



Available online at www.sciencedirect.com

ScienceDirect

Journal of Policy Modeling 45 (2023) 538–551



www.elsevier.com/locate/jpm

Immigration, terrorism, and the economy

Jomon A. Paul^{*}, Aniruddha Bagchi

Department of Economics, Finance, & Quantitative Analysis, Kennesaw State University, 560 Parliament Garden Way, Kennesaw GA, 30144, United States

Received 16 July 2022; Received in revised form 10 February 2023; Accepted 1 March 2023
Available online 16 March 2023

Abstract

In this paper, we look at the interaction of terrorism with immigrants' quality of life (measured by the foreign-born unemployment rate and globalization level) for OECD countries, and its impact on GDP per capita. We find strong evidence that GDP per capita is adversely affected by domestic terrorism. The magnitude of this effect is also substantial: at the sample mean, a one-standard-deviation increase in the number of domestic incidents is found to decrease GDP per capita between 5.7 % and 7.8 % of the sample average depending on the specification used. These results contrast with previous research which finds that transnational terrorism primarily affects these economic indicators. We find strong evidence that when we factor in the interaction of the foreign-born unemployment rate with either type of terrorism, an increase in the foreign-born unemployment rate decreases GDP per capita. On the policy front, we show that peace is valuable, and OECD countries will benefit by adopting policies to reduce the problem of terrorism. We also find that an increase in the foreign-born unemployment rate has a large negative impact on GDP per capita and policies that close the gap between foreign-born and native-born unemployment rates (for example, those aimed at reducing discrimination against immigrants) help the economy.

© 2023 The Society for Policy Modeling. Published by Elsevier Inc. All rights reserved.

Keywords: Terrorism; GDP per capita; Immigration; Globalization

1. Introduction

In recent times, terrorism is one of the major areas of concern in western democracies. For example, according to a study by the Pew Research Center, “.....the share that sees defending against

^{*} Corresponding author.

E-mail addresses: jpaul17@kennesaw.edu (J.A. Paul), abagchi@kennesaw.edu (A. Bagchi).

terrorism as a top priority has remained fairly steady: Around seven-in-ten Americans or more have cited it as a top priority in 17 surveys conducted by the Center since January 2002 (the first time the question was asked), when 83 % of Americans cited it” (Gramlich, 2018). Similarly, the results of a recent Eurobarometer survey indicated that “...Terrorism was ranked the number one concern in eight EU countries and was in the top two in every EU country except for Greece.” (Kroet, 2016). The natural response of these countries is therefore to increase their expenditures on counterterrorism. Using data from the Office of Management and Budget, we find that the U.S. increased its share of expenditure on homeland security from 0.58 % in 1990 to 1.15 % in 2016. So ultimately how big is the impact of terrorism on the economy? We advance the research on this issue in this paper.

Prior research indicates that terrorism adversely affects the economy. Gaibullov and Sandler (2008) find that an increase of 1 transnational incident per million population reduces growth by 0.4 %. The effect of domestic incidents is about half. Meierrieks and Gries (2013) find that terrorism adversely affects growth in the Granger sense. Gaibullov and Sandler (2019) find that the economic and financial ramifications of large-scale terrorist attacks are transitory. The impact on GDP per capita growth is minimal since most nations sustain insignificant terrorist attacks annually. The well-to-do diversified nations can absorb these attacks with little macroeconomic consequences; however, those nations that are developing or plagued with terrorism are adversely impacted. Overall, most researchers find a negative effect of terrorism on growth.

There is another strand of research that examines the effect of terrorism on trade. Bandyopadhyay et al. (2018) find that overall trade, manufactured goods imports, and exports are generally negatively impacted by domestic and transnational terrorism. Further, they note insignificant marginal differential impacts between domestic and transnational terrorism. De Sousa et al. (2018) using a game-theoretic framework examine the influence of transnational terrorism’s location on security and international trade. They find that the negative spillover effect on a country’s trade is positively correlated to the proximity to the source of terrorism with distant countries benefitting from an increase in security through additional trading.

Most of the research assumes constant marginal effects of terrorism. We conjecture that the marginal impact varies depending on local conditions, such as immigration. We model these non-linearities by considering the interaction of terrorism with immigrants’ quality of life captured by the foreign-born unemployment rate and globalization index.

Prior literature suggests that immigrants can be perpetrators as well as victims of terrorist attacks (Helbling & Meierrieks, 2020, p. 4). A recent example of a case in which an immigrant was the perpetrator was the stabbing of Sir David Amess (a British Member of Parliament) in 2021 (Faulkner & Kleiderman, 2021). A report from the U.S. White House (2018) describes that “... roughly three in four individuals convicted of international terrorism-related charges since September 11, 2001, were foreign-born.”¹ According to a paper by the Center for Immigration Studies, 104 Islamic terrorists entered the E.U. between 2014 and 18, and the vast majority of them stayed inside E.U. for a long time using the pretext of seeking asylum.² However, immigrants can be victims too. Indeed, McAlexander (2020) considers the evidence in Western Europe between 1980 and 2004 and finds that an increase in immigration is related to an increase in terrorism, primarily because immigrants are targets.

There can potentially be major economic impacts in either case. When immigrants act as perpetrators, the government of the host country is forced to divert more resources to

¹ See <https://www.whitehouse.gov/articles/national-security-threats-chain-migration-visa-lottery-system/>.

