

Did the “China Shock” affect British voters’ attitudes and voting behavior in Brexit?



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Abstract

Recent years' political development in Europe as well as in the US reflects a growing support for anti-globalization movements, protectionism and stronger nation-states. The victory for the Leave option in the Brexit referendum further emphasized this development, since many of these views were promoted by the Leave side. Previous research has investigated the relationship between globalization in terms of increased international trade and political behavior by studying the effects on regional labor markets from trade with China. An extensive literature has grown around the method of using China's rapid economic emergence and accession to the WTO in 2001 since it constitutes an exogenous import shock to many developed countries. This study continues this literature by investigating the impact of increased international trade, measured through the so-called China import shock, on voters' attitudes and voting behavior in the Brexit referendum.

Through a cross-sectional study, this paper contributes to existing literature by including the perspective of attitudes since it makes it possible to investigate whether a vote for Leave was a way of expressing general dissatisfaction or a direct protest vote against international trade and globalization. The results of this paper suggest that no support can be found for the import shock having effect on neither voting behavior nor voters' attitudes in Brexit. Nevertheless, individual and regional factors were on the other hand found to have significant positive effect, indicating that older and less educated people in regions with higher unemployment rates were more likely to both support the Leave option and to express negative attitudes toward trade and globalization.

Keywords: *Brexit, anti-globalization, trade exposure, import competition, "China shock", voting behavior, voters' attitudes*

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1. Introduction

The development of the world has for a long time been characterized by globalization, reduction in trade barriers and more integrated markets. The role of the nation-state has been reduced in favor for the free movement of goods, people, services and capital. Nevertheless, recent years have shown signs of an opposite development, which have been accelerating in speed since the financial crisis in 2008 (Elliot 2016). The election of Donald Trump as president in the US and the result of the EU referendum in the United Kingdom, commonly referred to as the Brexit referendum, can be seen as yet another step along this development.

In both the election of President Trump and the Brexit referendum, growing opposition to globalization and economic integration and mistrust in established political institutions and politicians have been central issues. Preceding campaigns have to great extent focused on protectionism, anti-globalization and reduction in the free movement of above all people (Lamy 2018). The growing support for populist parties across Europe, opposing many of the effects of globalization, additionally emphasizes the rising anti-globalization sentiments and disapproval of further economic integration (Shuster 2016).

The victory for Leave in the Brexit referendum was arguably the result of growing public discontent with the current economic and political situation, successfully captured by the Leave campaign. Analyzing this current political event is important for understanding the consequences of globalization in general, and the driving forces behind Brexit in particular. There is a quite widespread apprehension that increased trade and import shocks can explain recent years' emergence of anti-globalization movements and protectionism. Consequently, I want to investigate whether this connection can be found in the context of the UK and Brexit since it is a recent and relevant empirical example.

Recent research has analyzed the voting in the Brexit referendum and found some support for the theory of import shocks affecting how people voted. For example, Colantone and Stanig (2018a) show that regions where the support for the Leave option was higher also had been hit harder economically by increased import competition and trade (Colantone and Stanig 2018a). Additionally, previous research has also emphasized the role of individual characteristics such as education, gender and age regarding voting behavior in the referendum (Becker et al. 2017; Goodwin and Heath 2016).

Nevertheless, the issue with analyzing voting behavior in the context of international trade and economic integration is that a vote for the Leave option might have been a protest vote against other questions, and not a causal effect of people having a negative attitude to trade and economic integration. Consequently, I want to contribute to the existing literature by adding an analysis where I look directly on the effect on individuals expressed through their attitudes toward trade and economic integration, and not solely on their voting in the referendum. By using this method, it will be possible to avoid the risk of people expressing their general dissatisfaction and instead investigate if there are causal linkages

between import shocks and attitudes to trade and economic integration. Therefore, the question I intend to answer is whether the China import shock affected British voters' attitudes and voting behavior in the Brexit referendum.

The analytical framework of this paper builds on the work by Colantone and Stanig (2018a), in turn using a method first developed by Autor et al. (2013). Globalization in terms of increased trade and import competition is analyzed by investigating how the exogenous import shock from trade with China has affected different UK regions' labor markets with various strength, and consequently how this has affected voting behavior. Developing the work of Colantone and Stanig (2018a), this paper will study the Brexit referendum with the perspective of also including how individual attitudes might have been affected by the import shock. The analysis will consequently be divided into two parts, the first one analyzing voting behavior and the second one analyzing attitudes.

This paper aims at contributing in mainly two ways. First, by analyzing such an important political event this paper contributes by investigating the causal links between international trade in terms of import competition with attitudes and voting behavior. Much research regarding Brexit has focused on individual and socio-economic factors affecting voting behavior, while this paper targets mainly trade liberalization and globalization. Second, the emergence of anti-globalization movements and populism in many developed countries emphasize the importance of deeper understanding of the driving forces behind this development. Understanding the effects of globalization is an important key for identifying the consequences and how they in turn might influence political opinions and voting behavior. The underlying interest is based on how globalization affects individuals differently and have redistributing effects, and if there are any clear connections with recent years' political development in Europe. The analysis of this paper show that I cannot find empirical support for significant effect of the import shock on neither voting behavior nor individual attitudes.

In the next section, an overview of the background to the Brexit referendum will be outlined. In the third section, the role of China in the analysis will be explained. The fourth section provides the theoretical framework for this study while previous research is presented in section five. Section six covers the empirical strategy, estimation method and included data. In section seven, the results are presented which includes a discussion of the results. Finally, section eight will conclude the analysis and provide suggestions for further research.

2. Background: UK's relationship with the EU

In June 2016 the British people voted on whether the UK should "*remain a member of the European Union or leave the European Union?*" in the historic Brexit referendum. After a dramatic electoral night, it stood clear that the British people had voted in favor of leaving the EU (The Electoral

Commission 2016). The electoral outcome sent shock waves through political establishments across Europe as well as in the UK, pointing toward an uncertain future for the UK and the EU as well as for national governments in Europe (Asthana et al. 2016). Being a member of the union and integrate in the common market involve benefits as well as sacrifices. Many factors point toward that the membership came to symbolize gains as well as losses of globalization and economic integration for the British people (Mason 2016).

The EU fundamentally aims at securing the peace and contribute to the economic integration by making the member states more united politically and economically (European Union 2017). Central for this cooperation is the function of the single market and the four cornerstones of the union; free movement of goods, services, capital and people (Vroom and de Wit 2018). Moreover, for the single market and customs union to work efficiently, the member countries' trade policy and trade negotiations with third nations are exclusively assigned to the EU (Baldwin and Wyplosz 2015, p.284-295). By being a member, the UK has been obliged to contribute to the EU budget, uphold the four freedoms and follow EU laws (HM Government 2016). Additionally, the UK cannot rule over its own trade policy (Garcia-Herrero and Xu 2016). The reduction in sovereignty in favor for access to the single market and customs union have been debated for a long time in the UK (Elliot 2016).

The UK's relationship with the EU has been a special one since the nation became a member in 1973. The country is not a member of the Economic and Monetary Union (EMU) and did not adopt the Euro currency (European Central Bank 2018). Also, it never implemented the Schengen Area Agreement, thereby restricting the free movement within the EU (European Commission 2018c). Warlouzet (2016) furthermore identifies an "outsider tradition" towards Europe and the EU in UK policy (Warlouzet 2018). The Euroscepticism has been a part of the British society for a long time and is an important factor for understanding what ultimately led to the Brexit referendum (Mason 2016).

2.1 The way towards Brexit

Since the victory for the Leave option became public, there has been much debate and analysis on the result as well as on what factors that ultimately led to the referendum. The complex process of Brexit ignited when the former prime minister David Cameron initiated the referendum back in 2013, but the underlying discussion of a possible exit out of the EU has been circulating for a much longer time.

Euroscepticism and opposition towards the EU have existed in the UK since the accession to the union back in 1973, both within the political establishment and the general public (Mason 2016). After the financial crisis in 2008, the debate on a possible British separation from the EU heated up since the Euro crisis pushed the member countries into deeper integration. Prime Minister Cameron, still supporting the membership but under re-negotiated forms, faced internal pressure from his own party as well as

from the public opinion (Stephens 2012). Soon, the term Brexit went from being only a word to a whole political movement.

At the same time, the economic development in the UK was affected by the financial crisis and by decades of industrial restructuring originating from international competition as well as domestic factors (O'Reilly 2016, p.808-812). Even though the UK economy was one of the strongest in Europe after the crisis, stagnated earnings, increasing inequalities and in-work poverty resulted in growing public frustration (Romei 2016). Additionally, there was increasing discontent with how the financial and immigrant crisis had been handled by the politicians (O'Reilly 2016, p.808-812). Froud et al. (2016) further writes about how the labor markets in the UK had changed since the 1960's, where employment within the manufacturing sector to great extent had been replaced for imports of both goods and labor in the 2000's. They emphasize the role of "left-behind" groups of society not being able to enjoy the benefits of globalization, trade and growth (Froud et al. 2016, p.814-818).

