes of UK natives.”

²³Kiguchi and Mountford (2017) estimate an eight-variable (GDP, private consumption, nonresident investment, residential investment, unemployment, hours worked, real wages, and the numbers of new permanent residents) VAR system with annual data from 1950 to 2005 and find that unemployment temporarily rises in response to an immigration shock.

In France, and the UK we observe a decline in industrial production while the unemployment rate falls, in response to positive innovations in the MFI. A particular explanation for this is finding could be the structural transformation. The reallocation of resources across the broad economic sectors agriculture, industry, and services is a prominent feature of economic development. The share of industrial employment has been declining for more than three decades in today’s most advanced economies, a phenomenon that is referred to as “de-industrialization”. In other words, labor has been moving away from industry to services. We illustrate this in Figure 9. Figure 9 shows the evolution of the industrial employment²⁴ share in France, Germany, the UK, and the US between 1991 and 2018. Data are from the World Bank (2019) and we obtain a similar picture when we look at the value added shares instead of the employment shares. In other words, production factors have been moving from the industrial activities to the service sectors in France, Germany, the UK, and the US. This may explain the declines in industrial production without creating detrimental unemployment. In addition, decentralization of industrial production in Germany and the success of the hidden champions helps explain the relatively high share of manufacturing in Germany’s workforce and the slow pace of its decline shown in Figure 9.²⁵

Decentralization of industrial production is a significant factor for Germany’s robust economic performance. Dustman et al. (2014) show that Germany’s competitive position relative to its main trading partners has persistently improved since 1995 because its wages grew at a slower pace than productivity. They present evidence that the specific governance structure of the German labor market institutions allowed them to react flexibly in a time of global economic circumstances. This is due largely to the fact that the German economy went through an unprecedented process of decentralization of wage bargaining during the 1990s. That is what led to a dramatic decline in unit labor costs, and ultimately increased competitiveness. Germany’s hidden champions can explain the non-negative responses of industrial production. Simon (2009, p. 15) defines a hidden champion as company which is one of the top three in its global market, has less than \$4 billion in revenue, and is little known in the public. According to The Economist (2019) “at least two-thirds of the hidden champions are in settlements below 50,000 people, and they are dotted throughout Germany.”

²⁴The industry sector consists of mining and quarrying, manufacturing, construction, and public utilities (electricity, gas, and water).

²⁵There are several alternative explanations for this phenomenon (such as trade with China, automation, skilled-biased technological change, offshoring, etc.) Since our paper is not about the causes of structural transformation we don’t delve into the details of the structural transformation in these countries.

3.3 Forecast error variance decompositions

We can further assess the importance of the MFI and the MEPU on each economy's industrial production and unemployment using forecast error variance decomposition (FEVD) methodology. Using the VAR structure, we decompose the forecast error of the VAR along different horizons, attributing portions of the error variance to immigration-related shocks. Table 1 documents the FEVD attributable to MEPU and the MFI at various forecast horizons ($h=1, 4, 8, 40$) in each country.²⁶ The columns correspond to different measures of uncertainty used in the bivariate VAR systems for each country. The rows show the fraction (multiplied by 100) of the total forecast error variance of each economic activity variable of each country due to innovations in uncertainty, where the uncertainty series is ordered first in a recursive identification.

Panel (a) in Table 1 shows that both indices explain a non-negligible amount of the variance in industrial production at the 40-quarter horizon in France, yet the MEPU index explains slightly more (16.83% vs. 6.91%). Both indices explain a relatively small amount of variance in unemployment, but the innovations in the MFI explains more than three times the amount of variance than the MEPU index does at the 40-quarter horizon (8.96% vs 2.46%). Panel (b) shows that the MFI explains significantly more of the variance in industrial production than the MEPU index does (30.61% vs. 2.47%) at the 40-quarter horizon in Germany. Similarly, the MFI explains 41.86% of the variance in unemployment whereas the MEPU index only explains 3.28% (at the 40-quarter horizon) in Germany. In addition, the MFI explains more of the variance in unemployment than the MEPU index at all forecast horizons ($h=4, 8, 40$) in Germany. All these suggest that the MFI innovations clearly convey important information about the future time paths of industrial production and unemployment in Germany, and most notably, at longer horizons. Regarding the UK (panel c), the contributions of MEPU shocks to the volatility of industrial production are almost negligible in the short run. However, in the long-run, i.e., the 40-quarter ahead FEVD, the contribution of MEPU shocks to the volatility of industrial production is as high as 30.13%, and it is slightly larger than that of the MFI shocks (24.53%). The MEPU index tends to explain more variance in unemployment in the short-run in the UK. However, the MFI explains more of the variance in unemployment (13.80% vs. 10.98%) at the 40-quarter horizon. Regarding the US (panel d), the contributions of the MFI shocks to the volatility of industrial production are small in the short run. After the initial impact, at every forecast horizon ($h=4, 8, 40$), the MFI explains significantly more of the variance in unemployment and ultimately explains 13.41% of the variance at the 40-quarter forecast horizon.

²⁶Again, the sample period for all VARs is common from 1991:Q1-2018:Q3. The VARs are estimated with 4 lags, and all economic activity variables enter the systems in levels.

4 Robustness checks

There are several robustness checks, which can be performed in order to make sure the results we present hold under different assumptions and specifications. Firstly, we compare the robustness of our results under different lag specifications. Secondly, we examine whether the effect of uncertainty on economic activity is different over time by estimating dynamic responses of economic activity variables to innovations in uncertainty on two subsamples. Thirdly, we ask to what extent, are innovations in migration fear simply reflective of information already contained in industrial production and unemployment, and to address this possibility, we reorder the variables in the system such that migration is fear orthogonalized with respect to industrial production and unemployment (the index is ordered last). Fourthly, we estimate a significantly larger VAR system for each country. Finally, we examine the exogeneity of immigration-related shocks.

4.1 Robustness to lag lengths

The dynamic properties of impulse responses may depend critically on the lag order of the VAR model fitted to the data and there is no one criterion works best for all classes of models. For example, Ivanov and Kilian (2005, p.1) state, “a number of such lag-order selection criteria are in use in the empirical literature, yet little is known about their implications for the accuracy of the implied impulse response estimates.” Figures 10-13 plot impulse responses of industrial production and unemployment to surprise increases in migration fear (MFI) in each country’s alternative lag structures. The VARs are estimated with 2, 4, or 6 lags, and all economic activity variables enter the systems in levels. The sample period for all VARs is common from 1991:Q1-2018:Q3. The shaded areas represent one-standard-error bias-corrected bootstrap confidence bands of Kilian (1998) and obtained from the system that is estimated with 4 lags. The results appear to be robust using 2, 4, or 6 lags. The rebound effect of unemployment’s response to surprise increases to the MFI is more pronounced in France when we use 6 lags.

4.2 Subsample analysis

We analyze the dynamic responses of economic activity variables to innovations in migration fear on two sub-samples, namely 1991:Q1-2018:Q3 (full sample) and 2001:Q3-2018:Q3 (post-9/11 sample). The shaded region is the \pm one standard error confidence band obtained from the system that is estimated using the full sample. Figures 14-17 present the IRFs for the two subsamples. The qualitative natures of the IRFs are similar in each case. That being

said, the impulse responses of unemployment to the uncertainty shocks in migration fear are stronger in the post-9/11 sample than in the full sample in the UK and the US.

4.3 Three-variable VARs and alternative orthogonalization

Here we present another robustness analysis, which is about reordering the variables in a VAR system. We design this exercise in the context of three-variable VAR systems, including industrial production, unemployment, and migration fear for each country. Firstly, we consider a three-variable VAR, ordered as (1) the MFI, (2) industrial production, (3) the unemployment rate. We then re-order the VAR as (1) industrial production, (2) the unemployment rate, (3) the MFI. The sample period for all VARs is common from 1991:Q1-2018:Q3. The VARs are estimated with 4 lags, and all economic activity variables enter the systems in levels. Panel (a) and (b) in Figures 18-21 are the IRFs from a three-variable VAR with migration fear, industrial production, and unemployment, where migration fear is ordered first. The shaded areas represent one-standard-error bias-corrected bootstrap confidence bands of Kilian (1998). Panel (c) and (d) in Figures 18-21 are the IRFs where migration fear is ordered last. The qualitative features of the impulse responses are more or less unaffected by the alternative orthogonalization and the results are in line with those obtained from bi-variate VARs.

4.4 Impulse responses from larger VARs

As discussed in Bachmann et al. (2013), smaller VARs are parsimonious and can be more credibly estimated and identified, but large VARs may be less prone to (potential) misspecification problems. One can also argue that our sample sizes are too short for any model larger than a bivariate model to be employed. Nevertheless, as a final robustness check to our model specification, we present IRFs from a larger VAR with the measure of uncertainty (MEPU or MFI) ordered second after the share price level as in Bloom (2009) and Bachmann et al. (2013). This choice of ordering implies that all variables except share price index respond contemporaneously to an uncertainty shock.

Figures 22-25 present responses of industrial production and unemployment to surprise increases in MEPU or the MFI in a way analogous to the bivariate VARs. The responses are obtained from estimating the six variable system, which features the log level of share prices, log of a measure of uncertainty, log industrial production, the unemployment rate, the investment share of GDP, and the consumption share of GDP (in this order).²⁷ The

²⁷We tried alternative orders and obtained similar results. We also experimented cases including consumer price index, short-term interest rates, and unit labor costs.

sample period for all VARs is common from 1991:Q1-2018:Q3. The frequency of the series in the VARs is quarterly, the VARs are estimated with 4 lags, and all economic activity variables enter the systems in levels. The shaded areas represent one-standard-error bias-corrected bootstrap confidence bands of Kilian (1998) and obtained using the MEPU index as the uncertainty measure. The uncertainty series are ordered second after the share price level, though results are largely invariant to this ordering assumption. Data for GDP, private final consumption expenditure, and gross fixed capital formation are taken from the OECD’s “Quarterly National Accounts (QNA).”²⁸ All variables are in “national currency, current prices, quarterly levels, and are seasonally adjusted.” We define the investment share of GDP as the ratio of gross fixed capital formation to GDP and the consumption share of GDP as the ratio of private final consumption expenditure to GDP. Both ratios are expressed in percentages.²⁹ Data for share price indices (2010=100) are from the OCED’s “Monthly Monetary and Financial Statistics (MEI).”³⁰ All other variables (industrial production, unemployment, MEPU, the MFI) are the same as in Section 3.1. The responses of industrial production and unemployment to increases in both immigration-related indices in these large VAR systems are qualitatively similar to the ones obtained in bivariate VARs in each country. The responses of unemployment in large VARs are somewhat less persistent than those in the bivariate VARs, and this is not surprising since there are more autoregressive parameters to estimate in large VARs.

4.5 On the exogeneity of immigration-related shocks

Our quantitative analysis follows the empirical literature that studies the causal effect of uncertainty on the economy by using a recursive approach to identify uncertainty shocks in VAR modelling (Bloom, 2009; Bachmann et al., 2013; Caggiano et al., 2014; Jurado et al., 2015; Baker et al., 2016; Scotti, 2016). We place uncertainty (MEPU or MFI) first in the ordering in our bivariate VAR models.³¹ One may argue to what extent the relationship

²⁸<http://stats.oecd.org/Index.aspx?DataSetCode=QNA>

²⁹Figures A1-A4 in Appendix A.1 plot impulse responses of investment and consumption shares of GDP to surprise increases in MEPU and the MFI in each country. The impulse responses are expressed in percentage points. The VARs are estimated with 4 lags, and all economic activity variables enter the systems in levels. The sample period for all VARs is common from 1991:Q1 to 2018:Q3. The shaded areas represent one-standard-error bias-corrected bootstrap confidence bands of Kilian (1998) and obtained using the MEPU index as the uncertainty measure.

³⁰http://stats.oecd.org/Index.aspx?DataSetCode=MEI_FIN

³¹In an empirical study based on Norwegian data, Furlanetto and Robstad (2019) find that an exogenous increase in immigration contributes to a decline in unemployment. Furlanetto and Robstad (2019) impose two key sign restrictions to disentangle immigration shocks from other shocks: (i) an exogenous increase in immigration would have a negative impact effect on wages; and (ii) an increase in immigration has a positive effect on the labor force participation rate. They support these sign restrictions following the previous related empirical using Norwegian data. We do not impose any sign restrictions. It is worth noting that empirical

between each variable is causal. For example, a terrorist attack can generate increases in migration-related fear and uncertainty, but could also be associated with beliefs that economy will be negatively affected by the attack (see also Baker and Bloom, 2013; and Piffer and Podstawski, 2018 for such a rationale).³²

Inspired by Baker and Bloom (2013), we provide a simple test of exogeneity of the migration-related shocks. Table 2 shows the regressions results to examine whether we can find any predictive power for MEPU shocks using lagged industrial production and unemployment rates. We present results for (i) the entire sample period of our bivariate VARs (1991:Q1-2018:Q3), (ii) the period before the 2007-2009 global financial crisis (GFC) (1991:Q1-2007:Q3), and (iii) the period after the GFC (2009:Q3-2018:Q3). We cannot say with confidence that we find any predictive power for MEPU shocks using lagged industrial production and unemployment rates because although some of the coefficients are statistically significant, most of the significant coefficients are barely significant at 10%. Based on these findings we cannot conclusively argue that MEPU shocks appear to be predictable over the quarterly horizon.

5 Relations with other measures of uncertainty

5.1 Some correlations

It is important to analyze the effects of the changes in the migration related indices on other measures of uncertainty given the possibility that migration fears and uncertainty might simply reflect general economic policy uncertainty. In this section we explore the relationship between MEPU/MFI and EPU. As we discussed in Section 2, Baker et al. (2016) extend the notion of uncertainty to include economic policy uncertainty (EPU). The researchers construct indices for EPU based on the frequency of terms related to policy uncertainty in newspaper articles. Recently, Ahir et al. (2018) use Economic Intelligence Unit (EIU) reports to construct a new index of uncertainty—the World Uncertainty Index (WUI)—for 143 countries on a quarterly basis from 1996 onwards. In contrast to the existing measure of the EPU, the WUI is based on a single source. The WUI is defined using the frequency of the word ‘uncertainty’ (and its variants) in the quarterly EIU country reports. To make the

literature does not reach a consensus about the effects of immigration on wages paid to natives. Borjas (2003, 2013) find a negative impact of immigration on wages, while Card (2009) and Ottaviano and Peri (2012) do not.

³²Isolating exogenous variations in uncertainty is a challenge (see Stock and Watson (2012) for a discussion). Piffer and Podstawski (2018) propose a new instrument for the uncertainty shock by exploiting the variations in the price of gold. They argue that the price of a safe haven asset (i.e., gold) should emphasize the uncertainty-related component of the events. This helps separate uncertainty shocks from news shocks.

WUI comparable across countries, the raw count is scaled by the total number of words in each report.³³

Are the levels of migration related uncertainty indices correlated with the EPU and/or WUI? We design the following exercise using the quarterly data of EPU and WUI from Ahir et al. (2018) for the sample period of 1996:Q1-2017:Q4.³⁴ We regress EPU on the MEPU and MFI separately in a panel framework of four countries of which we have data for the MEPU and MFI. We study specifications with and without country fixed effects. Then, we run the same regressions using the WUI as the dependent variable instead of the EPU. Results are presented in Table 3. We find that there is a strong statistically significant relationship when regressing EPU (or WUI) on MEPU (or MFI) in a panel framework of four countries, and also purging for country fixed effects. These findings suggest that the level of migration related uncertainty is positively associated with economic policy uncertainty and the world uncertainty indices.