² See <https://cis.org/Report/Terrorist-Migration-Over-European-Borders>.

counterterrorism. Also, more terrorist attacks create business uncertainty. On the other hand, attacks on immigrants can also affect the economy. First, it can reduce immigration and that can lead to labor shortages. Second, it can discourage foreign direct investment. Finally, it can also discourage foreign tourists, which impacts countries with major tourism industries.

Therefore, while terrorism and immigration can individually affect the economy as is shown in prior literature (Bandyopadhyay et al., 2018; Ortega and Peri, 2014, etc.), we hypothesize that they interact with each other. In that case, the net effect of terrorism will vary depending on certain attributes of immigration.

There are several important takeaways from this paper. First, we find that in OECD countries (which is our sample), GDP per capita is adversely affected by domestic terrorism but the impact of transnational terrorism on GDP is not clear. Second, we show that an increase in the foreign-born unemployment rate in a given year adversely affects GDP per capita next year. In our analysis comparing a country's output when there is no problem of terrorism vs. the situation when there are domestic terrorist attacks in one year (equal to one standard deviation), we note that there is a reduction in per capita income of 9 % in one year. This effect is more pronounced with regard to transnational terrorism. These two results demonstrate that peace is valuable, and OECD countries will gain by adopting policies to reduce the problem of terrorism. We note that a one-unit increase in the foreign-born unemployment rate in one year in the presence of domestic terrorism reduces GDP per capita in the next year by approximately \$11.25 in PPP terms in the OECD countries. However, if the foreign-born unemployment rate was the same as the native-born unemployment rate, then the corresponding reduction in GDP per capita would have been only \$2 in PPP terms. A similar result was found to hold for transnational terrorism indicating that policies that close the gap between foreign-born and native-born unemployment rates help the economy.

The structure of the paper is as follows: We review the literature in Section 2. We describe our data and econometric methodology in Section 3. We present our findings in Section 4. Concluding remarks are in Section 5.

2. Literature review

Given our primary hypotheses that the marginal impact of terrorism varies depending upon local conditions and that while terrorism and immigration can individually affect the economy, they also interact with each other, we next devote our attention to the extant literature on immigrant unemployment, and globalization.

2.1. Immigrant unemployment

In recent times, immigration is one of the most important issues in public discourse in many western democracies. Indeed the rise of many politicians such as President Trump in the U.S.A., Marie Le Pen in France, Geert Wilders of the Netherlands, etc. can be attributed to a large extent to their rhetoric against immigration.³ Some common complaints against immigrants are

³ For a summary of the position on immigration of each of these politicians, see the following: <https://www.reuters.com/article/us-usa-election-immigration-factbox/trump-and-biden-take-sharply-different-paths-on-immigration-idUSKBN2611VDhttps://www.independent.co.uk/news/world/europe/french-elections-latest-marine-le-pen-immigration-suspend-protect-france-borders-front-national-fn-a7689326.htmlhttps://time.com/4696459/geert-wilders-the-dutch-trump/>.

that they deprive locals of jobs, strain public services, contribute to crime, and more seriously to terrorism. Public sentiment against immigration contributed to a large measure in the U.K.'s decision to pull out of the European Union (E.U.), popularly known as 'Brexit'. [Arnorsson and Zoega \(2018\)](#) examine the characteristics of regions whose residents mostly voted for Brexit. Two important characteristics relevant to our paper are that these are poor regions and have high rates of immigration.

Indeed, a common complaint against immigration is that it does not add any significant value to the economy. According to a British think tank Migration Watch, immigration into the U.K. did not have any significant positive impact on GDP per capita primarily because most of the immigrants were low-skilled workers.⁴ According to [Borjas and \(2013, 2015\)](#), immigration increases U.S. GDP by 11 % (around \$1.6 trillion) annually. However, almost all of the gains accrue to the immigrants themselves, and the gain to the native-born population is only around \$35 billion annually (equivalent to 0.2 % of the GDP).⁵ There is however research that finds large positive effects of immigration. For example, [Jaumotte et al. \(2016\)](#) find that the elasticity of GDP per capita concerning the share of migrants in the adult population is around 2. So overall there are divergent opinions about the relationship between immigration and GDP per capita.

There is also literature that investigates the relationship between immigrants and terrorism. [Bandyopadhyay and Sandler \(2014\)](#) find that if a developed nation brings in more skilled labor from a developing nation, these immigrants are gainfully employed with a better quality of life. On the other hand, if skilled labor quotas are more stringent, this causes many to stay back with a lower standard of living. This could make them join terrorist groups that rely on such skilled labor to hit targets in the developed country. Restrictions on unskilled immigration lead to an opposite chain of events, where terrorism is focused on the host developing country. Specifically, an examination of the terror-supply elasticity showed that the relaxation of skilled labor quotas is particularly effective for skill-scarce developing countries that host terrorist groups.

[Bove and Bohmelt \(2016\)](#) find that immigration is unlikely to positively affect terrorism. They discover that more migration generally into a country is associated with a lower level of terrorist attacks. [Choi and \(2018, 2019\)](#) empirically examines the effects of twelve restrictive policy alternatives that Western democracies employ for immigrant screening to thwart terrorism. The findings are mixed. On the one hand, terrorism is likely to decrease when a country imposes immigration restrictions based on skill or wealth, or if it offers immigrants limited legal rights that permit only restricted residence and designated employers. On the other hand, terrorism is expected to increase when states allow no special visas or procedures to recruit immigrants, or when states give workers citizenship only when they are born to a native parent.