Wolfgang Münchau argues that the opposition to globalization in Europe to great extent depends on the failing of compensating the losers of trade. He refers to above all the working class and low-skilled labor losing their jobs and experiencing stagnation of real wages (Münchau 2016). Finally, one of the issues dominating the Brexit debate was the question of immigration which is deeply connected with the free movement of people established within the EU's single market. It is not difficult to imagine that it was easy for many within the "left-behind" areas to blame increasing immigration as a cause for unemployment and higher pressure on public services (Mason 2016).

In surveys performed in 2012 by YouGov about the UK's relationship with the EU, this development becomes even clearer. A majority of the British people believed that the UK does not profit financially from being a member of the EU. When asked about different policy areas, a majority wanted the British government to decide solely on rules regarding economic policy, employment rights, immigration and asylum (YouGov 2019a). When the same survey sample was asked about the current economic situation, 73 % believed British economy were in a quite or very bad shape, while a total of 53 % believed that their own financial situation would become worse over the next 12 months (YouGov 2019b). Monthly performed polls from in the years before the referendum regarding the British people's attitudes toward the EU membership also point towards declining support for membership of the EU (YouGov 2019c).

2.2 The result of the referendum

The Leave side won the referendum with the numbers 51.9 % against 48.1 %, a difference of almost 4 percentage points at the national level. The overall turnout in the election was 72.2 % with regional variation going from 76.8 % in the region South East to 62.7 % in Northern Ireland (Electoral Commission 2016). The results illustrate that the country is quite divided in this question. England and

Wales voted Leave, Scotland voted Remain and the result in Northern Ireland was even. Much work has been done to try to figure out the characteristics and factors that determined Brexit. It turns out that in general, major cities voted Remain while smaller regions voted Leave. Younger and more educated people voted Remain, while areas with older people and less educated voted for Leave (BBC 2016).

2.3 Voters' attitudes preceding the referendum

Preceding the referendum, many surveys and voting polls were made to try to apprehend the Britons' sentiments regarding the EU as well as on other globalization matters. Since the main contribution of this paper is to investigate the effects of globalization on individual attitudes as well as voting behavior in the British context, a set of questions from one of these surveys, the British Election Study (BES), will be included. The intention is to include questions that might capture issues that are central to both the debate around Brexit in particular, and international trade and economic integration in general. While a further description of these questions will be presented in section 6, they will contain topics on free trade, free movement of workers, the economic development and immigration.

3. The impact of the emerging China

This paper aims at analyzing effects of trade on voting behavior and attitudes to trade by studying the Brexit referendum. Trade between industrialized and developing countries has been strongly increasing over the last three decades (Colantone and Stanig 2018a). One of the most important actors in this development is China, a country that over the last three-to-four decades has gone through an exceptional economic growth. This growth stems from numerous reasons.

Firstly, China's structural and economic transformation from a closed to market-based economy is an essential factor for the country's overall economic development (World Bank 2018) and for the increasing competitiveness in Chinese products (Branstetter and Lardy 2006, p.12-18). Secondly, the accession into the WTO in 2001 increased trading volumes and reduced trading costs between China and its trading partners by lowering trade barriers (Autor et al. 2013) and opening up the Chinese market (Martin et al. 2003). Lastly, the comparative advantage in the manufacturing sector, partly due to its abundance in labor supply, has made China one of the most prominent producers of labor-intensive products (Autor et al. 2016a, p.7-10). As concluded by Colantone and Stanig (2018a), the fact that China has emerged as one of the world largest manufacturing supplier in a relatively short time period "*has entailed a dramatic supply shock for developed countries*" (Colantone and Stanig 2018a).

China's rapid economic development and accession to the WTO constitutes a clear example of an exogenous factor having effects on developed countries' domestic economic conditions (Autor et al.

2016a). The importance of UK's trade with China becomes apparent when studying the trade patterns between the two countries, where China accounts for 7 % of the UK's total imports (Ward 2018).

When analyzing the effects of trade and globalization, an extensive literature has grown around the method of using the "China shock" as a way of measuring an exogenous import shock and its economic and political effects. This methodology, firstly developed by Autor et al. (2013), has thereafter been used by many others to investigate both the American and European setting (Acemoglu et al. 2016, Dippel et al. 2015; Colantone and Stanig 2018a & 2018b, Autor et al. 2016b). Since the use of the "China shock" has become an established method within this field, this is the approach that I will use.

4. Theoretical considerations

The general view on free trade has been that it generates economic gains and that the overall welfare increases for the countries involved in trading. On the aggregated level, theory suggests that all countries involved in international trade will be better off due to welfare gains because of increased productivity, improved resource allocation and lower goods prices for consumers (Mayda and Rodrik 2005). Nevertheless, trade theory and especially the Heckscher-Ohlin framework also identifies winner and losers of trade on the disaggregated level (Van Marrewijk 2012, p.132-150). As argued by Colantone and Stanig (2018a), *"such welfare gains from a demand perspective are diffused among the population –and somewhat difficult to assess for public opinion– the supply-side losses of firms and jobs determine clear and visible losers of globalization"* (Colantone and Stanig 2018a, p. 203).

The Stolper-Samuelson theorem connects global trade with effects on factor prices, predicting an increase in the reward of a factor used intensively in the production of goods. Since high-income countries typically are high-skilled abundant relatively to low-wage countries, the theorem indicates that when these countries start trading, high-skilled workers will experience a wage rate increase while low-skilled will experience a wage reduction (Van Marrewijk 2012, p.103-9). Colantone and Stanig (2018a) connect this reasoning with increased import competition in developed countries due to trade with China, stating that low-skilled workers in these high-income countries will experience negative effects on wages and employment levels (Colantone and Stanig 2018a, p.203-4). In the case of the UK, reasonably counted as abundant of high-skilled workers, the theory suggests that it is primary low-skilled workers, especially within manufacturing industries, that should be affected negatively due to international trade. Undoubtedly, international trade and imports from low-income countries such as China also pressure down the consumer prices of many goods, resulting in increased welfare and benefits for the consumers (Colantone and Stanig 2018a, p.203).

4.1 The effects of globalization on political behavior

International trade arguably might divide people into high-skilled and low-skilled, or winners and losers of globalization. In line with discussed trade theory and previous empirical findings (see e.g. Autor et al. 2016, Colantone and Stanig 2018a, Källén 2017), this is mainly done through labor market changes. The intention of this study is to analyze how individuals in regions have been affected differently by these labor market changes, and if this in turn have had consequences for their voting behavior on the one hand and attitudes on the other hand.

The labor market changes might have different effects depending on if looking at individuals as consumers or as workers. As argued in the previous section, consumers in general benefits from increased international trade because of the lowering of prices. Nevertheless, these positive demand effects might be more difficult to identify for individuals as consumers than the negative supply effects for individuals as workers who lose their jobs. In turn, these negative effects tend to hit some geographic regions harder than other because of their dependence on certain manufacturing industries that are being out-performed (Colantone and Stanig 2018a, p. 203-4). This adds to the reasons for studying the effects on individuals as workers and the effects on regional labor markets.

The approach of trade theory has mostly been to study the effects of trade on factor prices in terms of wages and capital returns. As argued by Autor et al. (2013), the focus on wages might result in missing out on other aspects of labor market-adjustments due to trade. In their findings, they show that regional labor markets more exposed to import competition from low-income countries such as China experience rising unemployment rates, increased use of social benefits, lower labor-force participation rates and lower wages (Autor et al. 2013). Colantone and Stanig (2018a) continue this reasoning by discussing the importance of understanding labor market frictions when studying the effects of trade shocks in international trade theory. They argue that these frictions prevent the smooth reallocation of workers, while the adjustment of local labor markets has been slow, adding to the strength of the negative effects on especially manufacturing workers and industries in certain regions (Colantone and Stanig 2018a).

The general approach is that international trade and globalization lead to regional labor market changes that differ in magnitude depending on the initial industrial structure. Regions more exposed to trade and import competition will consequently experience more extensive effects. In turn, individuals are affected differently because of these regional labor market changes. Applying the theoretical framework on Brexit, increased trade with China constitutes an exogenous trade shock influencing UK regions differently. In turn, this might have causal effects on the Brexit referendum in the sense that UK citizens used the Leave option as a way of expressing discontent of the current economic situation in their region.

Colantone and Stanig (2018a) identify three main mechanisms through which higher import competition, leading to declining economic performance in certain UK regions, could have increased

the support for Brexit. Firstly, a vote for Leave was a way of expressing disapproval on current political establishments and political elites. Secondly, a vote for Leave was a vote against economic integration and trade liberalization and in favor of re-strengthening the nation-state. Lastly, a vote for Leave was a vote against further immigration (Colantone and Stanig 2018a, p.207-208).

The first option relates to the public discontent of the political elite in Brussels, where the Leave campaigners argued that political decisions were taken by incumbents not elected by the British people. The distance both emotionally and geographically to the EU, combined with growing dissatisfaction towards British politicians, paved the way for the Leave victory. Important to remember is that the referendum came at a time when discontent with current political establishments and increasing support for populist alternative parties were emerging all over Europe as well as in the US (Mason 2016). As argued by Colantone and Stanig (2018a), people do not need to logically connect import competition as their main problem. Instead, the Leave option was as a way of generally expressing discontent toward years of economic decline.