5.2 Migration related uncertainty indices versus EPU

To further explore the relationship between the migration related uncertainty indices and the EPU we report IRFs and FEVDs from recursively-identified VARs featuring MEPU (or MFI) and the EPU. Figure 26 plots impulse responses of EPU to surprise increases in MEPU and MFI in France, Germany, the UK, and the US. The impulse responses of EPU are expressed in percent. The VARs are estimated with 4 lags, and all variables enter the systems in levels (in logarithms). The sample period for all VARs is common from 1996:Q1 to 2017:Q4 (except the UK case, which is 1997:Q1 to 2017:Q4). The shaded areas represent one-standard-error bias-corrected bootstrap confidence bands of Kilian (1998) and obtained using the MEPU index as the uncertainty measure. Sizes of all shocks are one standard deviation. Significant and sizeable responses are noted for France and the UK.

Next, we further assess the importance of the MFI and the MEPU on each economy's EPU using the FEVD method. Using the VAR structure, we decompose the forecast error of the VAR along different horizons, attributing portions of the error variance to immigration-related shocks. Table 4 documents the FEVD attributable to MEPU and the MFI at various forecast horizons in each country. Both indices explain a significant amount of the variance in EPU at the 40-quarter horizon in France, yet the MEPU index explains slightly more (61.49% vs. 44.34%). Innovations in the MFI explain more than six times the amount of variance than the MEPU index does at the 40-quarter horizon in Germany. Both the MEPU

³³http://www.policyuncertainty.com/wui_quarterly.html

³⁴Quarterly data for the EPU and WUI are from Ahir et al. (2018), which are available at Nicholas Bloom's website (<https://nbloom.people.stanford.edu/research>).

index and MFI explain more than 60% of the variance in EPU in the UK at the 40-quarter horizon. The MEPU explains more of the variance in EPU than the MFI at all forecast horizons in the US.

5.3 Migration related uncertainty indices and growth

One final exercise we present is the correlations of alternate indices with stock market volatility and economic growth.³⁵ We follow Ahir et al. (2018) and run panel regressions between the stock market volatility and different uncertainty indices, also allowing for country fixed effects. We also run similar regressions using annualized quarterly GDP growth as the dependent variable instead of stock market volatility. Table 5 presents interesting set of findings. Both EPU and WUI are statistically significantly correlated with stock market volatility and economic growth, and these associations are more pronounced when we use the WUI as a measure of uncertainty. However, we do not find such significant correlations between the migration related indices and economic growth. The lack of association between the migration related indices and stock market volatility is also observed, except for specification (II) where the related coefficient is significant at 10%.³⁶

Motivated by these findings, we further explore the relationship between uncertainty and economic activity using panel VAR analysis. We fit a VAR to a quarterly panel of 4 countries from 1996:Q1 to 2017:Q4. We follow Ahir et al. (2018) and use a Cholesky decomposition with the following order: the log of average stock return, the uncertainty index (EPU or WUI or MEPU or MFI) and GDP growth. Our specification includes four lags of all variables. Country and time fixed effects are also included. Figure 27 reports the model-implied impulse response of GDP to a one-standard deviation increase in the related uncertainty index and the associated 90 percent confidence bands. The last two panels show that the response of output is statistically insignificant through the entire estimation horizon. On the other hand, panel (a) shows that the initial response of GDP is statistically significant against the WUI innovations. Our findings in panel (a) for four countries are consistent with those of Ahir et al. (2018) when they use a panel of 46 countries. While we refrain in giving causal interpretations to these results, results in panel (c) and panel (d) show that the innovations to the migration related uncertainty indices do not foreshadow weaker economic performance.

³⁵Quarterly data for stock market volatility and economic growth are from Ahir et al. (2018).

³⁶Antonakakis et al. (2017) examine whether US stock returns and volatility can be predicted from a set of uncertainty indices as well as the same migration-related uncertainty indices we use. They find that migration-related uncertainties increases stock market volatility in the US. In a footnote they state that they also look at Germany, France, and the UK and find that migration-related measures only possess predictive information for UK stock returns.

6 Further discussions

6.1 Correlations with the actual migration flows

Throughout this paper, many parallels have been drawn to the economic effect of migration itself, and it is important to remember that sentiment towards migration and migration flows are separate. To investigate the results further, it might be informative to see whether the indices are correlated with actual migration flows. If a country’s migration-related fear, or uncertainty, is correlated with its migration flows, then the migration itself may explain some of the changes in economic activity. Furthermore, we may expect these countries to have highly significant VAR results given that the fear/uncertainty is of actual migration and in this case, firms and businesses may be more likely to re-act.³⁷ Table 6 addresses this concern.

The correlations we report in Table 6 are Pearson’s correlation coefficients, which measure the amount of linear dependence between two series. One immediate point regarding the associations observed in the data for each country is the concern that reported correlations will change if one takes the logarithms since taking logarithm can be thought as a nonlinear transformation (and therefore general correlations will change). In addition, because we estimate our VARs in logs, we also address this concern by providing correlations between the logs of the variables in Table 6. The qualitative nature of our results (relative size and significance) remains the same.

The data is compiled from the OECD’s International Migration Database which provides annual data on migration flows and stocks in OECD countries.³⁸ We use the variable “in-flows of foreign population by nationality” for each of the four countries between 1990 and 2016. As the migration-related uncertainty indices are available in quarterly frequencies, and quarterly migration flows are not available, we transform MEPU and the MFI to their annual counterparts by taking the 4-quarter average within each year for each country.

Panel (a) of Table 6 reports the correlations between variables in levels. Germany, France, and the UK all have high and significant correlations. The US, on the other hand, has very low (and insignificant) correlations between migration inflow, the migration fear and migration policy uncertainty indices. In France, the MFI and the MEPU are highly correlated with each other (0.93) and have a correlation with migration inflows of 0.78 and 0.67, respectively. This is not surprising as the bivariate VAR results for France are notable and

³⁷Due to the ‘text-search news-based’ construction methods of our indices, fears and uncertainty may be generated without any actual migration and these indices may capture sentiments other than fears/uncertainty of domestic migration flows (e.g., fear about migration in foreign countries, fear of lower migration, uncertainty about deportation schemes, etc.).

³⁸<http://stats.oecd.org/Index.aspx?DataSetCode=MIG#>

significant. This supports our view that if the indices are correlated with actual migration inflows, then it is likely that the heightened ‘fears’ and ‘uncertainties’ in these countries are genuine and therefore economic activity is more likely to react. The indices for Germany are also highly (and significantly) correlated with migration inflows, implying a similar story to that of France. It is interesting to note that in Germany, the MFI is far more highly correlated with migration inflows than the MEPU index is and also, the correlation between the MFI and inflows (0.82) is much higher than the correlation between the MFI and the MEPU index (0.76). This could be the reason why the German migration policy uncertainty index is relatively insignificant in bivariate VARs. UK results show, again, highly significant and correlated indices. However, the correlations for the UK are overall less than those of France and Germany. In the US, the MFI and the MEPU are correlated with each other (0.52). However, the correlation between the MEPU (or the MFI) and inflows is insignificant in the US. The results for the US are insignificant and correlated to a very low degree. This could explain why the VAR results for the US are insignificant. Panel (b) of Table 6 shows results of correlations between migration inflows and the migration fear and uncertainty indices where all variables are expressed in natural logs. This is performed as a robustness measure given that our VARs are estimated in logs. The qualitative nature of our results (relative size and significance) remains similar. In other words, whether the variables are expressed in levels or logs does not affect the nature of the correlations between the variables and therefore the discussions based on Panel (a) of Table 6 are valid and still hold.

Our findings regarding unemployment are also consistent with those found in the analysis of natural experiments in labor economics, wherein immigration inflows occur independent of economic conditions.³⁹ A well-known study of Card (1990) examines the 1980 Mariel boatlift from Cuba, in which some 125,000 Cuban immigrants suddenly arrived in Miami, on the Miami labor market in the US. Card finds virtually no impact on the labor market outcomes of native workers, a result that may support our findings of higher economic activity, and our findings of statistical insignificance.⁴⁰ Hunt (1992) studies the influx of repatriates from Algeria to France in 1962 to examine the effects of immigration on the labor market, and finds only small effects of the 900,000 people repatriated from Algeria to France in 1962 and

³⁹Blau and Kahn (2015) and Tumen (2015) provide surveys of the natural experiment approach in migration research. There is also a growing interest towards the use of natural experiments in macroeconomics (see Fuchs-Schündeln and Hassan (2016) for a comprehensive survey). Regarding immigration, Burchardi et al. (2017), Cohen et al. (2017), and Parsons and Vézina (2018) evaluate the causal impact of migrant networks on the variation in international trade and foreign direct investment across locations in the US.

⁴⁰Borjas (2017) and Peri and Yasenov (2017) reappraise the Mariel boatlift immigration episode. Borjas (2017) argues that there is evidence of large negative effects for high school dropouts, while Peri and Yasenov (2017) confirm the early findings of Card (1990). National Academies of Sciences, Engineering, and Medicine (2017) provides a comprehensive discussion of these studies.

estimates that the repatriates increased the 1968 unemployment of non-repatriates by at most 0.3 percentage points.⁴¹

6.2 Evidence from surveys

An important finding that comes out of our analysis is that increased migration fears or migration-related policy uncertainty does not have detrimental effects on the German economy. International Organization for Migration (IOM) (2015) provides an insight into public attitudes towards immigration worldwide, presenting findings based on interviews with over 183,000 adults across more than 140 countries between 2012 and 2014. In general, people in Europe appear to be the most negative towards migration, with the majority (52%) of respondents believing that immigration should decrease (IOM, 2015, p.2). Table 7 presents the distribution of responses in France, Germany, the UK, and the US for the following question: “In your view, should immigration in this country be kept at its present level, increased or decreased?” A significant portion of adults in the UK (69%), France (44%), and the US (40%) say that immigration levels should decrease. Public sentiment in Germany, however, more positive, with nearly half of Germans (49%) saying immigration should be kept at present levels, and another 14% saying it should be increased. This more positive public sentiment toward immigration in Germany is also confirmed in another poll. According to a 2016 Project poll,⁴² 57% of Germans are not convinced that migration will decrease jobs available for German citizens.^{43,44} This finding is also consistent with an analysis of all 16 German states (*Bundesländer*) that shows that those states with higher migrant populations have lower unemployment and higher levels of risk capital investment. For example, Berlin is the state (i) that has the highest percentage of residents who are foreign-born, and (ii) with the highest number of firms receiving venture capital.⁴⁵ It would be a particularly interesting question for future research to examine if relatively a more positive attitude towards immigrants in Germany could explain the positive (negative) responses of industrial production (unemployment) to immigration-related uncertainty and fear.

In each of the countries we study, migration fear indices show a steady rise, with spikes

⁴¹Friedberg (2001) studies the effect of Russian immigrants on the Israeli labor market during the 1990s and finds no evidence of an adverse effect of Russian immigrants on the wages and unemployment of Israeli natives. In Europe, Angrist and Kugler (2003) find a slight reduction in native employment rates, i.e., an increase in the foreign share of 10% would reduce native employment rates by 0.2-0.7 of a percentage point, with a larger effect observed in countries where product markets are more restricted to competition.

⁴²<http://project28.eu/results/>

⁴³The exact question is *Please tell me if you find this statement to be true or untrue: The influx of immigrants to the country will decrease jobs available for the citizens.*

⁴⁴On the contrary, 62% of respondents in the UK are convinced that migration will decrease jobs available for the citizens.

⁴⁵Data are available at <https://www.movinga.de/en/foreign-human-capital/>

at the time of elections or terrorists attacks. Our findings suggest that such increases in immigration-related fear indices are not associated with an increase in unemployment rates. IOM (2015) may also provide an insight to interpret the findings that unemployment decreases as a response to migration ‘fear’ shocks. Table 8 presents the distribution of responses in France, Germany, the UK, and the US for the following question: “Do you think immigrants mostly take jobs that citizens in this country do not want (e.g. low-paying or not prestigious jobs) or mostly take jobs that citizens in this country want?” The residents of each economy are much more likely to say immigrants take jobs citizens do not want than take jobs that citizens want. We interpret these figures as the respondents’ perception that immigrant workers are complements for native-born workers instead of being substitutes.⁴⁶ Such an interpretation is consistent with the findings of Furlanetto and Robstad (2019) for Norway. Furlanetto and Robstad do not find any evidence in favor of displacement effects and their results indicate a high degree of complementarity between domestic and foreign workers in Norway.

7 Concluding remarks

The dynamic relationship between the economic activity and uncertainty is fascinating to explore, partly because uncertainty is unobservable, and therefore finding a method of quantification is, in itself, a matter for scrutiny and debate, but also because uncertainty can have dramatic effects on the real economy. Motivated by the recent migrant crisis, Brexit, and President Trump’s immigration priorities, and to the best of our knowledge, we provide new evidence into how migration related fear and migration related uncertainty effect macroeconomic activity in France, Germany, the UK and the US.

We find that the size of the fluctuations in economic activity are reasonably diverse across the four countries. This implies that the effects migration fear and migration policy uncertainty depend on institutional and other economic differences between these four countries. We also find that for every country, positive innovations in the migration fear index lead to lower unemployment. We also show that the migration fear index is relatively correlated with actual migration flows. Given that migration often depends on the relative health of a given nation’s economy, it is fair to assume that countries with low unemployment rates may attract more migrants, and therefore could in turn, generate migration fear. It is also important to remember that most of the results are fairly insignificant. In the context of the

⁴⁶These four countries belong to the high-income group according to the World Bank. According to IOM (2015), the residents of high-income economies overall are much more likely to say immigrants take jobs citizens do not want (58%) than take jobs that citizens want (17%). In all other economies, residents are more likely to say immigrants take the jobs that citizens want.

world we live in today, this is a comforting result if it means that migration sentiment has a negligible effect on economic activity, but this paper simply acts as an introduction to the dynamic economic effects of migration sentiment and further research should be applied to this area to substantiate these conclusions.

Any further work could benefit from using a more specified model, or a different theoretical framework. Exploring different fear/uncertainty quantification methods would also be a worthwhile exercise. Further contributions to this niche of literature will go a long way to not only helping understand how ‘fears’ are generated, and how economic agents react, but also to guiding government entities and state actors to construct policy in a manner which aligns with the interest of providing certainty to the markets they govern.

References

- Ahir, H., Bloom, N., Furceri, D. 2018. The world uncertainty index. Mimeo, www.policyuncertainty.com/media/WUI_mimeo_10_29.pdf.
- Akay, A., Constant, A., Giugetti, C. 2014. The impact of immigration on the well-being of natives. *Journal of Economic Behavior & Organization*, 103, 72-92.
- Alexopoulos, M., Cohen, J. 2015. The power of print: Uncertainty shocks, markets, and the economy. *International Review of Economics and Finance*, 40, 8-28.
- Alexopoulos, M., Cohen, J. 2009. Uncertain times, uncertain measures. University of Toronto, Department of Economics, Working Paper 352, <https://www.economics.utoronto.ca/public/workingPapers/tecipa-352.pdf>.
- Alexopoulos, M., Cohen, J. 2008. Uncertainty and the credit crisis. *VoxEU*, <https://voxeu.org/article/uncertainty-and-credit-crisis-worst-may-be-over>.
- Angrist, J. D., Kugler, A. D. 2003. Protective or counter-productive? Labour market institutions and the effect of immigration on EU natives. *Economic Journal*, 113(488), F302-F331.
- Antonakakis, N., Balcilar, M., Gupta, R., Kyei, C. 2017. Components of economic policy uncertainty and predictability of US stock returns and volatility: Evidence from a nonparametric causality-in-quantile approach. *Frontiers in Finance and Economics*, 14(2), 20-49.
- Arnorsson, A., Zoega, G. 2018. On the causes of Brexit. *European Journal of Political Economy*, 55, 301-323.
- Bachmann, R., Elstner, S., Sims, E. R. 2013. Uncertainty and economic activity: Evidence from business survey data. *American Economic Journal: Macroeconomics*, 5(2), 217-249.
- Baker, S. R., Bloom, N. 2013. Does uncertainty reduce growth? Using disasters as natural experiments. NBER Working Paper 19475.