There is prior literature (e.g., [Bagchi and Paul, 2018](#), [Okafor and Piesse, 2018](#), etc.) that shows that youth unemployment is one of the drivers of terrorism. In this paper, we extend the literature by considering the unemployment rate of another group viz. immigrants. A country that is hostile towards immigrants is likely to severely restrict immigration, and also make it hard for them to prosper even after settling down in the host country. [Gouda and Marktanner \(2019\)](#) find that youth unemployment is one of the causes of the phenomenon of foreign fighters in conflicts, such as Syria. [Marone and Vidino \(2019\)](#) examine profiles of 125 foreign fighters

⁴ See <https://www.migrationwatchuk.org/key-topics/economics> and https://www.migrationwatchuk.org/pdfs/BPI_16.pdf for policy papers on the effects of immigration on GDP per capita by Migration Watch.

⁵ See <https://cis.org/Report/Immigration-and-American-Worker>.

who originated in Italy. In their sample, 34.4 % were unemployed and 44.8 % had low-paying jobs. So, the quality of life of most of the persons in the sample was very poor.

We hypothesize that it is plausible for immigrants to have both a positive and a negative impact on GDP per capita. Also, there may be interactions between immigration and terrorism that can change the marginal effect of immigration. For example, if immigrants get involved with terrorist groups, the resulting disruption in the economy will dampen any positive effect that immigration may have on the economy.

As mentioned above, we are interested in capturing the motivation of immigrants to join or support terrorist groups. The unemployment rate among immigrants in OECD countries is one of the indicators of this motivation (with the other one being the globalization index). Unemployment can be a motivator of terrorism because it affects living conditions. It can also reflect systematic discrimination if a group continually faces a higher rate of unemployment relative to the rest of the population. [Becker \(1968\)](#) notes that an unemployed person has a higher incentive to commit crime due to the low opportunity costs of such acts. The low opportunity cost of crime can also lead to terrorism as long as there are other factors present, such as political grievances. Therefore, unemployment increases the incentive to join a terrorist movement. As noted in [Berrebi \(2007\)](#), highly educated individuals would be particularly frustrated by the loss of economic opportunities and the alternative economic cost of their risking arrest or worse would be lower. It also facilitates terrorist organizations to recruit volunteers ([Krieger & Meierrieks, 2011](#); [Helbling & Meierrieks, 2020](#)).

Indeed, data show that in OECD countries, the unemployment rate is much higher for immigrants than for the native-born population. For example, in 2019, the average unemployment rate for native-born workers in OECD countries was 5.5 % but it was 8.2 % for foreign-born workers. There are also certain countries of concern particularly in Europe, e.g., in France, the average unemployment rate since 2007 for native-born workers was 8.6 % but it was 15.4 % for foreign-born workers. This indicates that immigrants' quality of life in these countries is much lower than that of native-born residents. In this paper, we control the unemployment rate among immigrants and determine its interaction with terrorism.

2.2. Globalization

Globalization is an over-encompassing term that captures the degree of integration of an economy with the rest of the world ([Dreher, 2006](#)). It includes several aspects, such as economic, social, and political globalization.

The association between globalization and growth has been heavily and hotly debated with somewhat understandably mixed results. Studies such as [Dollar \(1992\)](#), [Sachs and Warner \(1995\)](#), and [Edwards \(1998\)](#) find a positive correlation between openness and growth. In a study featuring a new comprehensive index of globalization, [Dreher \(2006\)](#) investigates the impact of globalization on growth between 1970 and 2000 and finds that globalization promotes economic growth. Similarly, [Samimi and Jenatabadi \(2014\)](#) find that economic globalization affects the economic growth of OIC countries positively, and this positive effect is larger in countries with a higher level of human capital and deeper financial development. Further, the extent of benefits depends on the income level of each group. Specifically, benefits are restricted to high- and middle-income with low-income countries seeing no gains. There is also literature that investigates whether globalization could mitigate the negative effects of terrorism on growth. [Younas \(2015\)](#) finds that globalization dissipates the consequences of terrorism and therefore reforms aimed at openness can be effective counterterrorism policy tools.

We hypothesize that the marginal effect of globalization on GDP per capita is affected by terrorism. If an economy depends on foreign tourists, investors, etc. then it is severely affected if terrorists succeed in scaring away foreigners. Therefore, we expect the interaction of globalization and transnational terrorism to be negative. Domestic terrorism is unlikely to scare away foreign investors. Therefore, we expect the interaction of globalization and domestic terrorism to be negligible.

3. Description of data

In this paper, we focus on GDP per capita based on purchasing-power-parity as the economic indicator. This focus is in line with prior work such as [Sandler and Enders \(2008\)](#), [Gaibullov and Sandler \(2019\)](#), to name a few. We use data from OECD. Our focus on OECD countries⁶ is motivated by multiple reasons:

- (i) We are analyzing the effect of immigrants on the economy, and OECD countries are major recipients of immigrants.
- (ii) There is a recent increase in hostility toward immigrants in developed nations and it is imperative to examine if allowing immigrants is a net gain for these economies or not.
- (iii) Data availability is a major consideration. There is a significant issue with missing data from non-OECD countries which puts a serious dent in the credibility of any findings obtained.