The second mechanism refers to people being able to identify the causal effect of import competition because of globalization onto their own problems. This view comes from the perception that the problems of increased unemployment and economic downturn in regions dominated by manufacturing industries originates mainly from international trade (Colantone and Stanig 2018a, p.207-208). The third mechanism relates import competition to immigration, and the question on whether British people can admit free movement of people to also get free trade. Here, the Leave campaign related many of the UK's problems regarding unemployment, wages and education to increased immigration, claiming that it was time to take back the control (Mason 2016).

5. Previous research

5.1 Globalization, import competition and protectionism

The economic and political science literature on the effects of trade liberalization on economic and political outcomes offers a broad spectrum of explanations and causalities. Compared to many other fields in economics, there is a wide consensus among economists that trade on the aggregate level is a positive phenomenon increasing the welfare of a country (Mayda and Rodrik 2005). Nevertheless, most researchers also agree that trade liberalization have redistributing effects on economic conditions at both the individual and regional level (Autor et al. 2013; Autor et al. 2016a; Mayda and Rodrik 2005), which consequently might have impact on political behavior (Colantone and Stanig 2018a; Autor et al. 2017).

To analyze the effects of global trade on political opinions and voting behavior, one main channel through which this can be done is the labor market. Autor et al. (2013) examine labor market effects in

the US caused by increased import competition. The methodology developed in their paper have become central to research within this field. The model estimates the effects on regional labor markets from the import shock created because of China's economic emergence. They show that the increase in imports has resulted in higher unemployment in especially manufacturing industries and lower overall wages in regions carrying higher levels of manufacturing industries (Autor et al. 2013).

In line with this work, Acemoglu et al. (2016) examines the effects of import competition from China on the US labor market. Their findings include that imports from China have had negative effects on US manufacturing employment and on the general employment growth. Their analysis estimates that without the Chinese import shock, approximately 10 % less of the total employment decline in the manufacturing sector would have occurred (Acemoglu et al. 2016). These findings are confirmed by Autor et al. (2016a), building their analysis on the same method. They find that exposure to import competition from China have effect on import-competing manufacturing sectors but also on non-manufacturing sectors with reductions in employment, wages and consequently average household earnings (Autor et al. 2016a).

Pierce and Schott (2015) links the lowering of trade barriers between China and the US during the 2000's to the decrease in manufacturing employment in US industries more exposed to trade (Pierce and Schott 2015). Che et al. (2016) studies the effect of trade with China on US elections and show that there is a correlation between those experiencing negative effects of trade and increased support for politicians promoting redistribution program and protectionist views (Che et al. 2016). Mayda and Rodrik (2005) study how globalization affects individuals' opinions toward trade. By looking at two cross-country surveys, they find that both economic and non-economic factors determine these attitudes. Individuals less exposed to import competition and with higher levels of human capital such as education are more supportive of free trade and globalization (Mayda and Rodrik 2005).

Building on the methodology by mainly Autor et al. (2013), Colantone and Stanig (2018b) applies this in the European setting. Examining the effects of globalization on both individual voting behavior and electoral results, they find that higher levels of import competition lead to increased support for nationalist, radical-right and protectionist parties, and a general shift to the right on the political scale (Colantone and Stanig 2018b). In her interesting master thesis, Källén (2017) continues this work by analyzing the impact of import competition on political views based on survey questions in nine EU countries. Källén concludes that manufacturing workers reduce their support for political institutions when the imports increase, compared to non-manufacturing workers (Källén 2017).

5.2 Understanding Brexit

During recent years, many papers have tried to analyze the result in the Brexit referendum. Becker et al. (2017) show that areas in the UK with poorer economic performance and lower levels of education,

income and employment to higher degree voted Leave. Specific exposure to the EU, particularly through immigration and trade, had on the other hand no significant effect (Becker et al. 2017). Goodwin and Heath (2016) reach the same conclusion regarding socio-demographic factors with the addition that there is also a positive relationship between age and the share of Leave votes (Goodwin and Heath 2016).

Langella and Manning (2016) emphasize the role of local areas as well as individual characteristics on the election turnout, finding that a decrease in employment within industrial sectors such as construction and manufacturing is associated with an increase in the share of Leave votes (Langella and Manning 2016). Colantone and Stanig (2018a) makes a comprehensive analysis on the Brexit referendum, building their analysis on the framework by Autor et al. (2013). Confirming the work of Becker et al. (2017) and Goodwin and Heath (2016), they find that older, less educated and poorer people tended to vote Leave, while women and students voted Remain. Furthermore, they found a positive relationship between the China import shock and the support for Leave (Colantone and Stanig 2018a).

6. Empirical strategy

The objective of this paper is to examine the effects of globalization in terms of increased trade on voting behavior on the one hand, and political attitudes on the other hand. This will be applied in the context of Brexit, by studying the effects from the import shock through regional labor market changes and how this affects voting behavior and attitudes. To be able to investigate this, a cross-sectional regression analysis will be performed, since it allows for a study of a phenomenon (the referendum) at a specific point in time. To capture the import shock, I will exploit China's accession into the WTO in 2001 as an exogenous trade shock. This follows the methodology established by Autor et al. (2013).

In line with the analytical framework formulated in previous sections, I will analyze voting behavior and attitudes looking at the regional effects in the UK resulting from the import shock. This continues the work of Colantone and Stanig (2018a) and extends it by including the approach of analyzing attitudes. The following sections will begin by explaining the regression framework, estimation model and included variables that will be used in the analysis. This will be followed by a description of the empirical strategy that will be used. Finally, the included data will be described followed by a brief discussion of the possible limitations.

6.1 The regression framework

A theoretical framework has been developed by Autor et al. (2013) that connects the China import shock with regional effects on labor markets and political outcomes. Building on this previous research, the following equation will be used in the first part of my analysis, looking at the Brexit referendum result:

$$LeaveShare_i = \beta_1 + \beta_2 ImportShock_i + \beta_3 X_i + \varepsilon_i$$

Where i is the index regions.

To measure voting behavior, the dependent variable will be $LeaveShare_i$. The main explanatory variable is the $ImportShock_i$ capturing the magnitude of the import shock in each region. This variable will be explained further in section 6.2.3.

Additionally, for robustness checks I will include a vector of control variables, X_i , capturing regional economic and demographic factors that might have affected the voting behavior of UK citizens. First, I will follow the strategy of Colantone and Stanig (2018a) and include the share of immigrants since it was one of the most discussed subjects during the campaigns preceding the referendum. Second, I will control for median age, share with below secondary education, household income per capita and unemployment rate. These are included since previous research has found that there is a correlation between these individual characteristics and the voting behavior in the referendum. For example, older, less educated people tended to vote in favor for Brexit, whereby it is motivated to control for these factors (see e.g. Becker et al. 2017). Data for all control variables are from 2015 because it allows for the import shock (measured between 2000-2007) to have enough time to affect each region's labor market, while still being close to the year of the referendum.

The second part of the study will analyze the British voters' attitudes to a set of five questions that concern topics connected with globalization and international trade. Additionally, these topics have according to previous research had a prominent role in the context of Brexit. The regression model measuring the effects on political attitudes is very similar to the one analyzing the Leave share, with the exception that the dependent variable is substituted as follows:

$$Attitudes_i = \beta_1 + \beta_2 ImportShock_i + \beta_3 X_i + \varepsilon_i$$

Where the variable $Attitudes_i$ measures individuals' responses to the included survey questions clustered into each UK regional level indicated by i , while the explanatory variables are the same to make the analysis and interpretations clear and straightforward.

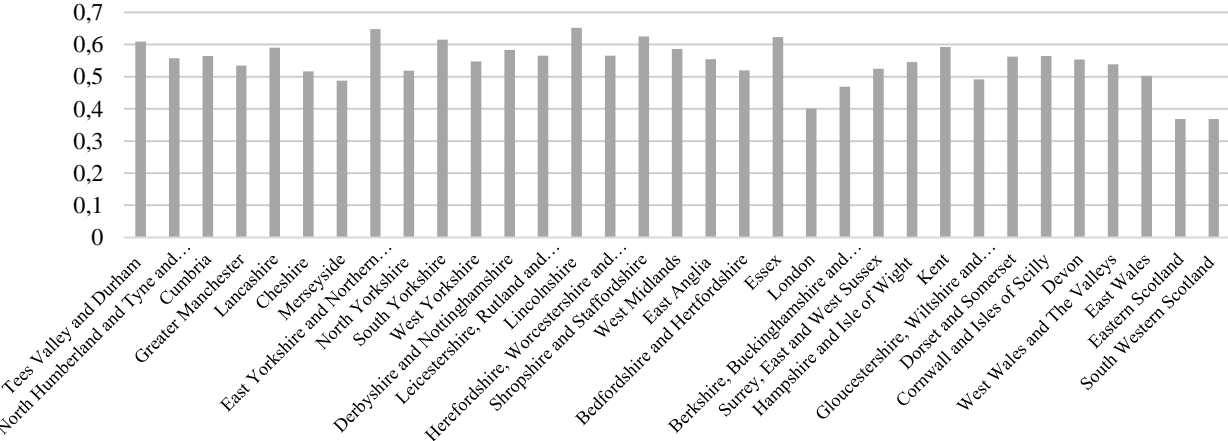
6.2 Included variables

The Brexit referendum is a highly relevant case to study in the context of globalization and international trade since these two subjects were greatly discussed in the campaigns and debates preceding the referendum. Supporting the Leave option might have been a way of expressing many different views, from expressing dissatisfaction with the general economic and/or political situation to protest vote against globalization matters such as international trade or immigration. To investigate whether the import shock had an impact on the voting behavior in the referendum, and consequently if supporting

the Leave option was a way of expressing general dissatisfaction or toward certain matters connected with globalization, my analysis will be performed in two parts. The first part will have the Leave share in the referendum as the dependent variable to analyze if the import shock had causal impact on the British voting behavior. In the second part, the dependent variable will be voters' attitudes, since it will allow for analyzing the more direct effects of the import shock on British people's opinions to trade and globalization.