- Baker, S. R., Bloom, N., Davis, S. J. 2016. Measuring economic policy uncertainty. *Quarterly Journal of Economics*, 131(4), 1593-1636.
- Baker, S. R., Bloom, N., Davis, S. J. 2015. Immigration fears and policy uncertainty. *VoxEU*, <https://voxeu.org/article/immigration-fears-and-policy-uncertainty>.
- Barsky, R. B., Sims, E. R. 2012. Information, animal spirits, and the meaning of innovations in consumer confidence. *American Economic Review*, 102(4), 1343-1377.
- Barsky, R. B., Sims, E. R. 2011. News shocks and business cycles. *Journal of Monetary Economics*, 58(3), 273-289.
- Blanchard, O. J. 1987. [Vector autoregressions and reality]: Comment. *Journal of Business & Economic Statistics*, 5(4), 449-451.
- Blanchflower, D. G., Shadforth, C. 2009. Fear, unemployment and migration. *Economic Journal*, 119 (535), F136-F182.
- Blau, F. D., Kahn, L. M. 2015. Immigration and the distribution of incomes. In: Chiswick, B. R., Miller, P. W. (Eds.) *Handbook of the Economics of International Migration*, Elsevier Press, pp. 793-843.
- Bloom, N. 2014. Fluctuations in uncertainty. *Journal of Economic Perspectives*, 28(2), 153-176.
- Bloom, N. 2009. The impact of uncertainty shocks. *Econometrica*, 77(3), 623-685.
- Borjas, G. J. 2017. The wage impact of the *Marielitos*. *Industrial and Labor Relations Review*, 70(5), 1077-1110.
- Borjas, G. J. 2013. Immigration and the American worker: A Review of the Academic Literature. Center for Immigration Studies, <https://cis.org/Report/Immigration-and-American-Worker>.
- Borjas, G. J. 2003. The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market. *Quarterly Journal of Economics*, 118(4), 1335-1374.
- Born, B., Breuer, S., Elstner, S. 2018. Uncertainty and the Great Recession. *Oxford Bulletin of Economics and Statistics*, 80(5), 951-971.
- Bruno, A. 2016. U.S. policy on Cuban migrants: In brief. Congressional Research Service, <https://fas.org/sgp/crs/row/R44714.pdf>.
- Burchardi, K. B., Chaney, T., Hassan, T. A. 2017. Migrants, ancestors, and investments. NBER Working Paper 21847.
- Caggiano, G., Castelnuovo, E., Figueres, J. M. 2017. Economic policy uncertainty and unemployment in the United States: A nonlinear approach. *Economics Letters*, 151, 31-34.

- Caggiano, G., Castelnuovo, E., Groshenny, N. 2014. Uncertainty shocks and unemployment dynamics in U.S. recessions. *Journal of Monetary Economics*, 67, 78-92.
- Card, D. 2009. Immigration and inequality. *American Economic Review*, 99(2), 1-21.
- Card, D. 1990. The impact of the Mariel Boatlift on the Miami labor market. *Industrial and Labor Relations Review*, 43(2), 245-257.
- Carli, P., Pons, F., Levraut, J., Millet, B., Tourtier, J.-P., Ludes, B., Lafont, A., Riou, B. 2017. The French emergency medical services after the Paris and Nice terrorist attacks: what have we learnt? *The Lancet*, 390(10113), 2735-2738.
- Charles, A., Darné, O., Tripier, F. 2018. Uncertainty and the macroeconomy: Evidence from an uncertainty composite indicator. *Applied Economics*, 50(10), 1093-1107.
- Chiswick, B. R., Miller, P. W. (eds). 2015. *Handbook of the Economics of International Migration*. Elsevier, Amsterdam.
- Chou, M.-H., Baygert, N. 2007. The 2006 French immigration and integration law: Europeanisation or Nicolas Sarkozy's presidential keystone? The University of Oxford's Centre on Migration, Policy and Society Working Paper No. WP-07-45, https://www.compas.ox.ac.uk/2007/wp-2007-045-meng-hsuan-baygert_french_immigration_law.
- Clarke, H. D., Goodwin, M., Whiteley, P. 2017. Why Britain voted for Brexit: An individual-level analysis of the 2016 referendum vote. *Parliamentary Affairs*, 70(3), 439-464.
- Cohen, L., Gurun, U. G., Malloy, C. 2017. Resident networks and corporate connections: Evidence from World War II internment camps. *Journal of Finance*, 72(1), 207-248.
- Constant, A. F. 2014. Do migrants take the jobs of native workers? *IZA World of Labor*, 10, doi:10.15185/izawol.10.
- Constant, A. E., Zimmermann, K. F. (eds). 2013. *International Handbook on the Economics of Migration*. Edward Elgar Publishing, Cheltenham, UK and Northampton, MA, USA.
- Crage, S. 2016. The more things change...Developments in German practices towards asylum seekers and recognised refugees. *German Politics*, 25(3), 344-365.
- Dustmann, C., Fabbri, F., Preston, I. 2005. The impact of immigration on the British labour market. *Economic Journal*, 115(507), F324-F341.
- Dustmann, C., Fitzenberger, B., Schönberg, U., Spitz-Oener, A. 2014. From sick man of Europe to economic superstar: Germany's resurgent economy. *Journal of Economic Perspectives*, 28(1), 167-188.
- Dyas-Correia, S., Alexopoulos, M. 2014. Text and data mining: Searching for buried treasures. *Serials Review*, 40(3), 210-216.

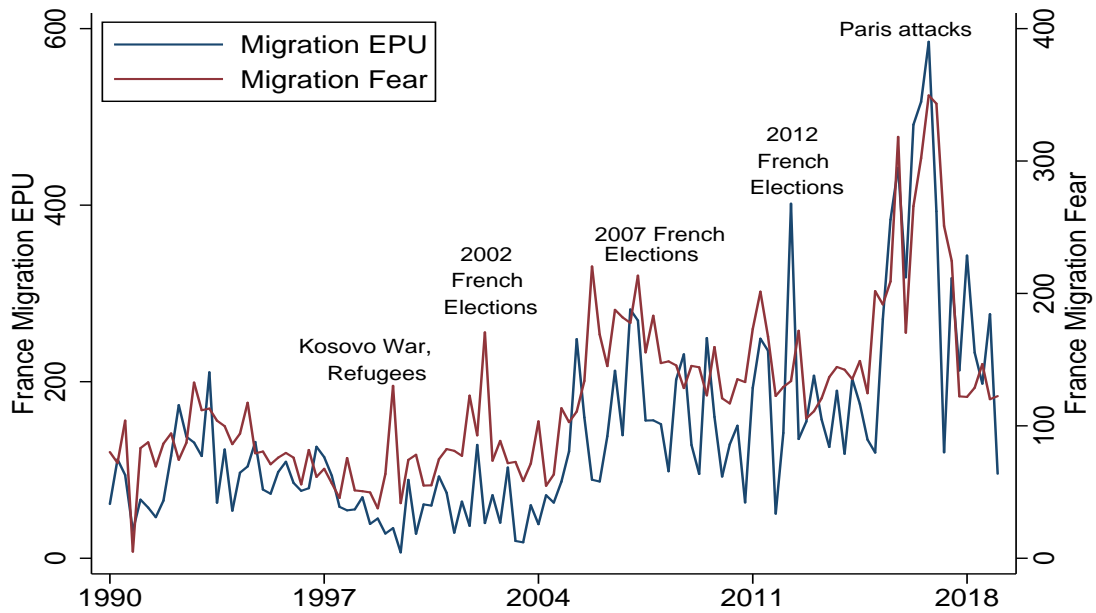
- Edo, A., Ragot, L., Rapoport, H., Sardoschau, S., Steinmayr, A. 2018. The effects of immigration in developed countries: Insights from recent economic research. CEPII Policy Brief No. 22.
- Edo, A., Giesing, Y., Öztunc, J., Poutvaara, P. 2017. Immigration and electoral support for the Far Left and the Far Right. CEPII Working Paper No. 2017-20.
- Faiola, A. 2014. The new land of opportunity for immigrants is Germany. The Washington Post. Retrieved from https://www.washingtonpost.com/world/europe/the-new-land-of-opportunity-for-immigrants-is-germany/2014/07/27/93464262-7eff-4931-817c-786db6d21ec8_story.html?utm_term=.dda8d5629c87.
- Fraser, T. 2018. Categorical economic policy uncertainty and economic activity. Unpublished Master Thesis. University of Otago.
- Friedberg, R. M. 2001. The impact of mass migration on the Israeli labor market. Quarterly Journal of Economics, 116(4), 1373-1408.
- Friedberg, R. M., Hunt, J. 1995. The impact of immigrants on host country wages, employment and growth. Journal of Economic Perspectives, 9(2), 23-44.
- Fuchs-Schündeln, N., Hassan, T. A. 2016. Natural experiments in macroeconomics, in: Taylor, J. B., and Uhlig, H. Handbook of Macroeconomics Volume 2A, Elsevier Press, pp. 923-1012.
- Furlanetto, F., Robstad, Ø. 2019. Immigration and the macroeconomy: Some new empirical evidence. Review of Economic Dynamics, 34, 1-19.
- Gentzkow, M., Kelly, B. T., Taddy, M. 2017. Text as data. NBER Working Paper 23276.
- Girardi, A., Reuter, A. 2017. New uncertainty measures for the euro area using survey data. Oxford Economic Papers, 69(1), 278-300.
- Goodwin, M., Heath, O. 2016. Brexit vote explained: Poverty, low skills and lack of opportunities. Joseph Rowntree Foundation. Retrieved from <https://www.jrf.org.uk/report/brexit-vote-explained-poverty-low-skills-and-lack-opportunities>.
- Gross, D. M. 2002. Three million foreigners, three million unemployed? Immigration flows and the labour market in France. Applied Economics, 34(16), 1969-1983.
- Hunt, J. 1992. The impact of the 1962 repatriates from Algeria on the French labor market. Industrial and Labor Relations Review, 45(3), 556-572.
- International Organization for Migration. 2015. How the World views migration, publications.iom.int/system/files/how_the_world_gallup.pdf.
- Ivanov, V., Kilian, L. 2005. A practitioner's guide to lag order selection for VAR impulse response analysis. Studies in Nonlinear Dynamics & Econometrics, 9(1), 1-34.

- Jones, P. A. 2004. Still struggling for equality: American public library services with minorities. Westport: Libraries Unlimited.
- Jurado, K., Ludvigson, S. C., Ng, S. 2015. Measuring uncertainty. *American Economic Review*, 105(3), 1177-1216.
- Kiguchi, T., Mountford, A. 2017. Immigration and unemployment: A macroeconomic approach. *Macroeconomic Dynamics*, 1-27, <https://doi.org/10.1017/S1365100517000244>.
- Kilian, L. 1998. Small-sample confidence intervals for impulse response functions. *Review of Economics and Statistics*, 80(2), 218-230.
- Kirkup, J., Swinford, S. 2014. Ukip storms European elections, <https://www.telegraph.co.uk/news/politics/ukip/10855972/Ukip-storms-European-elections.html>.
- Koopmans, R. 1999. Germany and its immigrants: An ambivalent relationship, *Journal of Ethnic and Migration Studies*, 25(4), 627-647.
- Korte, G., Jackson, D. 2017. Trump orders clamp down on immigrant ‘sanctuary cities,’ pushes border wall. *USA Today*. Retrieved from <https://www.usatoday.com/story/news/politics/2017/01/25/trump-take-executive-action-border-sanctuary-cities/97035086/>.
- Leduc, S., Liu, Z. 2016. Uncertainty shocks are aggregate demand shocks. *Journal of Monetary Economics*, 82, 20-35.
- Liu, X. 2010. On the macroeconomic and welfare effects of illegal immigration. *Journal of Economic Dynamics and Control*, 34(12), 2547-2567.
- Mann, N. 2003. Blair’s asylum gamble. *BBC News*. Retrieved from http://newswww.bbc.net.uk/2/hi/uk_news/politics/2738065.stm.
- Mayda, A. M., Peri, G., Steingress, W. 2016. Immigration to the U.S.: A problem for the Republicans or the Democrats? NBER Working Paper 21941.
- Meleady, R., Seger, C. R., Vermue, M. 2017. Examining the role of positive and negative intergroup contact and anti-immigrant prejudice in Brexit. *British Journal of Social Psychology*, 56(4), 799-808.
- Nabeel, G., Bhatti, J. 2016. Refugees in Europe say they fear terrorists are among them. Retrieved from <http://www.usatoday.com/story/news/world/2016/07/14/refugees-europe-say-they-fear-terrorists-among-them/87008334>.
- National Academies of Sciences, Engineering, and Medicine. 2017. The economic and fiscal consequences of immigration. Washington, DC: The National Academies Press, <https://doi.org/10.17226/23550>.
- Netšunajev, A., Glass, K. 2017. Uncertainty and employment dynamics in the euro area and the US. *Journal of Macroeconomics*, 51, 48-62.

- Nossiter, A. 2015. For Marine Le Pen, migration is a ready-made use. The New York Times. Retrieved from <https://www.nytimes.com/2015/10/06/world/europe/for-marine-le-pen-migration-is-a-ready-made-issue.html>.
- Okkerse, L. 2008. How to measure labour market effects of immigration: A review. *Journal of Economic Surveys*, 22(1), 1-30.
- Ottaviano, G. I. P., Peri, G. 2012. Rethinking the effect of immigration on wages. *Journal of the European Economic Association*, 10(1), 152-197.
- Parsons, C., Vézina. 2018. Migrant networks and trade: The Vietnamese boat people as a natural experiment. *Economic Journal*, 128(612), F210-F234.
- Peri, G., Yasenov, V. 2017. The labor market effects of a refugee wave: Synthetic control method meets the Mariel boatlift, <http://giovanniperi.ucdavis.edu/research.html>.
- Piffer, M., Podstawski, M. 2018. Identifying uncertainty shocks using the price of gold. *Economic Journal*, 128 (616), 3266-3284.
- Pischke, J.-S., Velling, J. 1997. Employment effects of immigration to Germany: An analysis based on local labor markets. *Review of Economics and Statistics*, 79(4), 594-604.
- Portes, J. 2018. The economic impacts of immigration to the UK, <https://voxeu.org/article/economic-impacts-immigration-uk>.
- Sampson, T. 2017. Brexit: The economics of international disintegration. *Journal of Economic Perspectives*, 31(4), 163-184.
- Scotti, C. 2016. Surprise and uncertainty indexes: Real-time aggregation of real-activity macro-surprises. *Journal of Monetary Economics*, 82, 1-19.
- Simon, H. 2009. *Hidden Champions of the Twenty-First Century: Success Strategies of Unknown World Market Leaders*. Springer.
- Solsten, E. (eds). 1995. *Germany: A country study*. Washington, D.C.: Federal Research Division Library of Congress.
- Stock, J. H., Watson, M. W. 2012. Disentangling the channels of the 2007-2009 recession. *Brooking Papers on Economic Activity*, 81-135.
- The Economist. 2019. Economic geography: Germany spreads the love. February 9th. Print Edition.
- Trines, S. 2017. Lessons from Germany's refugee crisis: Integration, costs, and benefits. Retrieved from <https://wenr.wes.org/2017/05/lessons-germanys-refugee-crisis-integration-costs-benefits>.
- Tumen, S. 2015. The use of natural experiments in migration research. *IZA World of Labor*, 191, doi:10.15185/izawol.191.