In this paper, we use data from the Global Terrorism Database ([Global Terrorism Database, 2013](#)). We extract information about terrorist incidents in the OECD countries (listed in electronic [appendix Table 1](#)) for the years 2007 through 2017. Specifically, we focus on domestic and transnational incidents as our independent variables. We follow [Enders et al. \(2011\)](#) when counting an attack as a terrorist. Further, some events do not seem to be terrorist attacks and GTD classifies them as doubtful events. We drop these doubtful events from our sample.

The next step is to classify each terrorist attack as domestic or transnational. We follow [Paul and Bagchi \(2019\)](#) in distinguishing between them. Further, in this paper, we consider two kinds of transnational attacks motivated by prior literature such as [Gaibullov and Sandler \(2011\)](#). These involve attacks against foreign nationals in a country and attacks by foreign terrorist groups.⁷

Our variable descriptions and their type i.e., dependent, independent, or instrumental are listed in electronic [appendix Table 3](#). We now briefly discuss the rationale behind the choice of variables and what they embody.

We measure the motivation of immigrants to support or join terrorist groups using foreign-born unemployment rates and the globalization index. Indeed, the unemployment rate seems to be much higher for immigrants than for the overall population of several OECD countries (OECD, 2020; [US News, 2017](#); [Drinkwater, 2017](#)). As per OECD, the foreign-born unemployment rate is calculated as the share of unemployed foreign-born persons aged 15–64 in the foreign-born labor force (the sum of employed and unemployed foreign-born) of that same age. Unemployed people consist of those persons who report that they are without work during the reference week, are available for work, and have taken active steps to find work during the four weeks preceding the interview.

⁶ A list of the countries that make up the OECD considered in our study can be found in the Electronic Appendix Section B Table 1 at <https://coles.kennesaw.edu/econopp/docs/Electronic-Appendix.pdf>.

⁷ Electronic [Appendix Section B Table 2](#) lists the domestic, transnational, and total terrorism incidents for our period of study.

We measure globalization using KOF Globalisation Index. The KOF Globalisation Index (Gygli et al., 2019; Dreher, 2006) measures the economic, social, and political dimensions of globalization. Globalization in the economic, social, and political fields has been on the rise since the 1970s, receiving a particular boost after the end of the Cold War.

We also include a measure of restriction on religion imposed either by governments or by private actors (groups and individuals) in a country. As per Pew Center (2020), restrictions on religion resulted from actions taken by government officials, social groups, or individuals espousing nationalist positions. Typically, these nationalist groups or individuals were seeking to curtail immigration of religious and ethnic minorities or were calling for efforts to suppress or even eliminate a particular religious group, in the name of defending a dominant ethnic or religious group they described as threatened or under attack. In the Netherlands, for instance, Geert Wilder's Freedom Party announced an election platform in 2016 that called for the “de-Islamization” of the country, including barring asylum seekers from Islamic countries, prohibiting Muslim women from wearing headscarves in public, closing all mosques, and banning the Quran. In another case, the Czech group Block Against Islam (which opposes allowing Muslim refugees into the country and calls for restrictions on the Muslim community) organized about 20 anti-Islam rallies around the country during the year.

We also include the Economic Freedom Index (Fraser Institute, 2019) published in *Economic Freedom of the World* in our modeling specifications. It measures the degree to which the policies and institutions of countries are supportive of economic freedom. The cornerstones of economic freedom are personal choice, voluntary exchange, freedom to enter markets and compete, and security of the person and privately owned property. Forty-two data points are used to construct a summary index and to measure the degree of economic freedom in five broad areas: the size of government; legal system and property rights; sound money; freedom to trade internationally; regulation.

To the best of our knowledge, there is no single data set that includes all of the variables required for our analysis. Therefore, it was required that the information on these variables be collected from a variety of sources.⁸

There are 36 countries in the OECD. Out of these, we had to drop 4 countries due to a lack of information. Further, multiple countries had missing data. This led to a loss of 25 observations. The surviving sample with no missing values for any of the variables has 327 observations with no obvious pattern or bias in the observations removed to raise concerns about the resulting sample.⁹

We use the Generalized Method of Moments (GMM) for our econometric modeling. As a robustness test, we employ the feasible generalized least squares (FGLS) estimator. Extended details motivating the choice of these methodologies can be found in Electronic Appendix Section A.

4. Results

4.1. Domestic incidents, globalization, and immigrant living conditions

In Table 1, we first present results for System GMM regressions for GDP per capita, followed by results from FGLS specifications. The regressions include main variables of interest

⁸ All variables used in our analysis and their sources are provided in the Electronic Appendix Section B Tables 3 and 4.

⁹ Electronic Appendix Section B Table 5 provides summary statistics for this sample.

Table 1

Domestic terrorism, immigrant living conditions, and globalization in OECD countries.