6.2.1 Leave share

Diagram 1 – The share of Leave votes in the Brexit referendum



Note: This diagram shows the Brexit referendum result. The share of Leave votes out of the total valid votes for each included UK region is illustrated with the grey bars, measured as a percentage share which is indicated by the left vertical axis.

The dependent variable in the first part of my analysis, the $LeaveShare_i$, measures the share of votes for the Leave option out of the total valid votes in each included UK region. Diagram 1 presents the referendum results and show that the support for Leave is quite varied across the different regions, going from the lowest support of 36.8 % in South Western Scotland to the highest of 65.2 % in Lincolnshire.

6.2.2 Attitudes

The second part of my analysis intends to examine the British voters' attitudes to a set of five topics connected with globalization and international trade. The dependent variable $Attitudes_i$ is used to measure these attitudes and is constructed from five different survey questions to capture attitudes that can be interpreted as more negative to these topics. As discussed, the survey questions have been taken

from the BES Wave 7 survey. The questions included have originally been asked on the individual level, but have been clustered together depending on which region the individual lives in. The survey has been performed as a multiple-choice survey, whereas the individuals could choose between a set of defined responses for each question. The questions chosen aims at covering British voters' attitudes to the following topics; free trade, free movement of workers, the development of the household economy, the development of the general economy and immigration. In the following sections, these questions will be referred to as Q1 – Free trade, Q2 – Free movement, Q3 – Household economy, Q4 – General economy and Q5 – Immigration to make the analysis as clear as possible.

Table 1 – Survey questions included

Question	Available responses	Responses included
Q1 - Free trade with Europe	1 Good for Britain 2 Neither good nor bad for Britain 3 Bad for Britain 9999 Don't know	3 - Bad for Britain
Q2 - Allowing the free movement of workers within Europe	1 Good for Britain 2 Neither good nor bad for Britain 3 Bad for Britain 9999 Don't know	3 - Bad for Britain
Q3 - How does the financial situation of your household now compare with what it was 12 months ago? Has it:	1 Got a lot worse 2 Got a little worse 3 Stayed the same 4 Got a little better 5 Got a little better 9999 Don't know	1 - Got a lot worse 2 - Got a little worse
Q4 - How do you think the general economic situation in this country has changed over the last 12 months? Has it:	1 Got a lot worse 2 Got a little worse 3 Stayed the same 4 Got a little better 5 Got a little better 9999 Don't know	1 - Got a lot worse 2 - Got a little worse
Q5 - Do you think immigration is good or bad for Britain's economy?	1 Bad 2 3 4 5 6 7 Good 9999 Don't know	1 - Bad 2 - 3 -

Note: This table shows the included questions in the second part of my analysis, how the survey questions and available answers were exactly defined, and which responses that have been included to calculate the dependent variable on attitudes.

Table 1 shows the five questions included in the survey and which responses that have been used to define my dependent variable on attitudes. To get a further understanding of how I have constructed the dependent variable, regarding e.g. Q1 – Free trade I have summarized all respondents in each region that responded that free trade with Europe is bad, and divided it with the total respondents in the same region. With this strategy, the dependent variable will be defined as the percentage share that believe free trade with the EU is bad, or in other words that has a negative attitude to free trade. The same

method has been used for each question and topic, with the intention to capture if and how these negative attitudes differ regionally and if there is a correlation with the import shock.

6.2.3 The import shock

Connected to their theoretical framework, Autor et al (2013) develop a measurement for the regional industry-specific import shock from trade with China. The regional variation in the strength of the import shock will be the main explanatory variable (Autor et al 2013). Building on the same methodology and theoretical framework, the import shock will be measured as follows:

$$\text{ImportShock}_{it} = \sum_j \frac{L_{ij}}{L_i} \times \frac{\Delta \text{ImportChina}_{jt}}{L_j}$$

Where i represents UK regions, t year and j manufacturing industry sectors.

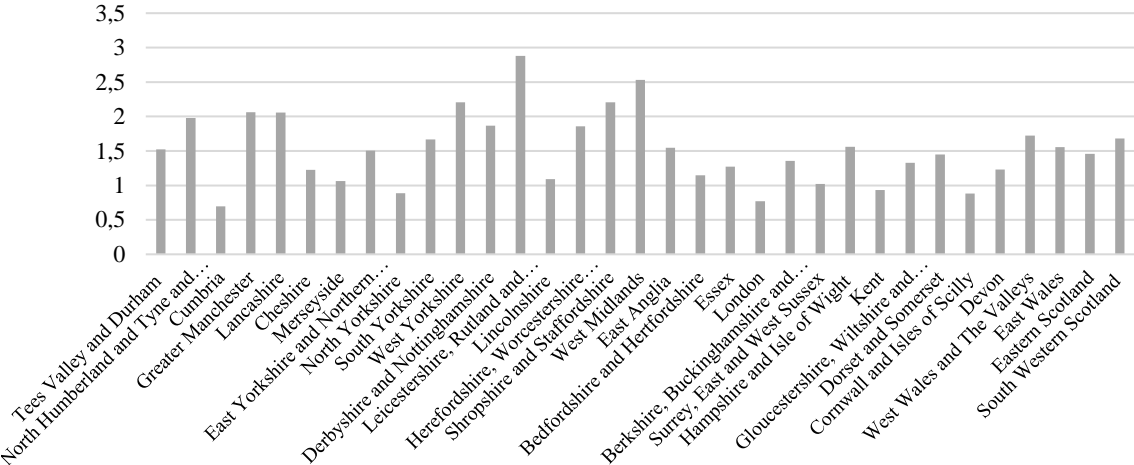
$\Delta \text{ImportChina}_{jt}$ is the national-level change in imports from China to the UK industry sectors over the period 2000-2007. This is equal to the difference between imports in manufacturing industry sector j at the start and end of the sample period, measured in thousands of USD. This is normalized by the initial number of workers in each industry, L_j , to identify the causality between the level of imports and the initial level of employment in the same industry. In order to find the corresponding effect in the specific region this value is weighted by ratio $\frac{L_{ij}}{L_i}$, which is the initial numbers of workers in the specific region i and industry j divided by the initial total number of workers in the region i . The variation in strength of the import shock across regions originates from the initial employment structure in each region.

The interpretation of this variable is quite intuitive. For any given change in national-level imports to UK from China, regions with higher share of workers employed in manufacturing industries more exposed to imports will hence experience a stronger import shock. Consequently, the value of ImportShock_{it} will be higher in the regions more affected by import competition. As discussed by Colantone and Stanig (2018a), the regional variation in the strength of the import shock may originate from mainly two sources. Firstly, regions with higher initial share of labor within manufacturing industries will experience a stronger import shock (higher value of ImportShock_{it}). Secondly, for a given share of manufacturing workers, the shock is going to be stronger in regions where more workers are employed in industries where imports from China have increased the most (e.g. electronics).

Since the analysis is cross-sectional in nature, the ImportShock_{it} , is transformed into a single value measurement for my final regression framework. This results in the variable ImportShock_i capturing the increase of Chinese imports between 2000-2007 in each region and the corresponding strength of the import shock as illustrated in diagram 2. To get a further understanding for this variable, the average value is 1.57, indicating that the average growth in imports from China per manufacturing worker during

my sample period is 1570 USD. Building on the discussion above, the theoretical hypothesis is that the import shock will be positively correlated with the share of Leave votes as well as with the attitudes in the survey questions.

Diagram 2 – The import shock



Note: This table shows the strength and variation in the import shock across each included region. The left vertical axis indicates the size of the import shock.