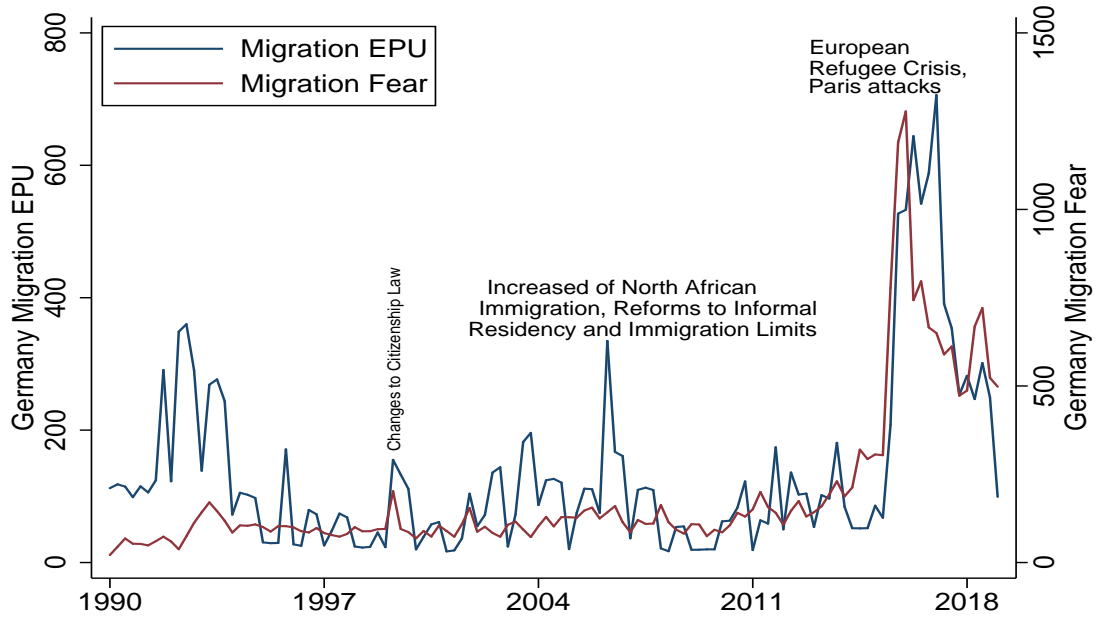
United Nations. 2017. Trends in international migrant stock: The 2017 revision. United Nations, Department of Economic and Social Affairs. Population Division (United Nations database, POP/DB/MIG/Stock/Rev.2017).

World Bank. 2019. World Development Indicators. <http://databank.worldbank.org/ddp/home.do>.



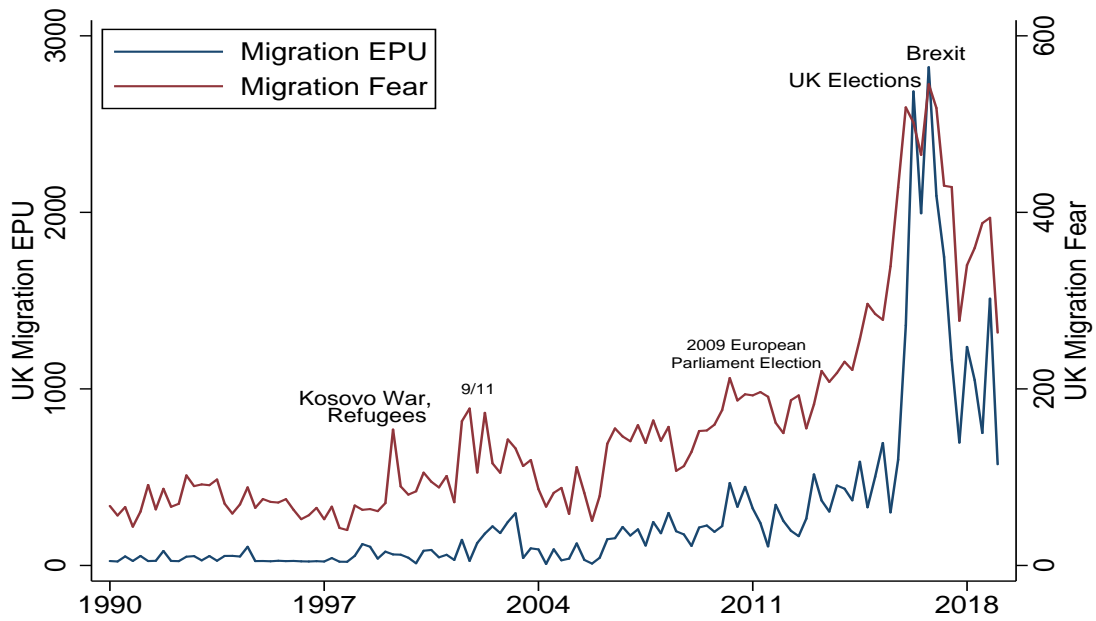
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Figure 1: France: Migration EPU and Fear Indices, 1990:Q1-2019:Q1



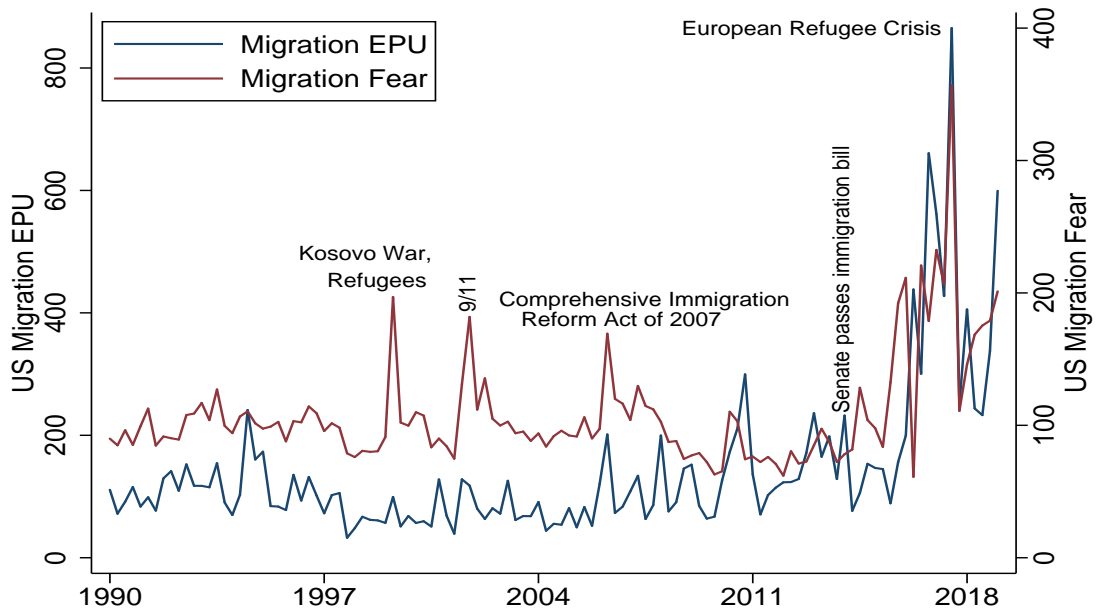
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Figure 2: Germany: Migration EPU and Fear Indices, 1990:Q1-2019:Q1



Source: http://www.policyuncertainty.com/immigration_fear.html, Accessed 30 March 2019.

Figure 3: UK: Migration EPU and Fear Indices, 1990:Q1-2019:Q1



Source: http://www.policyuncertainty.com/immigration_fear.html, Accessed 30 March 2019.

Figure 4: US: Migration EPU and Fear Indices, 1990:Q1-2019:Q1

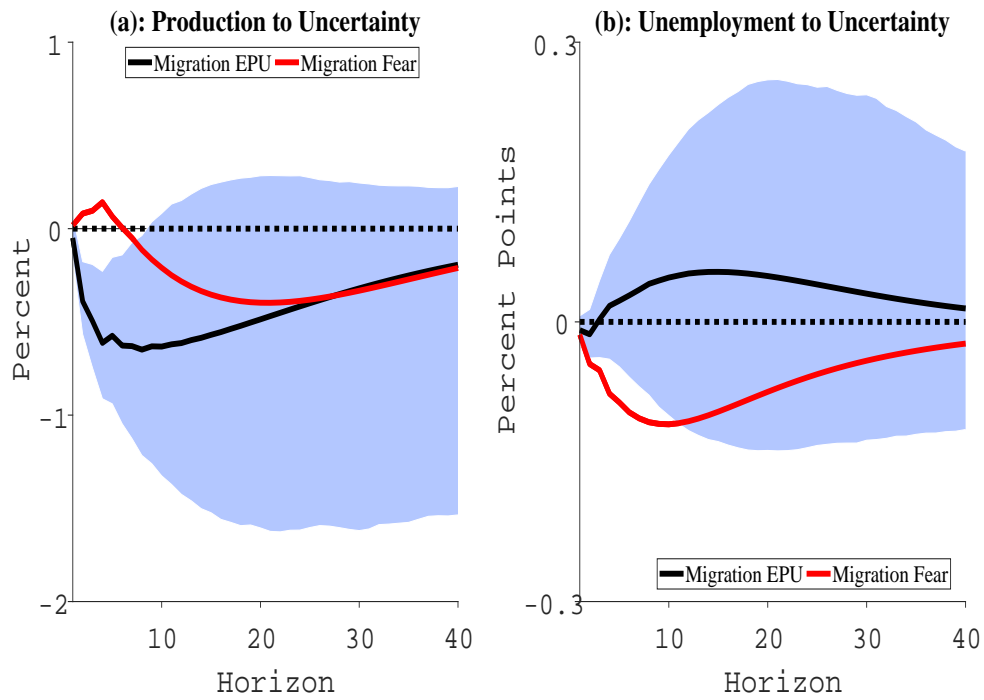


Figure 5: France: Migration EPU vs. Migration Fear

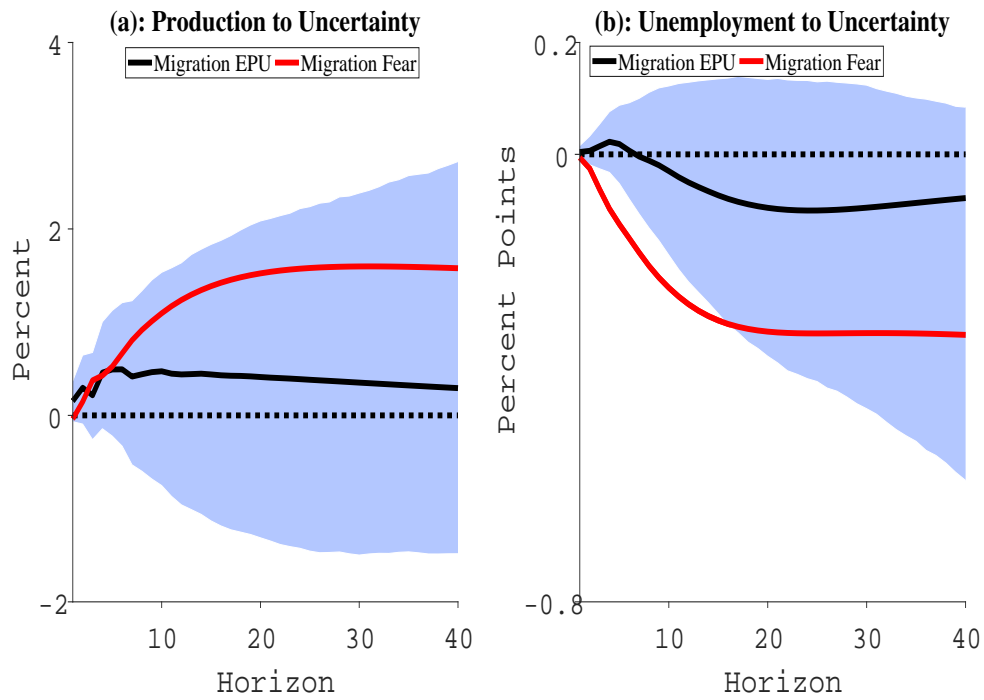


Figure 6: Germany: Migration EPU vs. Migration Fear

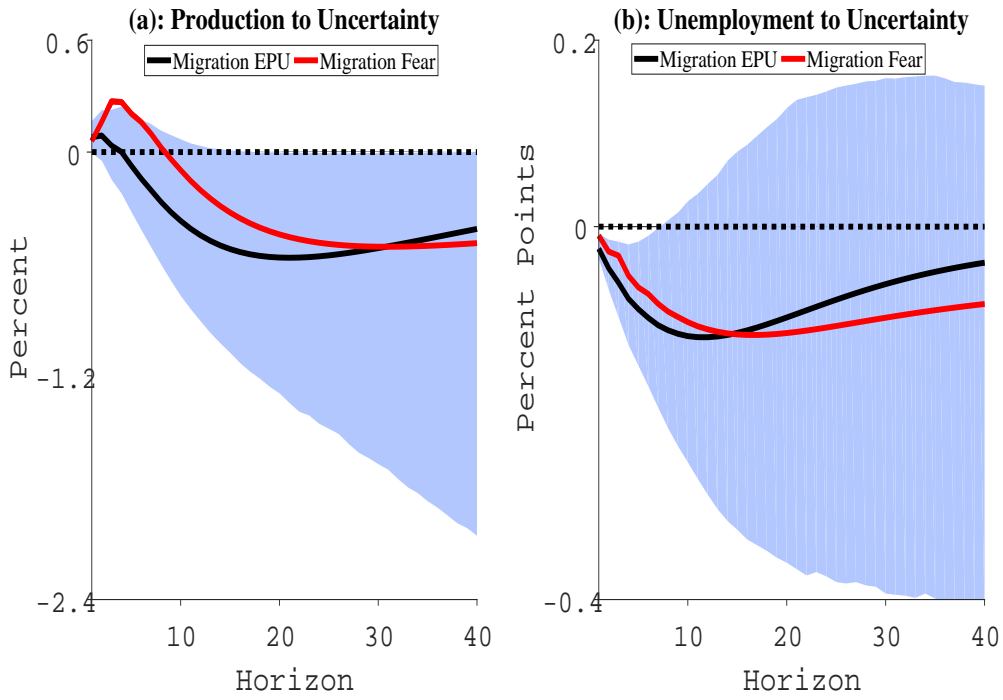


Figure 7: United Kingdom: Migration EPU vs. Migration Fear

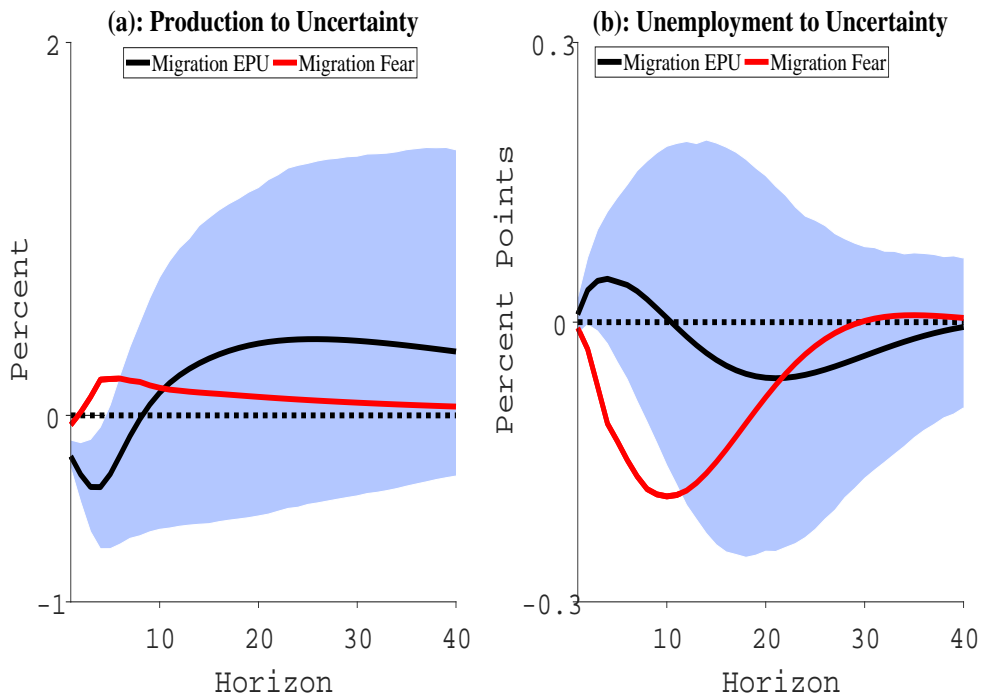


Figure 8: United States: Migration EPU vs. Migration Fear

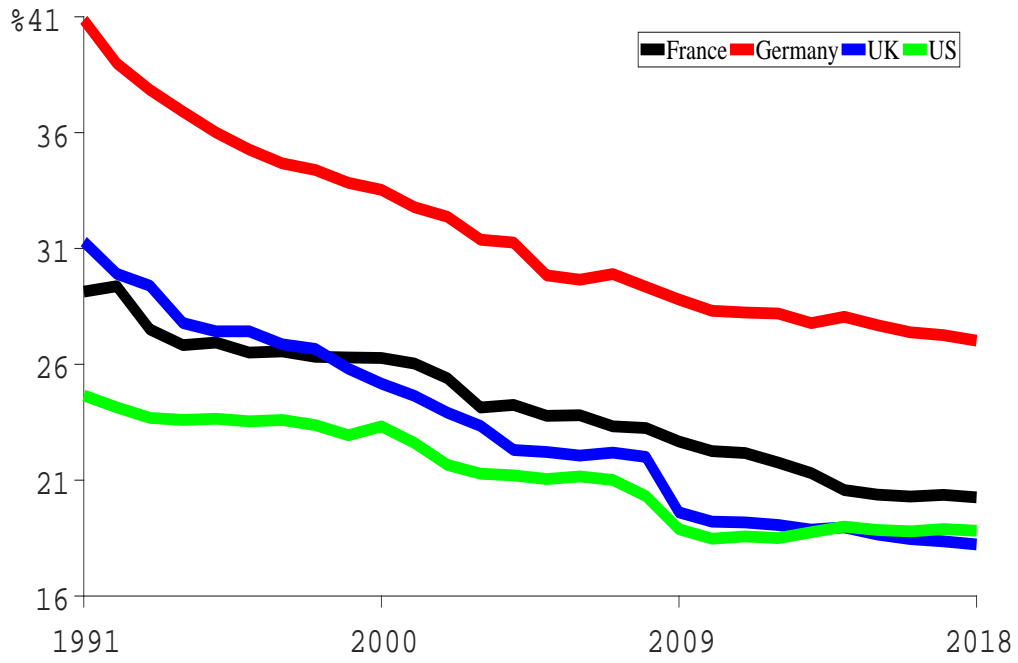


Figure 9: Employment in Industry (% of Total Employment)