| Variables | System GMM | | Feasible Generalized Least Squares | |
|--|----------------|-------------|------------------------------------|-------------|
| | GDP Per Capita | | GDP Per Capita | |
| | Coef. | Std. Error. | Coef. | Std. Error. |
| GDP per capita _{t-1} | 1.027*** | 0.2064 | 1.031*** | 0.0021 |
| Globalization Index _{t-1} | -2.487 | 59.272 | -0.135 | 0.401 |
| Religion Restriction Index _{t-1} | -41.719 | 77.986 | -0.364 | 1.276 |
| Economic Freedom Index _{t-1} | -69.803 | 492.615 | -1.43 | 5.172 |
| Domestic Incidents _{t-1} | 26.366 | 120.752 | 3.515 | 4.2 |
| Population Density _{t-1} | -4.912 | 16.752 | -0.011 | 0.013 |
| Foreign Born Unemployment Rate _{t-1} | -11.973 | 55.154 | -0.602* | 0.351 |
| Globalization Index x Domestic Incidents _{t-1} | -0.41 | 2.086 | -0.048 | 0.061 |
| Foreign Born Unemployment Rate x Domestic Incidents _{t-1} | 0.226 | 2.4 | 0.016 | 0.051 |
| Constant | 1304.438 | 5536.366 | 44.313 | 39.439 |
| Year Dummy | Yes | | Yes | |
| Sample Size | 327 | | 327 | |
| AR(1) | 0.308 | | | |
| AR(2) | 0.233 | | | |
| Sargan OIR | 0 | | | |
| Hansen OIR | 1 | | | |
| Difference in Hansen | 1 | | | |
| Fisher | 29.82 | | | |

along with lagged dependent variables, time, and country-specific fixed effects. It also includes all other time-variant control variables. It follows that the lagged value of GDP per capita has a statistically significant effect on its contemporaneous value under both specifications.

In [Table 1](#), none of the coefficients of the interaction terms are statistically significant. Because of the interaction terms, the marginal effect of domestic terrorism varies with the values of the globalization index and the foreign-born unemployment rate. The marginal effects of domestic terrorism are presented in [Table 2](#). Based on these results, we predict that at the sample mean, a one standard deviation increase in domestic incidents of terror will decrease GDP per capita by approx. 7.8 % (of the average value of GDP per capita) according to the System GMM regression, and by approx. 5.7 % according to the FGLS regression. The 95 % confidence interval is also presented in that table. As can be noted, domestic terrorism has a

Table 2

Marginal effects: domestic terrorism, immigrant living conditions, and globalization in OECD countries.

| Marginal Effect | System GMM | | Feasible Generalized Least Squares | |
|--------------------------------|--------------------------|-------------|------------------------------------|-------------|
| | GDP per Capita | | GDP per Capita | |
| | 95 % Confidence Interval | | 95 % Confidence Interval | |
| | Lower Limit | Upper Limit | Lower Limit | Upper Limit |
| Domestic Incidents | -8.706 | -1.943 | -0.369 | -0.199 |
| Foreign Born Unemployment Rate | -16.438 | -6.074 | -0.586 | -0.515 |
| Globalization Index | -9.861 | 2.284 | -0.335 | -0.239 |

statistically significant negative impact on GDP per capita according to both specifications. Gaibullov and Sandler (2019) while reviewing the literature on terrorism wrote that “Generally, terrorism had a small adverse effect on the growth of GDP per capita. The effect is driven by transnational terrorism; domestic terrorism is usually not statistically significant” (p. 316). In contrast to the literature, we find that domestic terrorism has a negative and statistically significant effect on GDP per capita, and the magnitude of this effect is quite large.

In Table 2, we also present the marginal effects of globalization and the foreign-born unemployment rate at the sample mean. We predict that at the sample mean, a one standard deviation increase in the foreign-born unemployment rate decreases GDP per capita by around 5 % according to the System GMM Regression and by 0.24 % according to the FGLS regression, and both are statistically significant at the 95 % confidence level. This means that the deterioration of employment chances of immigrants adversely affects the economy in OECD countries. Based on this evidence, it does not seem that immigrants can be easily replaced with native-born workers with no effect on the economy, as is alleged by proponents of tougher immigration policies.

The marginal impact of globalization is not clear-cut. It follows from Table 2 that globalization does not have a statistically significant effect on GDP per capita according to the System GMM Regression.

4.2. Transnational incidents, globalization, and immigrant living conditions

We present the regression results for transnational terrorism in Table 3. Lagged values of GDP per capita have a positive and statistically significant effect on their corresponding

Table 3
Transnational terrorism, immigrant living conditions, and globalization in OECD countries.

| Variables | System GMM | | Feasible Generalized Least Squares | |
|---|----------------|-------------|------------------------------------|-------------|
| | GDP Per Capita | | GDP Per Capita | |
| | Coef. | Std. Error. | Coef. | Std. Error. |
| GDP per capita _{t-1} | 1.178*** | 0.079 | 1.031*** | 0.0025 |
| Globalization Index _{t-1} | 101.28 | 108.263 | -0.165 | 0.455 |
| Religion Restriction Index _{t-1} | 58.462 | 195.142 | -0.538 | 1.437 |
| Economic Freedom Index _{t-1} | 107.492 | 341.649 | -2.003 | 5.518 |
| Transnational Incidents _{t-1} | 2.019 | 6.423 | -0.006 | 0.325 |
| Population Density _{t-1} | 2.185 | 2.343 | -0.013 | 0.015 |
| Foreign Born Unemployment Rate _{t-1} | -29.676* | 17.204 | -0.535 | 0.355 |
| Globalization Index x Transnational Incidents _{t-1} | -0.311* | 0.161 | 0.003 | 0.005 |
| Foreign Born Unemployment Rate x Transnational Incidents _{t-1} | 0.227 | 1.165 | 0.002 | 0.035 |
| Constant | -9661.32 | 6989.353 | 51.397 | 41.347 |
| Year Dummy | Yes | | Yes | |
| Sample Size | 327 | | 327 | |
| AR(1) | 0.112 | | | |
| AR(2) | 0.125 | | | |
| Sargan OIR | 0 | | | |
| Hansen OIR | 1 | | | |
| Difference in Hansen | 1 | | | |
| Fisher | 1.54 | | | |