6.2.4 Endogeneity – the use of an instrument variable

The theoretical framework as described above builds on the assumption that the China import shock is exogenous to the UK. If there on the other hand would exist demand and/or supply shocks endogenous to the UK this would lead to positive effects on the UK labor market and consequently reduce the negative effects that might stem from the exogenous import shock. An example used by Colantone and Stanig (2018a) on this matter is if there is correlation between the political landscape of a certain region and imports in the same region. This might be the case if e.g. political leaders are taking on measures to protect some industries that are important in certain regions while allowing more imports in some other industries and regions. This could in turn lead to that the import shock would affect regions with different strength because of endogenous (political) factors and not solely because of exogenous supply conditions in China (Colantone and Stanig 2018a, p.205-206).¹

To avoid the risk of endogeneity of the trade shock, it is possible to construct an instrument variable by using the increase in Chinese imports to the US. Using the same measurement as before, I construct the following instrument variable:

¹ Even though this example might be quite far-fetched since regional politicians seldom have impact on trade policy, it might be used as a way of explaining the intuition behind the risk of endogeneity in this context

$$\text{ImportShock}_{US,it} = \sum_j \frac{L_{ij}}{L_i} \times \frac{\Delta \text{ImportChina}_{USjt}}{L_j}$$

Here, $\Delta \text{ImportChina}_{jt}$ is substituted for $\Delta \text{ImportChina}_{USjt}$, which is also calculated over the sample period by taking the difference in imports to the US between 2007 and 2000 in industry j . The aim with using this variable is to identify the regional variation in imports from China because of exogenous factors, and not from domestic British factors. There is still a risk that the UK and the US face the same industry specific shock, which would cause bias on both import shock variables. Autor et al (2013) test for this by including not only imports but also relative exports between the US and China, concluding that they manage to reach very similar estimates for the import shock. This suggests that there is no simultaneous import shock happening in the two countries, and that the instrument variable approach is a suitable one for handling the risk of endogeneity (Autor et al 2013, p. 2129-2131).

6.2.5 Control variables

Immigrant share

The immigrant share is counted as the share of foreign-born residents out of the total population in each region. To follow the strategy of Colantone and Stanig (2018a) I will include this variable to control for whether the share of immigrants regionally had any effect on the voting behavior in the referendum or on individual attitudes. The question of immigration was greatly debated in the campaigns preceding the Brexit referendum which further motivates the use of this variable (Inglehart and Norris 2016 p.6-7). The hypothesis is that the share of immigrants of a region will be positively correlated with the share of Leave votes and the attitudes in the survey questions.

Median age

The aim of including median age is to control whether the variation in median age of the population in a certain region is correlated voting behavior and attitudes, since previous research has shown that age affected how the British people tended. By including this variable, it will be possible to control for whether the regional median age can explain any variation in dependent variables of the first and the second part of my analysis. The hypothesis based on previous research is that the median age will be positively correlated with the Leave share and attitudes in the survey questions.

Share with below secondary education

Empirics have shown that education level affected how people voted in the Brexit referendum (Dos-Santos and Diz 2017). Additionally, research has also shown that education have had effect on how

individuals form their opinions on topics regarding globalization such as trade (Mayda and Rodrik 2005). The variable *Share with below secondary education* measures the share out of a population with lower education level, and the expectation is that this variable will be positively correlated with higher share of Leave votes as well as the attitudes in the survey questions.

Household income per capita

To capture the economic state of a certain region, *Household income per capita* is included as a way of measuring the economic status on the regional and individual (average) level. As shown by Mayda and Rodrik (2005), the individual's relative economic status is negatively correlated with protectionist views and anti-free trade sentiments (Mayda and Rodrik 2005, p.1408-1409). Thus, the presumption is that household income per capita will be negatively correlated with the Leave share and with the attitudes in the survey questions.

Unemployment rate

The last part of the set of control variables is the regional unemployment rate, measured as the share of unemployed out of the total labor force. It is included since the unemployment level might capture both one of the main subjects of this study, the labor market, and because it says something about the economic and welfare conditions of the individuals as well as the regions. Empirics have shown that higher unemployment level are associated with a higher share of Leave votes (Becker et al. 2017). Hence, the unemployment rate is expected to be positively correlated with the share of Leave votes and attitudes in the survey questions.

6.3 Econometric strategy

In the first part of the analysis, the dependent variable will be the regional share of Leave votes which will be analyzed with the regional import shock as the main explanatory variable and then controlled for by the set of control variables. In the second part of the analysis, I will run the same regression model but with the discussed attitudes as dependent variable. Lastly, a discussion and interpretation of these results will be performed. The main method of estimation will be Ordinary Least Squares (OLS). I will test the robustness by running the regressions with the set of control variables and further by estimating the regressions using a Two-Stage Least Square (2SLS) model to include an instrumental variable approach and a Fractional Logit model.

6.3.1 Instrument variable approach

The Two-Stage Least Squares (2SLS) is a commonly used method in econometrics to estimate variables in linear regressions when there is a risk of endogeneity, or so-called variable-bias in the equation estimation. The most straightforward way of doing this is by classifying an instrument variable and do the estimation in two stages, first by regressing the original variable on the instrument variable and then by estimating the regression model with the instrument variable (Angrist and Imbens 1995). The 2SLS regression will therefore be included to deal with the possible risk of endogeneity. Instead of using the variable for the import shock measured with imports from China to the UK, the instrument variable calculated with imports from China to the US will be used, defined as followed for the first part of my analysis:

$$LeaveShare_i = \beta_1 + \beta_2 \text{ImportShock}^{US}_i + \beta_3 X_i + \varepsilon_i$$

And for the second part:

$$Attitudes_i = \beta_1 + \beta_2 \text{ImportShock}^{US}_i + \beta_3 X_i + \varepsilon_i$$

6.3.2 Fractional Logit

When the dependent variable can take any value between zero and one, which is the case for both my outcome variables, OLS may not be an appropriate estimator. Papke and Woolridge (1996) have developed an estimation method for regression models that includes fractional dependent variables called *Fractional Logit*. The motivation of using this model is that it makes it possible to handle data that might take on the extreme values of zero and one apart from all the values included in between (Papke and Woolridge 1996). In the OLS model, the assumption is that the dependent variable is continuous while my dependent variables are bounded between zero and one. Hence, the Fractional Logit is included to test the robustness of the OLS results.

6.3.3 Econometric discussion

For the results to be interpreted and analyzed correctly, some tests are needed to be performed to assure this. Since the study is completely cross-sectional, there is no variation in time and therefore no risk of autocorrelation or stationarity whereby no tests are needed for this.

A test for multicollinearity has been made to find out whether there is any linear relationship between any of the explanatory variables. As stated by Dougherty (2016), multicollinearity exists in most regressions making it difficult to completely avoid. Nevertheless, higher levels of multicollinearity results in larger standard errors, which will make the risk of interpreting the coefficients wrong higher. The multicollinearity test was done with a Variance Inflation Factor (VIF) test in Stata. Values above

10 imply that there are signs of multicollinearity and that the variables might be creating misleading results (Baum 2006, p. 85). In the test², the highest value reached is 5.6, indicating that there are no larger problems with multicollinearity. The correlation matrix³ presents high correlation between some of the explanatory variables, but however high correlation in itself does not mean that the coefficient estimates will be incorrect (Dougherty 2016, p.171). Since the VIF values are rather low and the same variables have been used in previous research, the explanatory variables will be kept.

The Breusch-Pagan⁴ and White's test⁵ were used to test for heteroscedasticity in the data. The results indicate that there are no problems with heteroscedasticity since the null hypothesis of homoscedasticity was not rejected in any of the regressions. Nevertheless, the regressions were also run with robust standard error, showing no notable difference in neither significance level nor values of the coefficients.

6.4 Data

The data used in this analysis has been collected from several databases. Some difficulties have occurred when data from different sources was not divided under the same regional or industrial classification, resulting in the need to manually classify the data to fit into the same regression model. For the regional division of all included variables except data on imports from China, the Nomenclature of Territorial Units for Statistics (NUTS) official geographical classification level from Eurostat has been applied. The system is built on the hierarchal division of European countries' territories into three levels (European Commission 2018a). In this study, the NUTS 2 classification level has been used⁶.

The data on voting results has been retrieved from the Electoral Commission in the UK. The data on individual attitudes, the dependent variable of the second part of my analysis, has been collected from the British Election Study (BES). The study has been running since 1964, covers all UK regions except Northern Ireland and focus on question regarding political attitudes and behavior. For this study, the Wave 7 of the BES 2015 has been chosen since it includes specific questions on trade and the EU and because the survey was performed before the Brexit referendum (British Election Study 2018b).

Regional employment data on industrial level, as well as total employment data, has been retrieved from the Eurostat's database. The industrial classification is based on Eurostat's NACE Rev 1.1 industry classification⁷. The data on annual imports at industrial level from China to the UK and the US has been

² The results for the VIF test can be found in section A.5 in the appendix

³ The correlation matrix can be found in section A.2 in the appendix.

⁴ Results for Breusch-Pagan test (p-values): 0.2755, 0.7075, 0.4709, 0.9021, 0.2565, 0.7096 (Leave share and Q1-Q5 as dependent variables respectively)

⁵ Results for White's test (p-values): 0.3203, 0.3679, 0.5730, 0.3539, 0.7348, 0.4579 (Leave share and Q1-Q5 as dependent variables respectively)

⁶ See appendix section A.3 for further details on the UK NUTS 2 classification system and the NUTS 2 regions included in this study

⁷ See appendix section A.4 for further details on NACE Rev 1.1. and the manufacturing industries included in the study.

downloaded from OECD Statistics database. Since OECD's database uses another industrial classification system, ISIC 3, the data on imports had to be converted into NACE Rev. 1.1. The data on immigrant share at the regional level in the UK comes from Office for National Statistics (ONS). A separate set of data for Scotland had to be extracted from National Records of Scotland since the data was not available at the regional level in the ONS database. The data for the control variables on median age, education level, household income per capita and unemployment rate at the NUTS 2 regional level has been collected from Eurostat's database. For further details and complete references of all data used, see appendix section A.1.