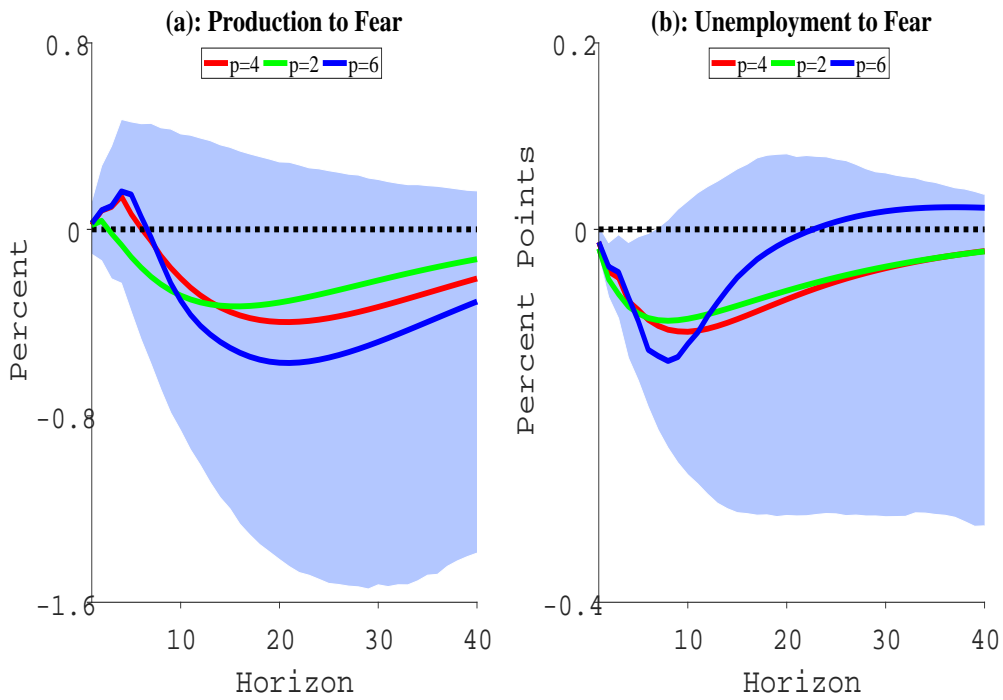


Figure 10: France: Migration Fear and Economic Activity: Lag Lengths

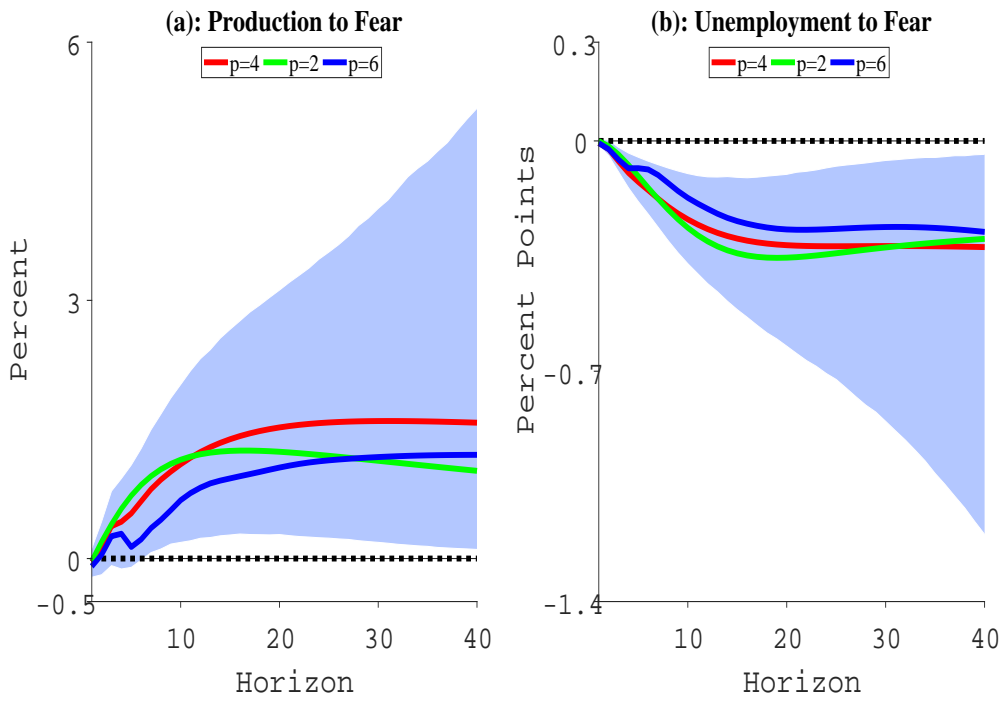


Figure 11: Germany: Migration Fear and Economic Activity: Lag Lengths

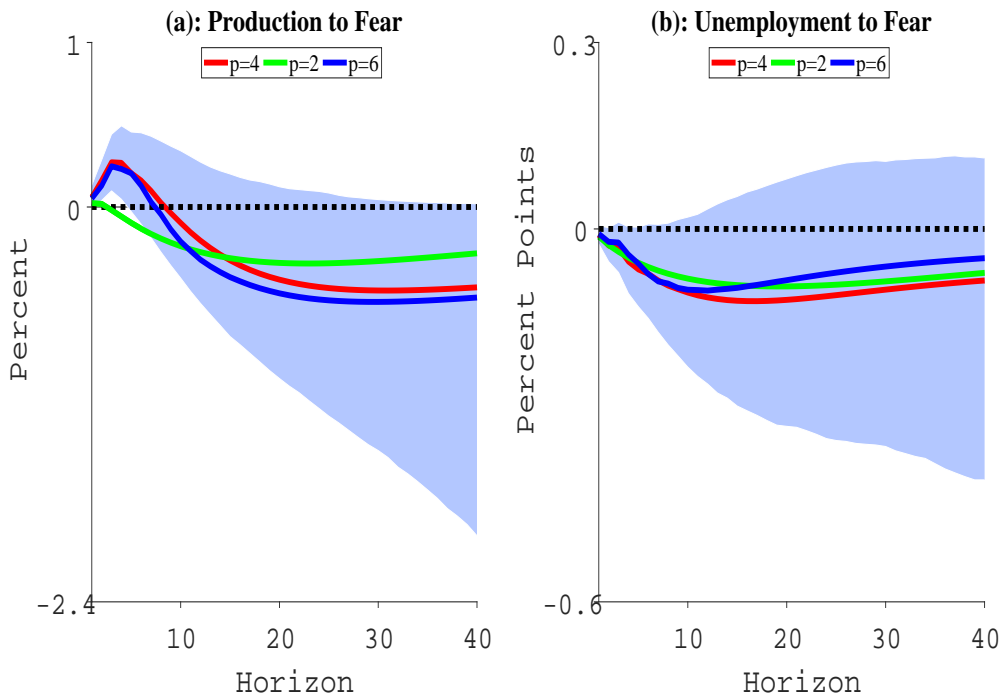


Figure 12: UK: Migration Fear and Economic Activity: Lag Lengths

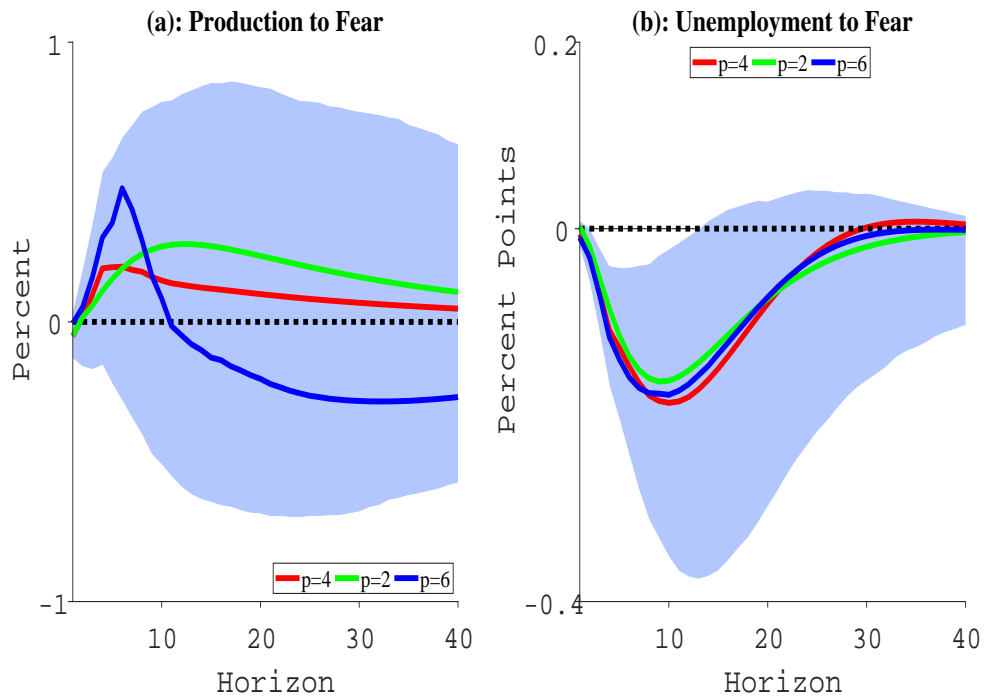


Figure 13: US: Migration Fear and Economic Activity: Lag Lengths

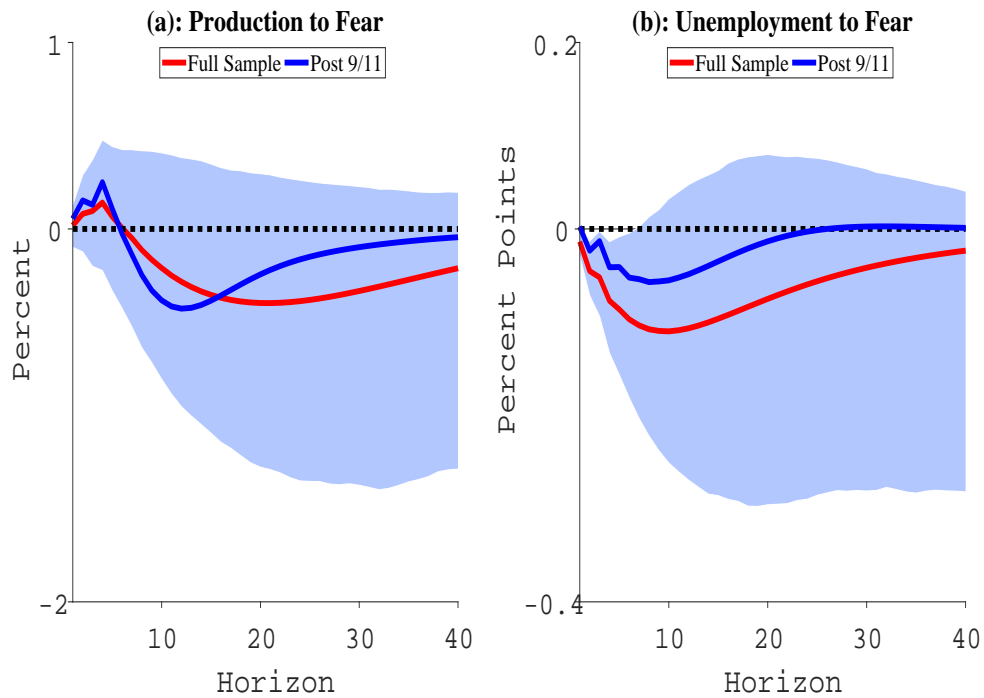


Figure 14: France: Migration Fear and Economic Activity: Subsamples

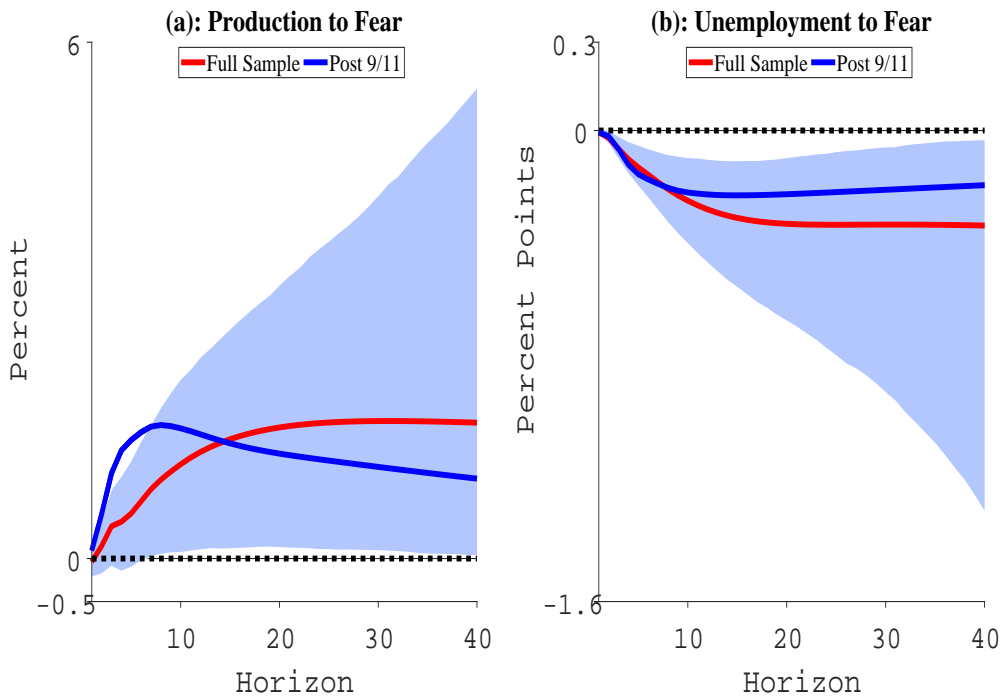


Figure 15: Germany: Migration Fear and Economic Activity: Subsamples

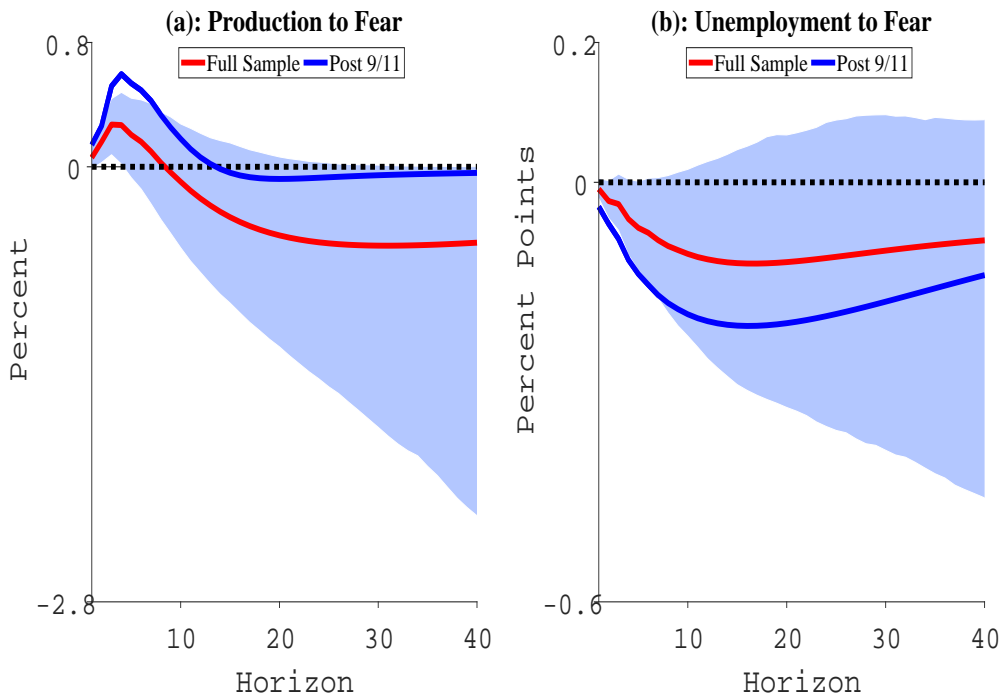


Figure 16: UK: Migration Fear and Economic Activity: Subsamples

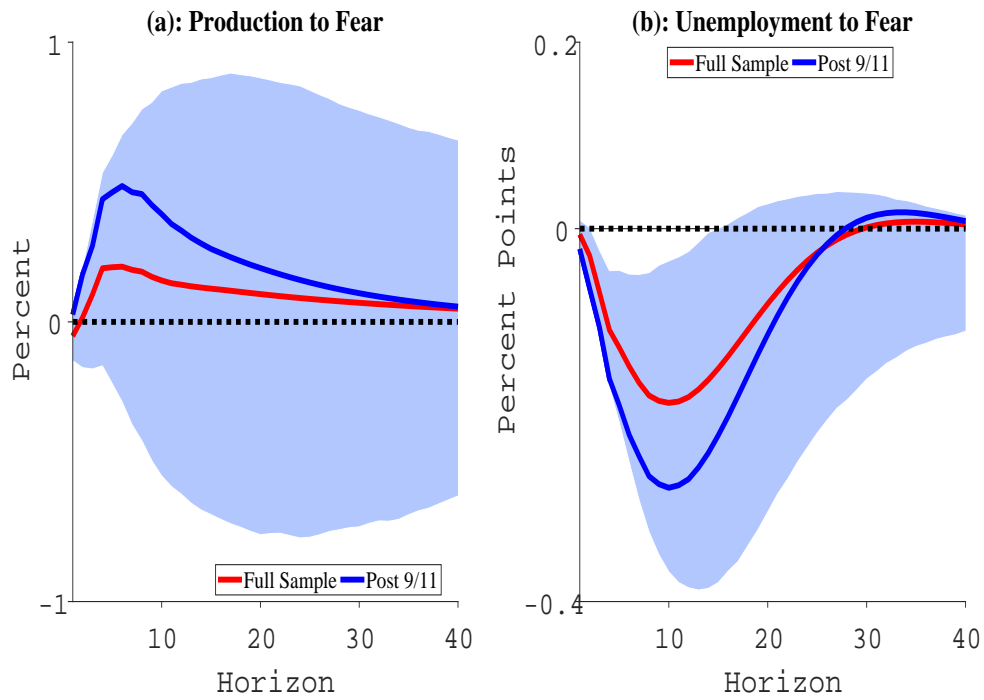


Figure 17: US: Migration Fear and Economic Activity: Subsamples

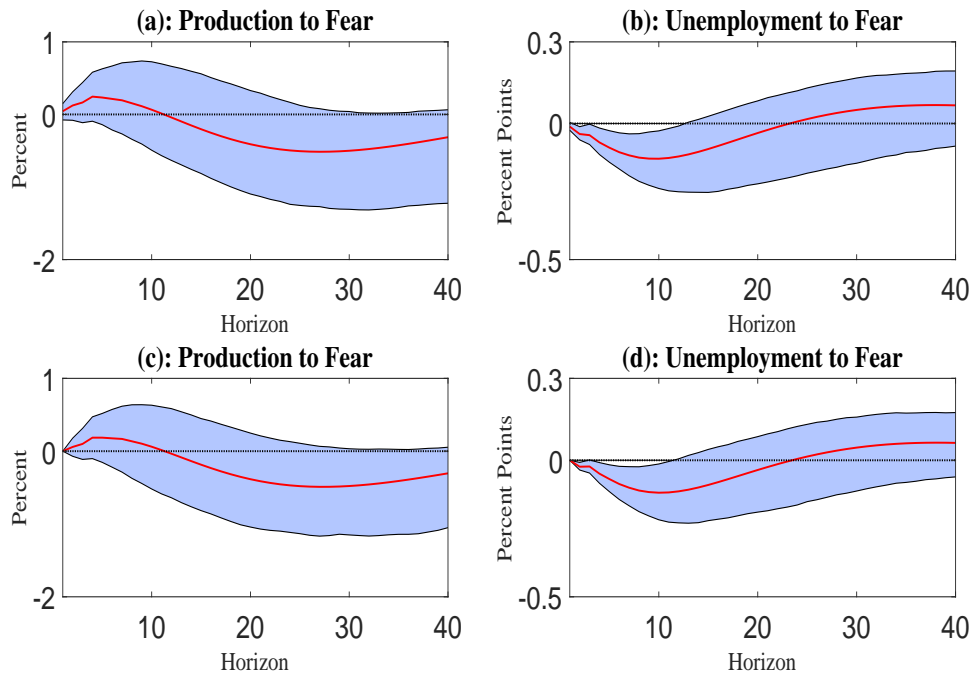


Figure 18: France: Responses to Migration Fear Innovation, Ordered First or Last

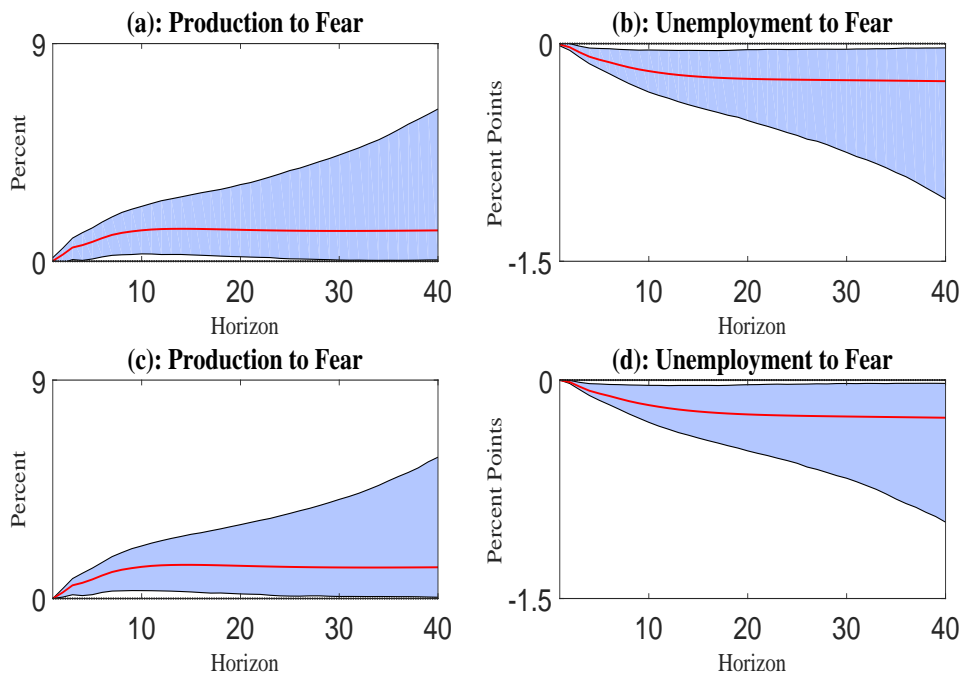


Figure 19: Germany: Responses to Migration Fear Innovation, Ordered First or Last