Table 4

Marginal effects: transnational terrorism, immigrant living conditions, and globalization in OECD countries.

| | System GMM | | Feasible Generalized Least Squares | |
|--------------------------------|--------------------------|-------------|------------------------------------|-------------|
| | GDP per Capita | | GDP per Capita | |
| | 95 % Confidence Interval | | 95 % Confidence Interval | |
| Marginal Effect | Lower Limit | Upper Limit | Lower Limit | Upper Limit |
| Transnational Incidents | -22.943 | -19.825 | 0.229 | 0.319 |
| Foreign Born Unemployment Rate | -30.198 | -27.33 | -0.566 | -0.491 |
| Globalization Index | 88.297 | 111.77 | -0.202 | -0.102 |

contemporaneous values. These results are similar to the case of domestic terrorism presented in Table 1. We also find that the interaction terms are negative whenever statistically significant.

Gaibullov and Sandler (2008, 2009, 2011) find that transnational terrorism exerts a negative effect on growth. Our estimates of the marginal effects of transnational terrorism are presented in Table 4. The effect of transnational terrorism on GDP per capita is not very clear. According to the System GMM Regression, a one standard deviation increase in transnational incidents will decrease GDP per capita by approx. 24.6 % (of the average value of GDP per capita) and this is statistically significant at the 95 % level of confidence. In contrast, the FGLS Regression implies that a one standard deviation increase in transnational incidents will increase GDP per capita by 0.3 % and this is also statistically significant at the 95 % confidence interval. Given the contrasting signs of the marginal effects in the two specifications, it is difficult to draw strong conclusions about the effect of transnational terrorism on GDP per capita, except that this marginal effect will either be negative or a small positive number.

In Table 4, we also present the marginal effects of globalization and the foreign-born unemployment rate at the sample mean when these variables interact with transnational terrorism. We predict that at the sample mean, a one standard deviation increase in the foreign-born unemployment rate decreases GDP per capita by around 12.7 % according to the System GMM Regression and by 0.23 % according to the FGLS regression, and both are statistically significant at the 95 % confidence level. This means that the deterioration of employment chances of immigrants adversely affects the economy in OECD countries, even after taking into account its interaction with transnational terrorism. Again, it does not seem that immigrants can be easily replaced with native-born workers with no effect on the economy, as is alleged by opponents of immigration.

4.3. Policy implications

The above results can be used to find out the value of peace (or the peace dividend) in an average OECD country. Barker et al. (1991) simulated the likely impact on the British economy of a reallocation of government expenditures from the military after the end of the cold war and estimated that output would increase above the base by 1.82 % between 1992 and 2000. Besley and Mueller (2012) examined the effect of cessation of violence in Northern Ireland on house prices and found that peace led to an increase in house prices by between 1.3 %–3.5 %,

although there is substantial heterogeneity across regions. The Institute for Economics and Peace (2021) estimates that in 2019, the economic cost of violence and conflict in the world was equivalent to 10.5 % of GDP, or \$1895 per person in PPP terms.¹⁰

Our model can also be used to determine the value of peace in OECD countries. Consider the estimates of the System GMM regression in [Table 1](#); this regression considers the case of domestic terrorism. We can compare a country's output when there is no problem of terrorism vs. the situation when there are domestic terrorist attacks in one year equal to one standard deviation (that is, 20.047 attacks), given that all other characteristics of the country are equal to the sample mean. In this case, the GDP per capita under violence will be \$106.91 less in PPP terms, which implies a reduction in per capita income of 9 % in one year. Further, the GDP per capita after this domestic terrorist shock will continue to be lower even in later years. As regards transnational terrorism, a terrorist shock equal to one standard deviation (that is, 15.825 incidents) in one year will reduce GDP per capita by approx. \$339 relative to the situation when there is complete peace. In summary, the System GMM regressions indicate that there is a substantial value of peace in OECD countries.

The relationship between a change in unemployment and a change in GDP per capita has been studied extensively in macroeconomics. This part of the literature originates from the work of [Okun \(1962\)](#) who concluded that in the US economy, a 1 % reduction in the unemployment rate increases output by 3 %, and such a relationship came to be commonly known as 'Okun's Law.' Since his work, there have been several papers that examined if this relationship exists, if it is stable over time, and if it is the same for different countries. [Prachowny \(1993\)](#) finds that a 1 % reduction in output increases output by 0.67 %. In more recent work, [Ball et al. \(2017\)](#) conclude that there is substantial variation in this relationship across countries. Our paper is not on Okun's law. However, our regressions can be used to determine the relationship between change in unemployment and change in output for OECD countries in the presence of terrorism. It follows from the marginal estimates derived from GMM regressions and presented in [Table 2](#) that at the sample mean, a one-unit increase of the foreign-born unemployment rate in one year in the presence of domestic terrorism reduces GDP per capita in the next year by approximately \$11.25 in PPP terms in the OECD countries. However, if the foreign-born unemployment rate was the same as the native-born unemployment rate, then the corresponding reduction in GDP per capita would have been only \$2 in PPP terms.

For the case of transnational terrorism, the GMM estimates suggest that a one-unit increase in unemployment will reduce GDP per capita by \$29 in PPP terms. If the foreign-born unemployment rate was the same as the native-born unemployment rate, then the corresponding reduction in GDP per capita would have been only \$22.5 in PPP terms.