Table 2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Leave share	33	0.5438	0.0692	0.3678	0.6516
Q1 - Free trade with the EU	33	0.0575	0.0135	0.0360	0.0884
Q2 - Free movement of workers	33	0.4364	0.0422	0.3437	0.5065
Q3 - Household economy	33	0.3170	0.0282	0.2642	0.3736
Q4 - General economy	33	0.4113	0.0460	0.3285	0.4924
Q5 - Immigration	33	0.4196	0.0548	0.2933	0.5049
Import shock	33	1.5216	0.5129	0.6954	2.8809
Immigration share	33	0.0979	0.0604	0.0389	0.3666
Import shock US	33	12.368	3.9282	4.2834	20.270
Median age	33	41.576	2.8376	34.4	46.4
Share with below secondary education	33	0.2076	0.0325	0.1510	0.2950
Household income per capita	33	25287.1	4636.55	19942.7	39586.8
Unemployment rate	33	0.0513	0.0147	0.0320	0.0850

Note: This table gives an overview of all included variables and the descriptive statistics of mean, maximum and minimum values, as well as of the number of observations and the standard deviations.

Table 2 shows the descriptive statistics for all included variables. Regarding the mean for the Leave share, it is higher than the national referendum result (51.9 %) since the statistics only cover the regions included in the sample and not all UK regions⁸. For example, Northern Ireland which had a lower share of Leave votes is not included whereby the mean increases for the remaining regions.

6.4.1 Data limitations

A general complication for this study has been to find data that fits into both the regional and industrial classification needed to follow the theoretical framework by Autor et al. (2013), and that also captures the relevant time period. Mainly three limitations can be observed in this study regarding the data.

Firstly, some of the NUTS 2 regions have changed over the sample period leading to difficulties with merging the data on the referendum results with the data on employment. Most of the regions perfectly

⁸ Also, since the mean of the Leave share in the descriptive statistics is calculated from the percentage share of Leave votes in each region, the calculated mean for Leave share in table 2 might be slightly misleading since it is a "mean of several means".

fit into the new classification making it enough to aggregate these regions. Nevertheless, it has resulted in a small reduction of the sample size since I had to exclude some regions where there was no clear way of transforming the old regions into the new ones. Additionally, a few regions had to be excluded because of missing labor market data on industrial level. Combining these two factors, the sample was reduced from the initial 40 NUTS 2 regions into the 33 NUTS 2 regions where all needed data was possible to collect and merge.

Secondly, labor data on regional and industrial level has only been available for all regions from the year of 2000 in Eurostat's database resulting in that this is the start of the sample period for the import shock measurement. Since China became a member of WTO in 2001, it would have been preferable to begin the sample period earlier to capture China's emergence in a more complete way. Also, there is a risk of bias since it would be possible for the labor markets as well as goods market to include expectations about China's entrance into the WTO in 2001. This could in turn lead to that the displacement of workers might already have started in sectors that were expected to be negatively affected by the increase in Chinese imports. Nonetheless, as argued by Autor et al. (2016a), the large and rapid increase in Chinese trading volumes and the country's emergence as an economic international power was unexpected by many economists as well as by the market. This implies that few actors anticipated the growth in Chinese trade flows (Autor et al. 2016a, p.209-210).

Lastly, because of limited access to data, this study had to be performed at the NUTS 2 regional level making the sample drastically reduced from the NUTS 3 regional classification including 174 regions to the 40 (and in the end 33) regions included at the NUTS 2 level. This smaller number of observations results in difficulties in finding both efficient estimates and significant results (Verbeek 2012). A way of handling this would be to collect data at a more disaggregated level, preferably on the NUTS 3 regional level. Since it was restricted access to this data it was not possible to collect it for this study.

7. Empirical results

Import competition and import shocks are recurrently used as a way of explaining the emergence of increased support for anti-globalization movements and protectionism. The theory previously discussed suggests that increased trade exposure affects labor markets negatively in import competing industries. This theoretical approach has thereafter been used to connect depressed labor markets with political behavior. Since a vote in favor of Brexit not necessarily meant a vote against trade and economic integration, this study aims to contribute to existing literature by investigating the effects of trade and import shocks on people's attitudes to trade and economic integration, in addition to examining the effects of import shocks on how people voted.

In the following sections, this will be done by examining the effects of the China import shock on the Leave share on the one hand, and on individual attitudes on the other hand. To investigate individual attitudes, I have included the set of survey questions and responses as outlined in section 6.2.2. By including these questions, it will be possible to examine more directly the effects of trade and avoid the risk of people solely using the Brexit referendum as a way of expressing general dissatisfaction. The first section will present a description of the baseline results. In the second section, the results of the robustness analysis including the 2SLS and the Fractional Logit approach will be described. In the last section, a discussion of the results will be performed.

7.1 Baseline results

The baseline model of this analysis is estimated using an OLS regression. The regression analysis has been performed in the following way. First, I have tested the correlation of the dependent variable in part one and two of my analysis with the main explanatory variable, the import shock, which can be found in column 1 in each table. Thereafter, I have added the set of control variables one by one in column 2-6 to be able to compare the effect of each explanatory variable on the dependent variable.

7.1.1 Baseline results from part one – the Brexit referendum

Table 3: Effects on the Leave share

VARIABLES	(1) Leave share	(2) Leave share	(3) Leave share	(4) Leave share	(5) Leave share	(6) Leave share
Import shock	0.028 (0.243)	0.028 (0.223)	0.052* (0.055)	0.026 (0.251)	0.030 (0.216)	0.022 (0.389)
Immigrant share		-0.405** (0.042)	0.003 (0.992)	0.497* (0.077)	0.412 (0.206)	0.408 (0.211)
Median age			0.012* (0.100)	0.021*** (0.002)	0.021*** (0.002)	0.017** (0.023)
Share with below secondary education				1.460*** (0.000)	1.616*** (0.002)	1.715*** (0.001)
Household income per capita					0.000 (0.601)	0.000 (0.953)
Unemployment rate						-1.025 (0.333)
Constant	0.501*** (0.000)	0.541*** (0.000)	-0.027 (0.936)	-0.722** (0.031)	-0.819** (0.036)	-0.567 (0.219)
Observations	33	33	33	33	33	33
R-squared	0.044	0.169	0.244	0.532	0.537	0.554

*Note: This table presents the relationship between the dependent variable, the Leave share, and the explanatory variables. The statistical significance of each coefficient in the model is denoted by ***, ** and * with the corresponding significance level 1 %, 5 % and 10 %. P-values are presented in the parentheses⁹.*

⁹ The following tables 4-11 are structured in the same way as table 3, with statistical significance of each coefficient denoted by ***, ** and *, corresponding significance level 1 %, 5 % and 10 % and P-values presented in the parentheses. Therefore, I will not provide this information for each table.

Table 3 present the result for the first part of my analysis. In column 1, where the only included explanatory variable is the import shock, the estimated coefficient is statistically insignificant. Thus, I cannot find any support for the hypothesis that the import shock would increase the share of Leave votes. When I also include the immigrant share in column 2, this new variable is found to have a statistically significant effect and negative coefficient, suggesting that regions with larger immigrant shares are less likely to vote in favor of Brexit. This seemingly unexpected result is not in line with my hypothesis. Nevertheless, it confirms previous research where a higher share of immigrants is associated with a lower support for the Leave option (see Becker et al. 2017). However, the coefficient for the import shock is still insignificant.

In column 3, the variable median age is added and shows a significant positive effect on the share of Leave votes at the 10 % significance level. This indicates that an increase in one year of median age in a region increases the share of Leave votes with 0.012 percentage points in the same region. This result confirms the hypothesis that higher age is positively correlated with a higher share of Leave votes, and what previous research have shown. Additionally, the coefficient for the import shock is now found to be significant positive at the 10 % significance level which is in line with my prediction. In column 4, the results show that the coefficient for the share with below secondary education is positive and statistically significant at the 1 % significance level. This suggests that if the share with below secondary education would increase with 1 percentage point in a region, the share of Leave votes would increase with 1.46 percentage points. This result confirms both the expectation that lower education levels are positively correlated with a higher support for Leave, and what previous literature have found.

In column 5, the coefficient for household income per capita shows no significant effect on the Leave share. The hypothesis was that higher income levels would lead to a smaller support for Leave, but the regression does not confirm this expectation. Nevertheless, the significance for the coefficient for the median age increases to the 1 % significance level while the share of below secondary education still suggests positive significant effect at the 1 % significance level. In the final column, the variable unemployment rate is included but the estimated coefficient shows no significant effect. However, the coefficient for the import shock is still insignificant, while the coefficients for the Median age and Share with below secondary education still suggest significant positive effects.