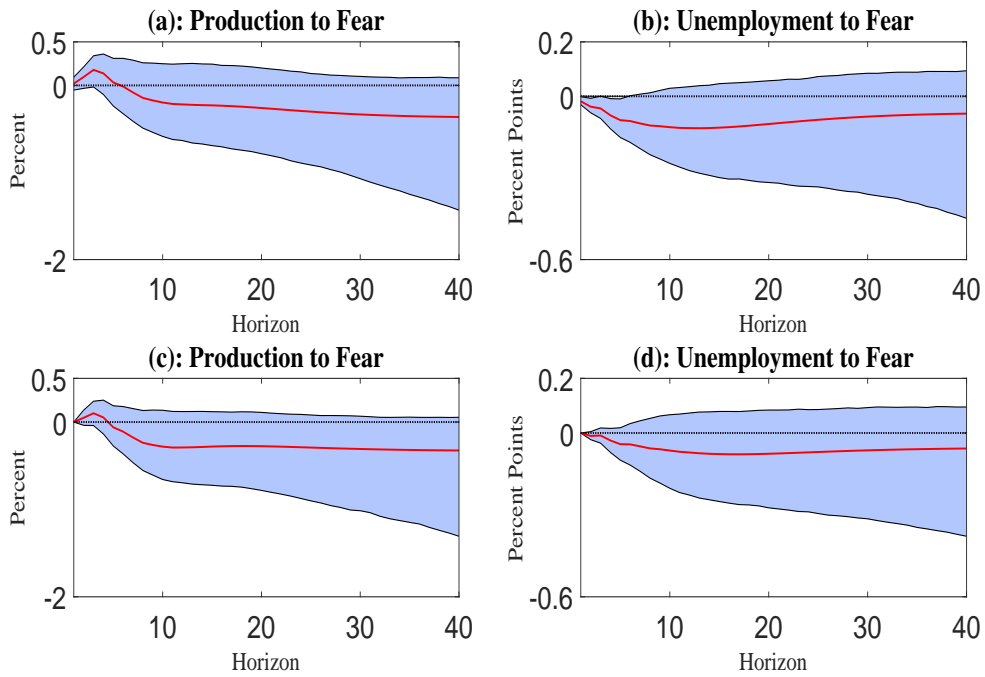


Figure 20: UK: Responses to Migration Fear Innovation, Ordered First or Last

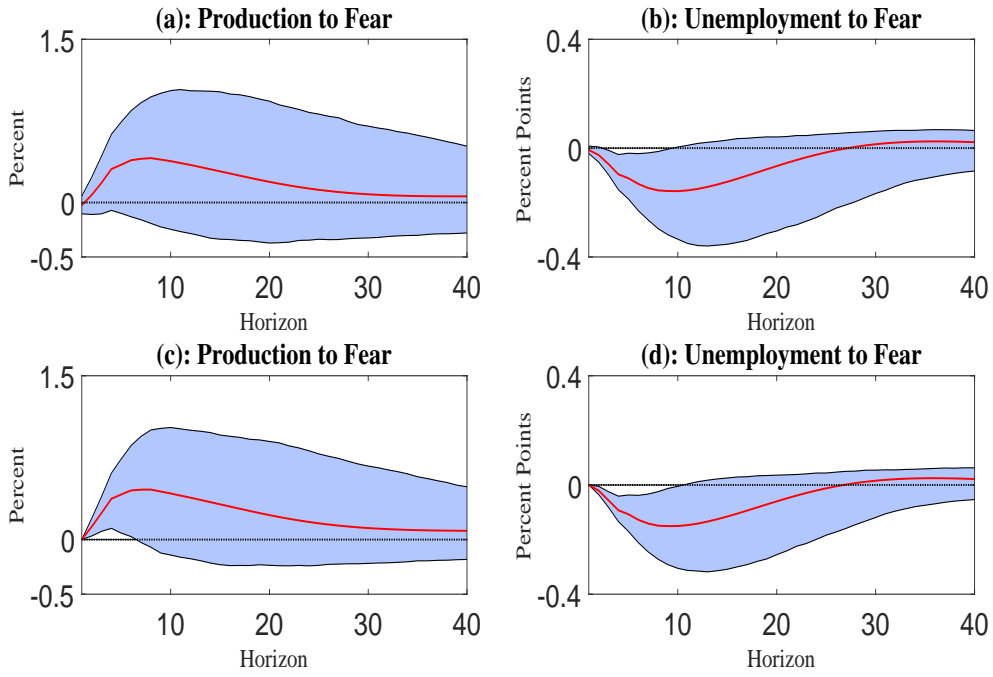


Figure 21: US: Responses to Migration Fear Innovation, Ordered First or Last

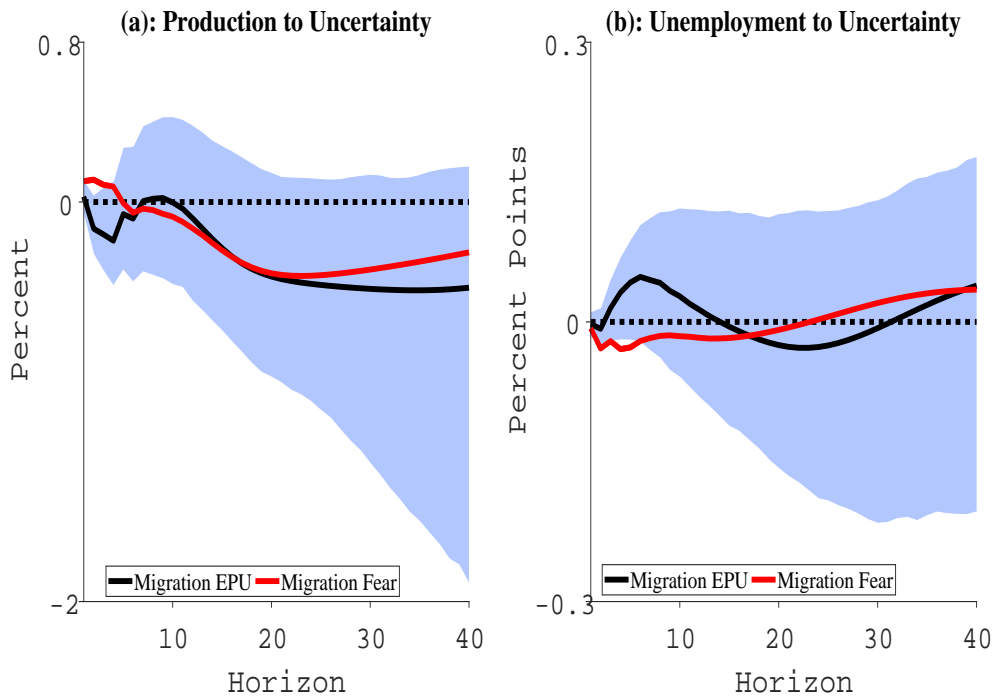


Figure 22: France: Migration EPU vs. Migration Fear, Large VAR

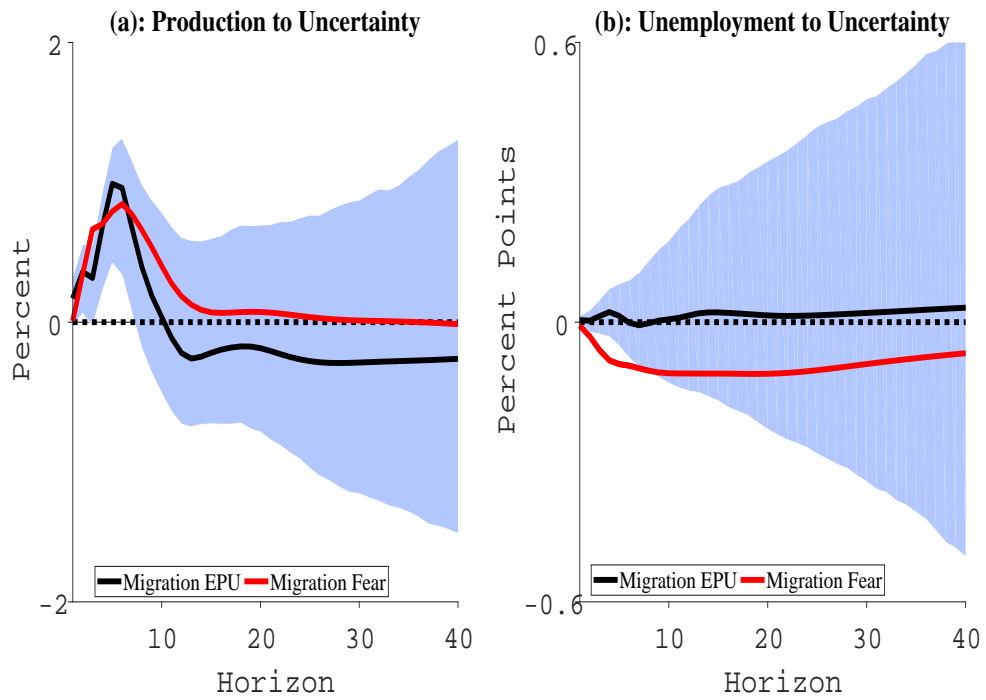


Figure 23: Germany: Migration EPU vs. Migration Fear, Large VAR

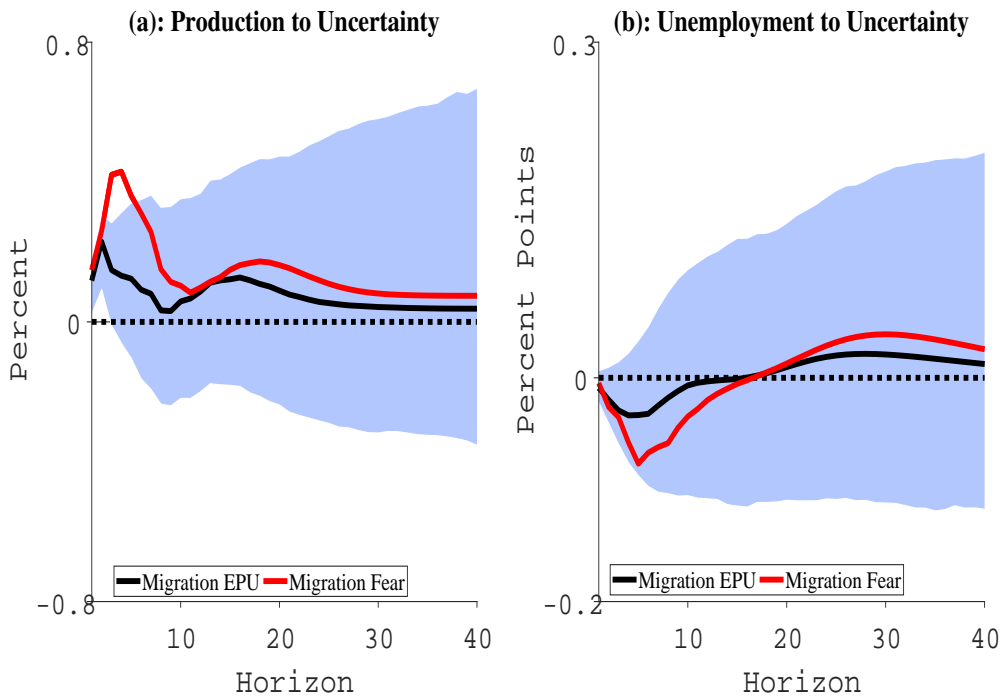


Figure 24: United Kingdom: Migration EPU vs. Migration Fear, Large VAR

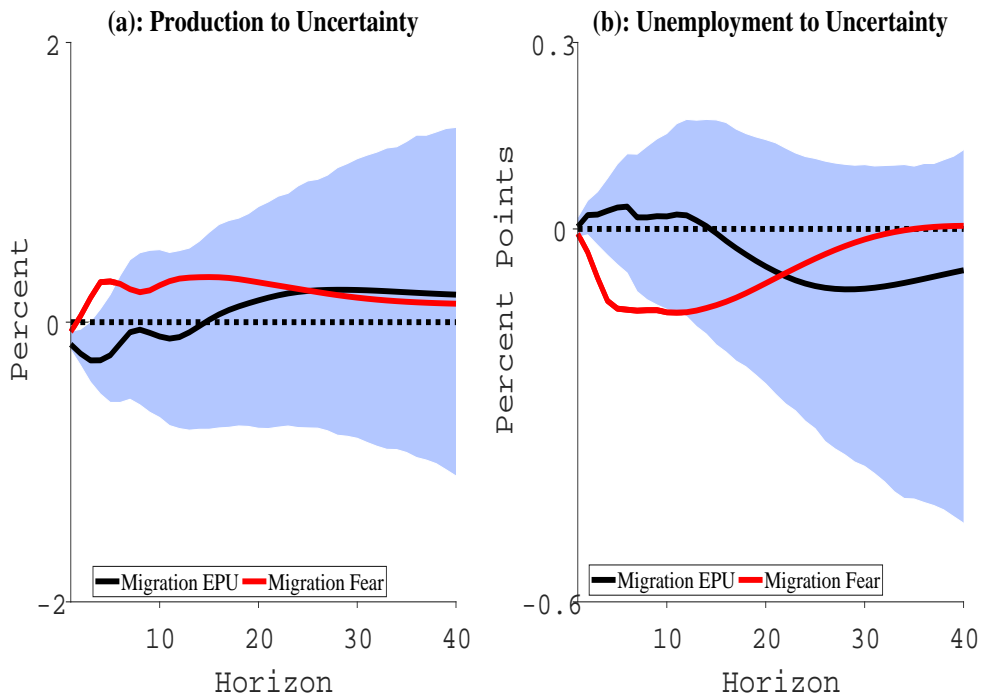


Figure 25: United States: Migration EPU vs. Migration Fear, Large VAR

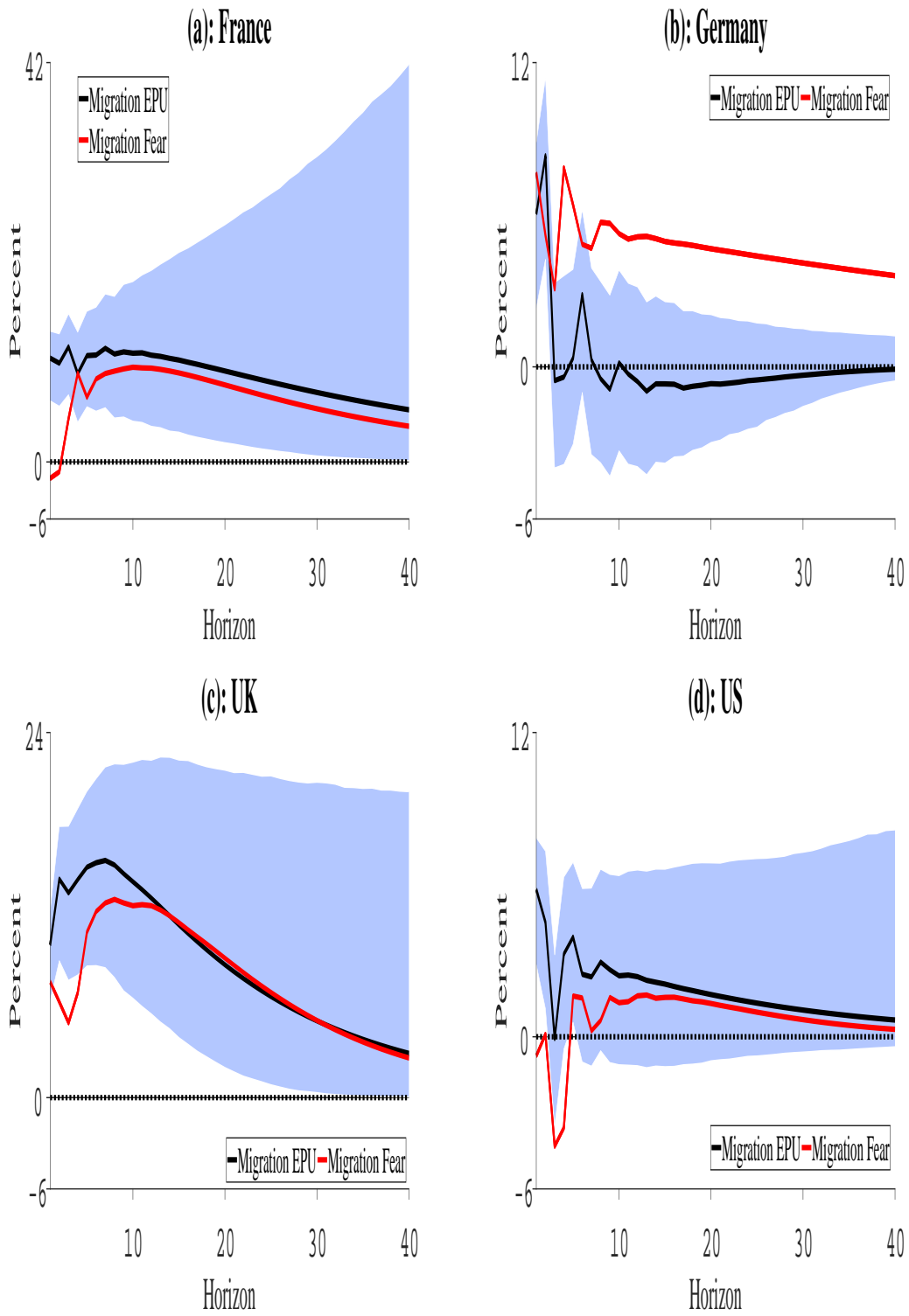


Figure 26: EPU Responses to Migration Indices

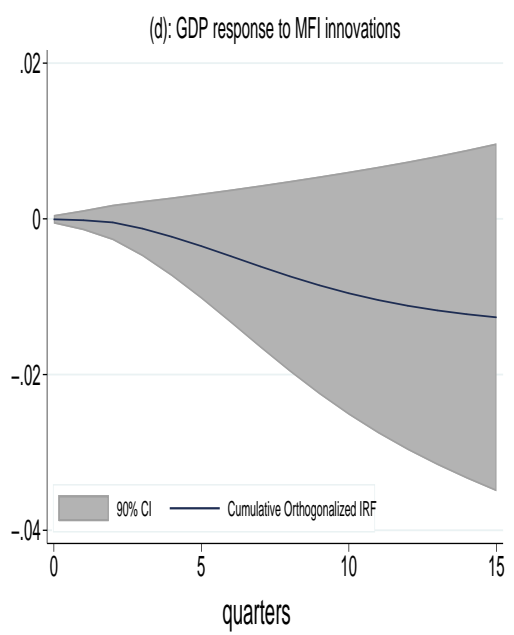
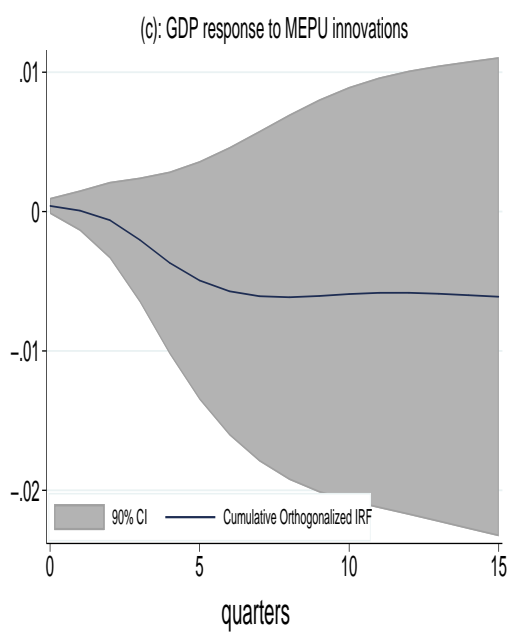
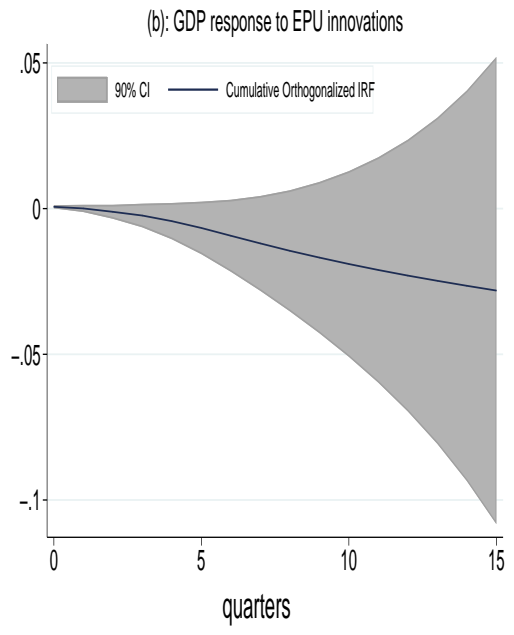
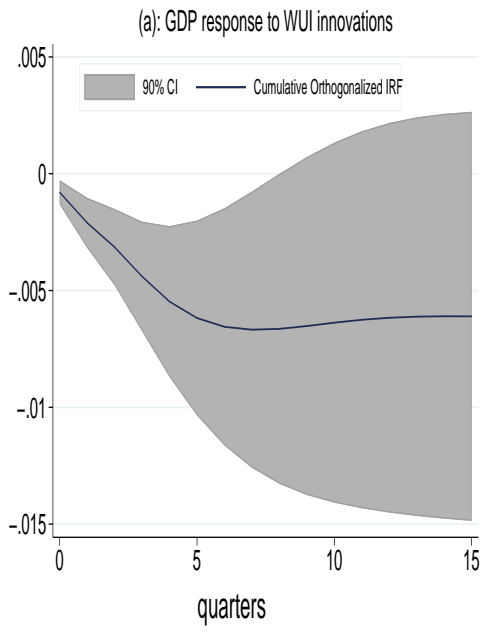


Figure 27: GDP Responses to Innovations in Different Indices