In either case, GDP per capita would have been less sensitive to immigrant unemployment if the foreign-born unemployment rate had been close to the native-born unemployment rate. A reduction in the foreign-born unemployment rate not only improves the quality of life of immigrants but also reduces the negative impact on the economy of an increase in this unemployment rate. Therefore, there is a strong case for adopting policies that close the gap between foreign-born and native-born unemployment rates.

¹⁰ See <https://www.visionofhumanity.org/wp-content/uploads/2021/01/EVP-2021-web-1.pdf>.

5. Concluding remarks

In this paper, we look at the interaction of terrorism with the foreign-born unemployment rate and globalization in OECD countries and find several interesting results. We find strong evidence that GDP per capita is adversely affected by domestic terrorism. The magnitude of this effect is also substantial. For example, at the sample mean, a one-standard-deviation increase in the number of domestic incidents is found to decrease GDP per capita by 7.8 % of the sample average according to the System GMM Regression and by 5.7 % according to the FGLS specification. The effect of transnational terrorism on GDP per capita is not so clear because we obtain different signs for the two specifications.

When the interaction of the foreign-born unemployment rate with either type of terrorism is factored in, it is found that an increase in the foreign-born unemployment rate decreases GDP per capita. This means that when we account for security aspects related to immigration, an improvement in the living conditions of immigrants is a net positive for the economies of OECD countries.

Overall, the results are stronger for the case of domestic terrorism. In our sample, the number of transnational incidents exceeds the number of domestic incidents. Despite that, we find a stronger systematic effect of domestic terrorism on economic indicators. This means that in developed economies, there is a need to seriously consider the threat of domestic terrorism, even though the frequency of such attacks is less than transnational attacks. Transnational terrorism may interact with other variables not captured in this study. We leave this for future research.

Our results also have major policy implications. We show that peace is valuable, and OECD countries will gain by adopting policies to reduce the problem of terrorism. An example of a policy in this direction is the Good Friday Agreement (or Belfast Agreement) of 1998 which lead to a cessation of violence in Northern Ireland. We also find that an increase in the foreign-born unemployment rate has a large negative impact on GDP per capita, and the magnitude of this effect depends on the type of terrorism. Therefore, policies that close the gap between foreign-born and native-born unemployment rates (such as those that aim to reduce discrimination) help the economy.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.jpolmod.2023.03.002](https://doi.org/10.1016/j.jpolmod.2023.03.002).

References

- Arnorsson, A., & Zoega, G. (2018). On the causes of Brexit. *European Journal of Political Economy*, 55, 301–323.
- Bagchi, A., & Paul, J. A. (2018). Youth unemployment and terrorism in the MENAP (Middle East, North Africa, Afghanistan, and Pakistan) region. *Socio-Economic Planning Sciences*, 64, 9–20.
- Ball, L., Leigh, D., & Loungani, P. (2017). Okun's law: Fit at 50? *Journal of Money, Credit and Banking*, 49(7), 1413–1441.
- Bandyopadhyay, S., & Sandler, T. (2014). Immigration policy and counterterrorism. *Journal of Public Economics*, 110(1), 112–123.
- Bandyopadhyay, S., Sandler, T., & Younas, J. (2018). Trade and terrorism: A disaggregated approach. *Journal of Peace Research*, 55(5), 656–670.