7.1.2 Baseline results from part two – Attitudes

The results from the second part of my analysis, covering individual attitudes, is presented in Table 4-8. I will go through the results from each included survey question individually, whereby each table presents the regression results for each survey question as the dependent variable¹⁰.

¹⁰ See section 6.2.2 for complete description of each survey question.

Table 4: Effects on Question 1- Free trade with the EU

VARIABLES	(1) Free trade	(2) Free trade	(3) Free trade	(4) Free trade	(5) Free trade	(6) Free trade
Import shock	0.002 (0.608)	0.002 (0.613)	0.003 (0.566)	0.001 (0.882)	0.000 (0.963)	0.001 (0.908)
Immigrant share		-0.034 (0.402)	-0.019 (0.776)	0.020 (0.779)	0.033 (0.701)	0.034 (0.703)
Median age			0.000 (0.774)	0.001 (0.476)	0.001 (0.497)	0.001 (0.501)
Share with below secondary education				0.124 (0.199)	0.101 (0.424)	0.095 (0.475)
Household income per capita					-0.000 (0.775)	-0.000 (0.872)
Unemployment rate						0.064 (0.830)
Constant	0.054*** (0.000)	0.057*** (0.000)	0.036 (0.626)	-0.019 (0.820)	-0.005 (0.958)	-0.021 (0.866)
Observations	33	33	33	33	33	33
R-squared	0.009	0.032	0.035	0.091	0.094	0.095

Note: This table shows the individual (but regionally clustered) responses to the survey question Q1 – Free trade as the dependent variable and the set of explanatory variables.

As seen in table 4, the first regression in column 1 shows that the coefficient for the import shock has no significant effect on Question 1 – Free trade. This suggests that the share of the respondents believing that free trade with the EU is bad has not been affected by the import shock. The same holds for all control variables included in column 2-6 since no significant results are found. The conclusion that can be drawn is that none of the coefficients for the explanatory variables present significant results, and consequently that no variation in the dependent variable can be explained by the included explanatory variables in the model.

Table 5: Effects on Question 2 – Allowing the free movement of workers within the EU

VARIABLES	(1) Free movement	(2) Free movement	(3) Free movement	(4) Free movement	(5) Free movement	(6) Free movement
Import shock	0.014 (0.344)	0.014 (0.336)	0.028 (0.102)	0.008 (0.533)	0.015 (0.273)	0.005 (0.723)
Immigrant share		-0.202 (0.104)	0.033 (0.862)	0.351** (0.034)	0.204 (0.267)	0.196 (0.253)
Median age			0.007 (0.129)	0.013*** (0.001)	0.013*** (0.001)	0.008** (0.045)
Share with below secondary education				1.003*** (0.000)	1.264*** (0.000)	1.396*** (0.000)
Household income per capita					0.000 (0.129)	0.000 (0.591)
Unemployment rate						-1.286** (0.031)
Constant	0.415*** (0.000)	0.435*** (0.000)	0.108 (0.613)	-0.339* (0.074)	-0.499** (0.022)	-0.181 (0.450)
Observations	33	33	33	33	33	33
R-squared	0.029	0.112	0.181	0.556	0.593	0.661

Note: This table shows the individual (but regionally clustered) responses to the survey question Q2 – Free movement as the dependent variable and the set of explanatory variables.

Table 5 shows the results for Question 2 – Free movement as dependent variable. In column 1, where the only included variable is the import shock, the estimated coefficient is statistically insignificant whereby I find no support for the hypothesis that a stronger import shock would increase the share of respondents having a negative attitude to the free movement of workers within the EU. When I include the variable immigrant share and median age in column 2 and 3, the coefficients for the two variables are also insignificant. In column 4, the variable share with below secondary education is included where the coefficient shows a significant positive effect. Also, the coefficients for the median age and immigrant share are found to have a significant positive effect. This suggests that regions with larger immigrant shares, older population and lower education levels are more likely to believe that the free movement of workers within Europe is bad for Britain.

When I include the variable household income per capita in column 5, the coefficient for this variable is statistically insignificant. However, the variables share for below secondary education and median age still provides significant positive effects. In column 6, the final variable unemployment rate is included, which is found to have a statistically significant effect and negative sign. This indicates that the higher the unemployment rate in a region, the lower the share believing that free movement of workers within the EU is bad. This result is quite surprising, since the hypothesis was that regions with larger unemployment rates would have a more negative attitude to free movement of workers in Europe since this would increase the competition for available jobs. Nevertheless, the coefficient for the import shock is still statistically insignificant.

Table 6: Effects on Question 3 – The financial situation of the household

VARIABLES	(1) Household economy	(2) Household economy	(3) Household economy	(4) Household economy	(5) Household economy	(6) Household economy
Import shock	-0.005 (0.617)	-0.005 (0.594)	-0.015 (0.181)	-0.022* (0.057)	-0.023* (0.056)	-0.015 (0.203)
Immigrant share		-0.154* (0.064)	-0.321** (0.017)	-0.212 (0.121)	-0.175 (0.276)	-0.169 (0.269)
Median age			-0.005 (0.105)	-0.003 (0.335)	-0.003 (0.328)	0.001 (0.809)
Share with below secondary education				0.346* (0.056)	0.281 (0.230)	0.178 (0.434)
Household income per capita					-0.000 (0.660)	0.000 (0.671)
Unemployment rate						1.003* (0.057)
Constant	0.325*** (0.000)	0.340*** (0.000)	0.572*** (0.000)	0.418** (0.011)	0.458** (0.017)	0.210 (0.329)
Observations	33	33	33	33	33	33
R-squared	0.008	0.117	0.195	0.295	0.300	0.393

Note: This table shows the individual (but regionally clustered) responses to the survey question Q3 – Household economy as the dependent variable and the set of explanatory variables.

In table 6, the results for the regression analysis of Q3 – Household economy are presented. In column 1, the estimated coefficient for import shock is statistically insignificant and thereby I cannot find any support for the hypothesis that a stronger import shock would increase the share of respondents believing that their household economy has become worse. In column 2, including the variable immigrant share, the coefficient is found to have a significant negative effect. This indicates that a higher share of immigrants in a region decreases the share of respondents believing that their financial household situation has worsened. In column 3, the variable median age is included but the coefficient indicates no significant effect. On the other hand, the coefficient for the immigrant share is still significant and with a negative sign. However, as in previous two columns, the coefficient for the import shock is still insignificant. In column 4, the coefficient for the share with below secondary education is included and the coefficient shows a significant positive effect. In this regression, the coefficient for the import shock becomes negatively significant which suggests that the stronger the import shock, the lower the share having a negative attitude to the development of the household's financial situation.

In column 5, household income per capita is added where the coefficient for the variable shows no significant effect on the dependent variable while the coefficient for the import shock still shows significant negative effect. When including the unemployment rate in column 6, this coefficient is found to have a significant positive effect while the import shock no longer shows any significant relationship with the dependent variable. This indicates that the variation in the dependent variable that the regression model in column 4-5 indicated that the import shock could explain, in fact seems to be better explained by the variation in unemployment rate in column 6.

Table 7: Effects on Question 4 – The development of the general economy

VARIABLES	(1) General economy	(2) General economy	(3) General economy	(4) General economy	(5) General economy	(6) General economy
Import shock	-0.002 (0.893)	-0.002 (0.870)	-0.024 (0.153)	-0.029 (0.102)	-0.041** (0.023)	-0.030* (0.092)
Immigrant share		-0.328** (0.014)	-0.691*** (0.001)	-0.608*** (0.007)	-0.346 (0.142)	-0.338 (0.137)
Median age			-0.011** (0.021)	-0.009* (0.059)	-0.010** (0.033)	-0.005 (0.360)
Share with below secondary education				0.260 (0.350)	-0.205 (0.542)	-0.343 (0.307)
Household income per capita					-0.000** (0.037)	-0.000 (0.208)
Unemployment rate						1.332* (0.084)
Constant	0.415*** (0.000)	0.447*** (0.000)	0.953*** (0.000)	0.837*** (0.002)	1.122*** (0.000)	0.793** (0.017)
Observations	33	33	33	33	33	33
R-squared	0.001	0.186	0.325	0.346	0.445	0.506

Note: This table shows the individual (but regionally clustered) responses to the survey question Q4 – General economy as the dependent variable and the set of explanatory variables.

Table 7 shows the results for Q4 – General economy as dependent variable. In column 1, the coefficient for the import shock indicates no significant correlation with the dependent variable. This suggests that I cannot find any support for the prediction of a positive correlation between the import shock and the dependent variable. In column 2, when including the immigrant share, the coefficient indicates a significant negative effect. This suggests that a higher share of immigrants is correlated with a lower share with a negative attitude to the general economic development. When I also include the median age in column 3, this variable is found to have a significant negative effect, indicating that regions with higher median age are less likely to have a negative attitude to the development of the general economic situation. When including the share with below secondary education in column 4, the estimated coefficient is found to have no significant effect.