Table 1: Forecast variance to uncertainty measures

(a) France				
Industrial Production			Unemployment	
Horizon	Migration EPU	Migration Fear	Migration EPU	Migration Fear
h = 1	0.14	0.02	0.30	0.72
h = 4	5.74	0.27	0.17	3.22
h = 8	8.23	0.20	0.45	4.72
h = 40	16.83	6.91	2.46	8.96
(b) Germany				
Industrial Production			Unemployment	
Horizon	Migration EPU	Migration Fear	Migration EPU	Migration Fear
h = 1	0.61	0.04	0.13	0.25
h = 4	1.06	1.06	0.24	4.74
h = 8	1.58	3.68	0.10	10.93
h = 40	2.47	30.61	3.28	41.86
(c) United Kingdom				
Industrial Production			Unemployment	
Horizon	Migration EPU	Migration Fear	Migration EPU	Migration Fear
h = 1	0.69	0.38	2.10	0.35
h = 4	0.26	2.99	3.91	1.48
h = 8	1.28	2.14	5.28	2.92
h = 40	30.13	24.53	10.98	13.80
(d) United States				
Industrial Production			Unemployment	
Horizon	Migration EPU	Migration Fear	Migration EPU	Migration Fear
h = 1	6.47	0.35	0.17	0.10
h = 4	3.95	0.43	1.09	3.58
h = 8	2.24	0.69	0.67	7.15
h = 40	6.56	0.74	2.01	13.41

Table 2: Do economic variables forecast MEPU and MFI?