- Barker, T., Dunne, P., & Smith, R. (1991). Measuring the peace dividend in the United Kingdom. *Journal of Peace Research*, 28(4), 345–358.
- Becker, G. (1968). Crime and punishment: An economic approach. *Journal of Political Economy*, 76(2), 169–217.
- Berrebi, C. (2007). Evidence about the link between education, poverty and terrorism among Palestinians. *Peace Economics, Peace Science and Public Policy*, 13(1), 1–36.
- Besley, T., & Mueller, H. (2012). Estimating the peace dividend: The impact of violence on house prices in Northern Ireland. *American Economic Review*, 102(2), 810–833.
- Borjas, G.J. (2013). Immigration and the American worker. Available at (<https://cis.org/Report/Immigration-and-American-Worker>) (downloaded March 9, 2021).
- Borjas, G. J. (2015). Immigration and globalization: A review essay. Ethnic diversity and economic performance. *Journal of Economic Literature*, 53(4), 961–974.
- Bove, V., & Bohmelt, T. (2016). Does immigration induce terrorism? *Journal of Politics*, 78(2), 572–588.
- Choi, S.-W. (2018). Does restrictive immigration policy reduce terrorism in western democracies? *Perspectives on Terrorism*, 12(4), 14–25.
- Choi, S.-W. (2019). Immigration policy and terrorism: An empirical analysis. *Defence and Peace Economics*, 30, 1–25.
- De Sousa, J., Mirza, D., & Verdier, T. (2018). Terror networks and trade: Does the neighbor hurt? *European Economic Review*, 107, 27–56.
- Dollar, D. (1992). Outward-oriented developing economies really do grow more rapidly: Evidence from 95 LDCs, 1976–1985. *Economic Development and Cultural Change*, 40, 523–544.
- Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics*, 38(10), 1091–1110.
- Drinkwater, S. (2017). Why does unemployment differ for immigrants? *IZA World of Labor*, 376. <https://doi.org/10.15185/izawol.376> Accessed April 8.
- Edwards, S. (1998). Openness, productivity and growth: What do we really know? *Economic Journal*, 108, 383–398.
- Enders, W., Sandler, T., & Gaibullov, K. (2011). Domestic versus transnational terrorism: Data, decomposition, and dynamics. *Journal of Peace Research*, 48(3), 319–337.
- Faulkner, D., & Kleiderman, A. (2021). Sir David Amess killing was terrorism, police say. *BBC*. (Available at) (<https://www.bbc.com/news/uk-58935372>).
- Fraser Institute. (2019). Economic Freedom of the World: 2019 Annual Report. (<https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2019-annual-report>). Accessed April 8, 2020.
- Gaibullov, K., & Sandler, T. (2008). Growth consequences of terrorism in Western Europe. *Kyklos*, 61, 411–424.
- Gaibullov, K., & Sandler, T. (2009). The impact of terrorism and conflicts on growth in Asia. *Economics & Politics*, 21(3), 359–383.
- Gaibullov, K., & Sandler, T. (2011). The adverse effect of transnational and domestic terrorism on growth in Africa. *Journal of Peace Research*, 48(3), 355–371.
- Gaibullov, K., & Sandler, T. (2019). What we have learned about terrorism since 9/11. *Journal of Economic Literature*, 57(2), 275–328.
- Global Terrorism Database. (2013). National consortium for the study of terrorism and responses to terrorism. (<http://www.start.umd.edu/gtd/>). Accessed April 10, 2020.
- Gramlich, J. (2018). Defending against terrorism has remained a top policy priority for Americans since 9/11. *Pew Research Center*. (Available at) (<https://www.pewresearch.org/fact-tank/2018/09/11/defending-against-terrorism-has-remained-a-top-policy-priority-for-americans-since-9-11/>).
- Gouda, M., & Marktanner, M. (2019). Muslim youth unemployment and Expat Jihadism: Bored to death? *Studies in Conflict & Terrorism*, 42(10), 878–897.
- Gygli, S., Haelg, F., Potrafke, N., & Sturm, J. E. (2019). The KOF globalisation index – Revisited. *Review of International Organizations*, 14(3), 543–574.
- Helbling, M., & Meierrieks, D. (2020). Terrorism and migration: An overview. *British Journal of Political Science*, 1–20.
- Jaumotte, F., Koloskova, K., & Saxena, S. (2016). Impact of migration on income levels in advanced economies. *IMF Spillover Note, Issue 8*.
- Krieger, T., & Meierrieks, D. (2011). What causes terrorism? *Public Choice*, 147(1–2), 3–27.
- Kroet, C. (2016). Terrorism fears on the rise: EU study. *Politico*. (Available at) (<https://www.politico.eu/article/terrorism-fears-on-the-rise-eu-study-terrorism-immigration/>).
- Marone, F., & Vidino, L. (2019). Destination Jihad: Italy's Foreign Fighters. *International Centre for Counter-Terrorism*. (Available at) (<https://icct.nl/app/uploads/2019/03/Marone-Vidino-Italys-Foreign-Fighters-March2019.pdf>).

- McAlexander, R. J. (2020). How are immigration and terrorism related? An analysis of right- and left-wing terrorism in Western Europe, 1980–2004. *Journal of Global Security Studies*, 5(1), 179–195.
- Meierrieks, D., & Gries, T. (2013). Causality between terrorism and economic growth. *Journal of Peace Research*, 50(1), 91–104.
- Okafor, G., & Piesse, J. (2018). Empirical investigation into the determinants of terrorism: Evidence from fragile states. *Defence and Peace Economics*, 29(6), 697–711.
- Okun, A.M. (1962). Potential GNP: Its measurement and significance. In Proceedings of the Business and Economic Statistics Section of the American Statistical Association, pp. 89–104. 1962.
- Ortega, F., & Peri, G. (2014). Openness and income: The roles of trade and migration. *Journal of International Economics*, 92(2), 231–251.
- Paul, J. A., & Bagchi, A. (2019). Civil liberties and terrorism in Middle East, North Africa, Afghanistan, and Pakistan. *Annals of Operations Research*, 275(2), 623–651.
- Pew Center. (2020). Global uptick in government restrictions on religion in 2016. (<https://www.pewforum.org/2018/06/21/global-uptick-in-government-restrictions-on-religion-in-2016/>). Accessed April 8, 2020.
- Prachowny, M. F. (1993). Okun's law: Theoretical foundations and revised estimates. *Review of Economics and Statistics*, 331–336.
- Sachs, J., & Warner, A. (1995). Economic reform and the process of global integration. *Brookings Papers on Economic Activity*, 1995, 1–118.
- Samimi, P., & Jenatabadi, H. S. (2014). Globalization and economic growth: Empirical evidence on the role of complementarities. *PLoS ONE*, 9(4), Article e87824. <https://doi.org/10.1371/journal.pone.0087824>
- Sandler, T., & Enders, W. (2008). Economic consequences of terrorism in developed and developing countries: An overview. In Philip Keefer, & Norman Loayza (Eds.). *Terrorism, Economic Development and Political Openness*. Cambridge: Cambridge University Press.
- US News. (2017). Europe's out-of-step workforce. (<https://www.usnews.com/news/best-countries/articles/2017-06-30/in-europe-unemployment-divides-native-and-foreign-born>). Accessed April 8, 2020.
- Younas, J. (2015). Does globalization mitigate the adverse effects of terrorism on growth? *Oxford Economic*, 67(1), 133–156.