	Shock type as dependent variable					
	Full sample		Before GFC		After GFC	
	MEPU	MFI	MEPU	MFI	MEPU	MFI
Industrial production, last quarter	-3.67*	-1.23	-1.92	-1.42*	0.90	2.44
	(1.51)	(0.83)	(1.39)	(0.48)	(3.55)	(2.52)
Unemployment, last quarter	-0.03*	-0.04*	-0.05*	-0.01	-0.13*	-0.08**
	(0.01)	(0.02)	(0.02)	(0.01)	(0.05)	(0.02)
F-test p-value	0.12	0.16	0.13	0.08	0.14	0.03
Observations	443	443	264	264	144	144

Notes: * significant at 10%, ** significant at 5%. All columns are estimated in OLS with robust standard-errors clustered at the country level. All columns include a full set of year by quarter dummies. The F-test p-value is the probability value of the F-test of the two economic variables in each column.

Full sample: 1991:Q1-2018:Q3; Before GFC: 1991:Q1-2007:Q3; After GFC: 2009:Q3-2018:Q3.

Table 3: Correlations of migration indices with EPU and WUI

Dependent variable	MEPU				MFI			
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
EPU	0.219*** (18.05)	0.221*** (14.98)			0.307 (1.40)	0.319*** (3.26)		
WUI			0.0003*** (10.13)	0.0003*** (6.38)			0.0004 (1.30)	0.0004*** (4.75)
Country FE	NO	YES	NO	YES	NO	YES	NO	YES
N	348	348	364	364	348	348	364	364
R^2 (within R^2)	0.54	0.53	0.27	0.23	0.22	0.24	0.17	0.10

Notes: *, **, *** denote statically significance at 10, 5, and 1 percent respectively. T-statistics in columns (I), (III), (V) and (VII) are based on clustered standard errors. T-statistics in the remaining columns are based on Driscoll-Kraay standard errors. R^2 is reported for columns (I), (III), (V) and (VII); otherwise within R^2 is reported.

Table 4: Forecast variance to uncertainty measures for EPU

France					Germany				
Horizon	Migration EPU	Migration Fear	Migration EPU	Migration Fear	Migration EPU	Migration Fear	Migration EPU	Migration Fear	
h = 1	13.71	0.37	4.28	6.92	4.28	6.92	4.28	6.92	
h = 4	26.53	7.11	8.16	13.31	8.16	13.31	8.16	13.31	
h = 8	37.61	17.60	7.15	19.83	7.15	19.83	7.15	19.83	
h = 40	61.49	44.34	7.06	44.73	7.06	44.73	7.06	44.73	

UK					US				
Horizon	Migration EPU	Migration Fear	Migration EPU	Migration Fear	Migration EPU	Migration Fear	Migration EPU	Migration Fear	
h = 1	13.23	8.00	6.00	0.10	6.00	0.10	6.00	0.10	
h = 4	31.93	10.44	6.78	3.35	6.78	3.35	6.78	3.35	
h = 8	47.33	33.07	9.09	3.37	9.09	3.37	9.09	3.37	
h = 40	62.23	64.54	14.81	6.23	14.81	6.23	14.81	6.23	

Table 5: Correlations of alternate indices with stock market volatility and growth

Dependent variable	MEPU				MFI			
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
Stock market volatility	0.0002 (0.45)	0.001* (1.72)			0.0004 (0.37)	0.001 (0.60)		
Growth			-0.000001 (-0.48)	-0.000003 (-0.78)			-0.000004 (-0.42)	0.0000004 (0.05)
Country FE	NO	YES	NO	YES	NO	YES	NO	YES
N	280	280	336	336	280	280	336	336
R^2 (within R^2)	0.38	0.02	0.02	0.002	0.38	0.00	0.02	0.00
	EPU				WUI			
Dependent variable	(IX)	(X)	(XI)	(XII)	(XIII)	(XIV)	(XV)	(XVI)
Stock market volatility	0.002** (3.67)	0.002*** (2.87)			0.517** (3.88)	0.661*** (3.62)		
Growth			-0.00004 (-2.32)	-0.00004** (-2.30)			-0.026** (-3.93)	-0.030*** (-2.69)
Country FE	NO	YES	NO	YES	NO	YES	NO	YES
N	276	276	336	336	280	280	336	336
R^2 (within R^2)	0.35	0.13	0.02	0.04	0.37	0.07	0.06	0.08

Notes: *, **, *** denote static significance at 10, 5, and 1 percent respectively. T-statistics in columns (I), (III), (V), (VII), (IX), (XI), (XIII), and (XV) are based on clustered standard errors. T-statistics in the remaining columns are based on Driscoll-Kraay standard errors. R^2 is reported for columns (I), (III), (V), (VII), (IX), (XI), (XIII), and (XV); otherwise within R^2 is reported.

Table 6: Pairwise Correlations

Panel (a): All variables are in levels						
	Germany			France		
	MEPU	MFI	Inflows	MEPU	MFI	Inflows
MEPU	1.0000			1.0000		
MFI	0.7604***	1.0000		0.9255***	1.0000	
Inflows	0.6678**	0.8193***	1.0000	0.6744***	0.7832***	1.0000
	United Kingdom			United States		
	MEPU	MFI	Inflows	MEPU	MFI	Inflows
MEPU	1.0000			1.0000		
MFI	0.9155***	1.0000		0.5224***	1.0000	
Inflows	0.4319**	0.6280***	1.0000	0.1796	0.0561	1.0000

Panel (b): All variables are in natural logs						
	Germany			France		
	MEPU	MFI	Inflows	MEPU	MFI	Inflows
MEPU	1.0000			1.0000		
MFI	0.4494**	1.0000		0.8834***	1.0000	
Inflows	0.6047***	0.6802***	1.0000	0.6649***	0.7799***	1.0000
	United Kingdom			United States		
	MEPU	MFI	Inflows	MEPU	MFI	Inflows
MEPU	1.0000			1.0000		
MFI	0.9533***	1.0000		0.3223	1.0000	
Inflows	0.7705***	0.7265***	1.0000	0.2876	0.0461	1.0000

Note: All calculations are based on annual data between 1990 and 2016.

(*) significant at 10 percent significance level.

(**) significant at 5 percent significance level.

(***) significant at 1 percent significance level.

Table 7: Attitudes towards immigration (%)

	Present level	Increased	Decreased	Don't know/ Refused to answer
France	40	6	44	10
Germany	49	14	34	2
United Kingdom	24	5	69	2
United States	33	23	40	4

Source: International Organization for Migration (2015, Table 4.2).

Note: Figures might not add up to 100% due to rounding.

Table 8: Attitudes towards immigration by perception of job competition (%)

	Mostly take jobs that citizens in this country do not want	Mostly take jobs that citizens in this country want	Both	Don't know/ Refused to answer
France	40	10	33	17
Germany	61	15	19	5
United Kingdom	66	18	10	6
United States	68	21	7	4

Source: International Organization for Migration (2015, Figure 2.5).

Appendix A

Appendix A.1 Bivariate VARs for investment and consumption

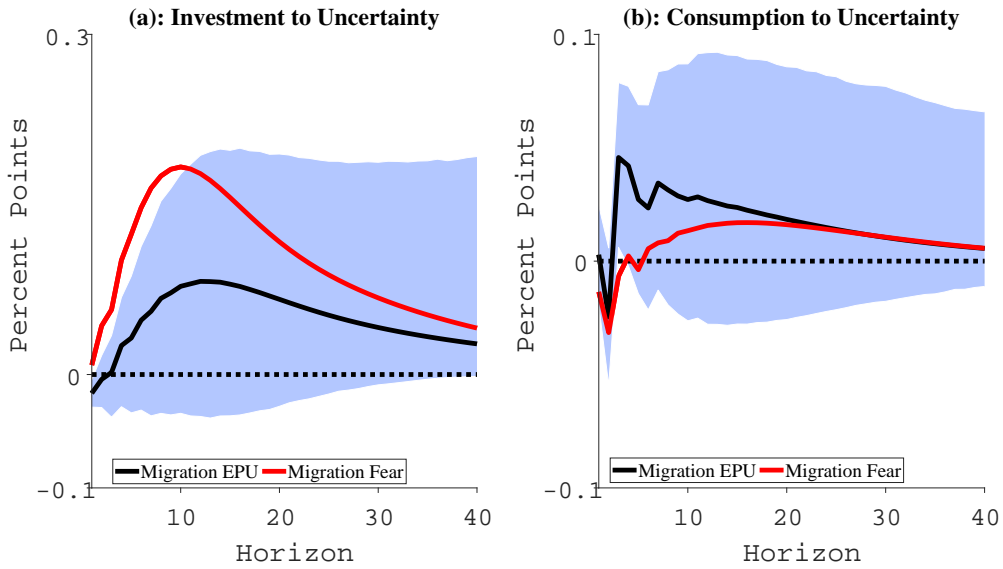


Figure A1: France: Migration EPU vs. Migration Fear

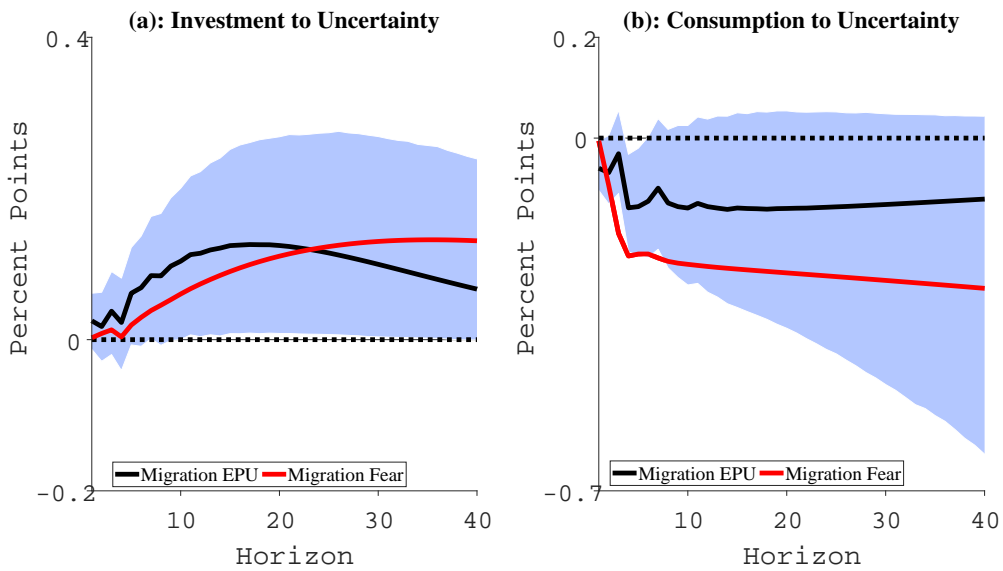


Figure A2: Germany: Migration EPU vs. Migration Fear

a

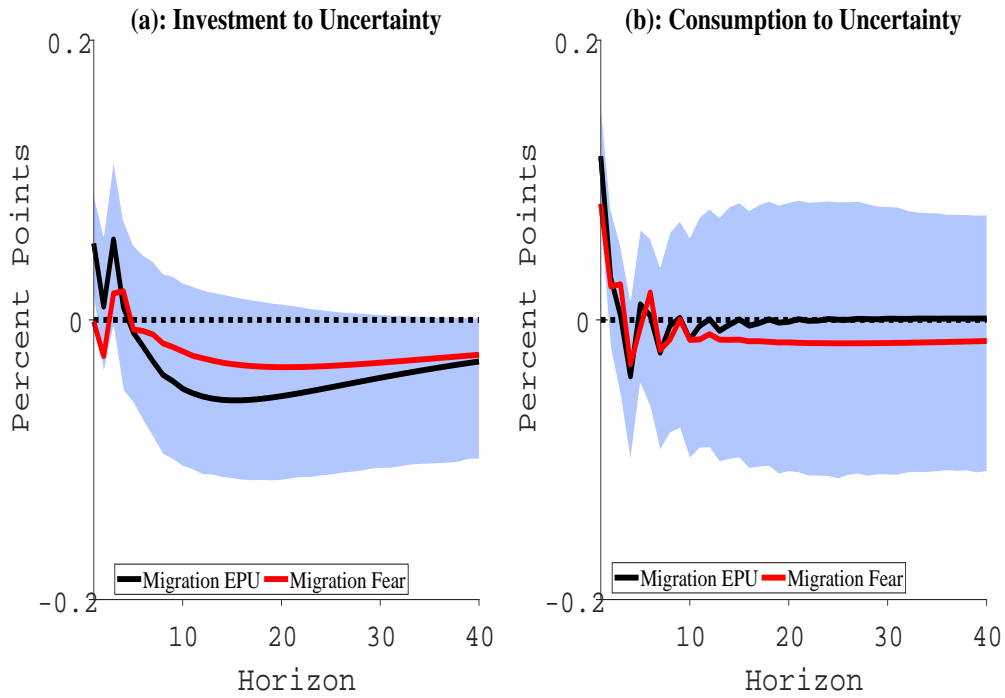


Figure A3: United Kingdom: Migration EPU vs. Migration Fear

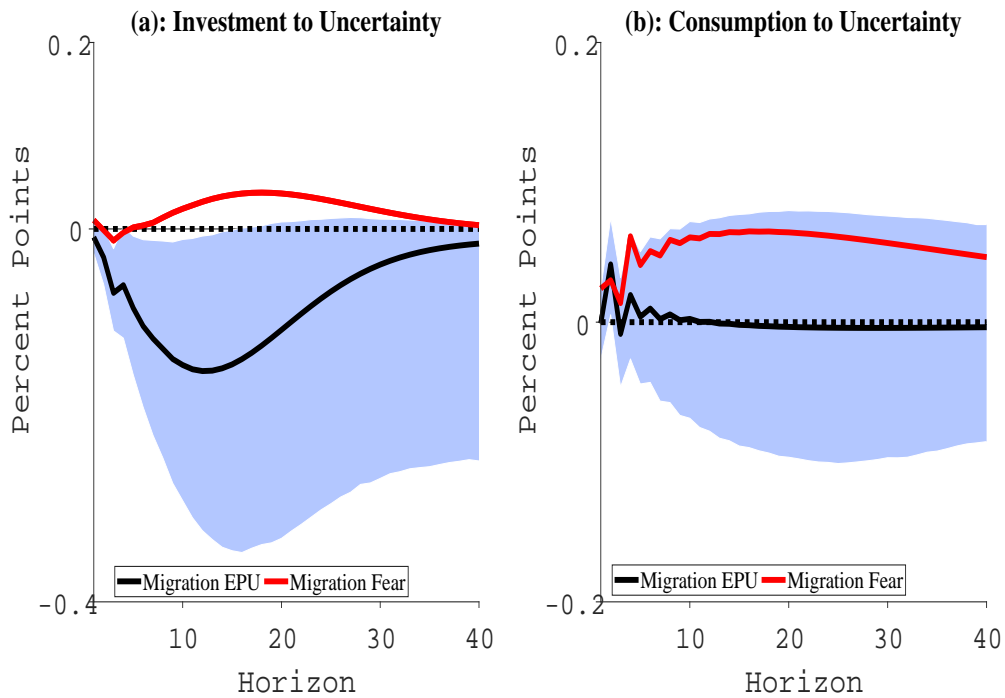


Figure A4: United States: Migration EPU vs. Migration Fear