In column 5, the household income per capita is added and found to have a significant negative effect. The variable median age still has a significant negative effect and ad, the coefficient for the import shock also becomes significant with a negative sign. This suggests that regions experiencing a stronger import shock are less likely to have a negative attitude to the general economic development, which is quite surprising. A possible explanation could be that even though a region faces a stronger import shock, the gains from trade in terms of e.g. lower consumer prices might outweigh the negative effects from increased import competition. In the final column, the unemployment rate is included where the coefficient suggests a positive significant correlation. This is, as in Q3 – Household economy, in line with the hypothesis that higher unemployment levels are correlated with an increase in the share of respondents having a negative attitude to the economic development. Additionally, the coefficient for the import shock still has a significant negative correlation with the dependent variable while the median age and household income per capita no longer show any significant effect.

Table 8: Effects on Question 5 – Immigration good or bad for Britain’s economy

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Immigration	Immigration	Immigration	Immigration	Immigration	Immigration
Import shock	0.034* (0.072)	0.034* (0.063)	0.032 (0.144)	0.012 (0.536)	0.015 (0.469)	0.015 (0.496)
Immigrant share		-0.284* (0.065)	-0.317 (0.206)	0.003 (0.989)	-0.064 (0.819)	-0.064 (0.823)
Median age			-0.001 (0.866)	0.005 (0.357)	0.005 (0.349)	0.005 (0.434)
Share with below secondary education				1.013*** (0.003)	1.132*** (0.009)	1.129*** (0.013)
Household income per capita					0.000 (0.646)	0.000 (0.673)
Unemployment rate						0.031 (0.974)
Constant	0.368*** (0.000)	0.396*** (0.000)	0.442 (0.114)	-0.009 (0.973)	-0.082 (0.797)	-0.090 (0.823)
Observations	33	33	33	33	33	33
R-squared	0.100	0.199	0.199	0.425	0.430	0.430

Note: This table shows the individual (but regionally clustered) responses to the survey question Q5 – Immigration as the dependent variable and the set of explanatory variables.

In Table 8, the results for the regression for Q5 – Immigration are presented. In column 1, the first regression shows that the estimated coefficient for the import shock is found to have a significant positive effect on the dependent variable. This suggests that respondents in regions experiencing a higher import shock are more likely to have a negative attitude to immigration which confirms my prediction. When including the immigrant share in column 2, the coefficient is found to have a significant negative effect, suggesting that regions with larger immigrant share are less likely to have a negative attitude to immigration. This is not in line with the hypothesis that regions with larger immigrant shares would be more negative to immigration.

In column 3 median age is included where the coefficient shows no significant effects. Additionally, the coefficients for import shock and immigrant share neither show any significant effect in this regression. When adding the variable share with below secondary education in column 4, the coefficient is found to have a significant positive effect. This indicates that regions with a higher share of less-educated population are more likely to have a negative attitude toward immigration. When adding the variable household income per capita in column 5, the coefficient is found to have no significant effect. In the final column, the coefficient for the unemployment rate is found to have no significant effect. The coefficient for share with below secondary education still shows significant positive effect, while the coefficient for the import shock now shows no significant effect which is not in line with my prediction. This indicates that while the regressions in column 1 and 2 estimates that the coefficient for the import shock has significant positive effect on the dependent variable, the inclusion of the full set of control variables instead shows that it is the education level of a region that manages to explain the variation in the dependent variable better. This is in line with the hypothesis.

7.2 Robustness analysis

In the following section, the results from the two additional estimation strategies are presented and compared with the OLS results to test for the robustness. This is followed by a short analysis of how the set of control variables might impact the effect of the import shock.

7.2.1 Robustness test for part one – the Brexit referendum

In line with previous research, the instrumental variable approach has been applied to test for the possible risk of endogeneity in the baseline model. In table 9, column 1 and 2 show the OLS regressions results while the 2SLS regression results are presented in column 3 and 4. When comparing the results, the main conclusion is that the results overall are very similar. The coefficients presenting significant results in the OLS, the variables share of below secondary education and median age, are still significant in the 2SLS. Additionally, share with below secondary education changes from a 5 % significance level

in the OLS model to a 1 % significance level. This strengthens the result of the baseline OLS model and indicates that there seem to be no clear signs of endogeneity in the baseline OLS regression.

Table 9: Regression results: OLS, 2SLS and Fractional Logit

VARIABLES	OLS	OLS	2SLS	2SLS	FL	FL
	(1)	(2)	(3)	(4)	(5)	(6)
	Leave share	Leave share	Leave share	Leave share	Leave share	Leave share
Import shock	0.028 (0.243)	0.022 (0.389)	0.020 (0.393)	0.017 (0.453)	0.114 (0.232)	0.087 (0.384)
Immigrant share		0.408 (0.211)		0.406 (0.151)		1.648 (0.200)
Median age		0.017** (0.023)		0.017*** (0.009)		0.071** (0.015)
Share with below secondary education		1.715*** (0.001)		1.722*** (0.000)		6.976*** (0.000)
Household income per capita		0.000 (0.953)		-0.000 (0.984)		0.000 (0.945)
Unemployment rate		-1.025 (0.333)		-1.087 (0.241)		-4.172 (0.320)
Constant	0.501*** (0.000)	-0.567 (0.219)	0.513*** (0.000)	-0.522 (0.196)	0.002 (0.989)	-4.330** (0.017)
Observations	33	33	33	33	33	33
R-squared	0.044	0.554	0.040	0.553		

Table 9 shows the regression results for the OLS, 2SLS model and Fractional Logit (FL) respectively. In this table, only the results for testing the effects with the main explanatory variable the import shock and the full set of control variables are included. For the regression results for each model and each explanatory variable, see the appendix section A.6.

In column 5 and 6 in table 9, the results from the Fractional Logit regressions are also presented. As can be seen, the results from the Fractional Logit model are also similar to the OLS model. The coefficients for median age and share with below secondary education are found to have significant positive effect at the same significance level as in the OLS. The only observed difference is that the significant coefficients increase somewhat in size in the Fractional Logit model. Since the results are very similar to the OLS model, it also strengthens the baseline results.

7.2.2 Robustness test for part two – Attitudes

In table 10, the regression results for the OLS and the 2SLS model are presented. Comparing the results of the 2SLS regression with the OLS regressions, the results are general in line with the baseline results. For Q1 – Free trade, the results in column 1 and 2 are very similar and in neither of the models the coefficients are found to have any significant effect on the dependent variables. In column 3 and 4, the results for OLS and 2SLS regarding Q2 – Free movement are also very similar.

Table 10: Regression results – OLS and 2SLS

VARIABLES	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Free trade		Free movement		Household economy		General economy		Immigration	
Import shock	0.001 (0.908)	0.001 (0.936)	0.005 (0.723)	-0.000 (0.978)	-0.015 (0.203)	-0.015 (0.161)	-0.030* (0.092)	-0.032** (0.044)	0.015 (0.496)	0.013 (0.527)
Immigrant share	0.034 (0.703)	0.034 (0.665)	0.196 (0.253)	0.194 (0.193)	-0.169 (0.269)	-0.169 (0.204)	-0.338 (0.137)	-0.339* (0.083)	-0.064 (0.823)	-0.065 (0.796)
Median age	0.001 (0.501)	0.001 (0.461)	0.008** (0.045)	0.007** (0.032)	0.001 (0.809)	0.001 (0.780)	-0.005 (0.360)	-0.005 (0.273)	0.005 (0.434)	0.005 (0.407)
Share with below secondary education	0.095 (0.475)	0.095 (0.411)	1.396*** (0.000)	1.406*** (0.000)	0.178 (0.434)	0.177 (0.371)	-0.343 (0.307)	-0.339 (0.245)	1.129** (0.013)	1.133*** (0.002)
Household income per capita	-0.000 (0.872)	-0.000 (0.840)	0.000 (0.591)	0.000 (0.669)	0.000 (0.671)	0.000 (0.627)	-0.000 (0.208)	-0.000 (0.136)	0.000 (0.673)	0.000 (0.669)
Unemployment rate	0.064 (0.830)	0.060 (0.820)	-1.286** (0.031)	-1.359*** (0.007)	1.003* (0.057)	1.004** (0.025)	1.332* (0.084)	1.306** (0.048)	0.031 (0.974)	-0.003 (0.997)
Constant	-0.021 (0.866)	-0.018 (0.870)	-0.181 (0.450)	-0.132 (0.535)	0.210 (0.329)	0.209 (0.271)	0.793** (0.017)	0.810*** (0.004)	-0.090 (0.823)	-0.067 (0.852)
Observations	33	33	33	33	33	33	33	33	33	33
R-squared	0.095	0.095	0.661	0.659	0.393	0.393	0.506	0.506	0.430	0.430

Table 10 shows the regression results for the OLS and the 2SLS model respectively. In this table, only the results when testing all explanatory variables including the full set of control variables are shown. For the regression results for each model, each question and each explanatory variable, see the appendix section A.7.

The coefficients for the variables median age and share with below secondary education are in both models found to have a statistically significant and positive effect on the dependent variable, while the coefficient for the Unemployment rate is found to have a statistically significant and negative effect. Additionally, the significance level for coefficient for the unemployment rate increases from the 5 % significance level to the 1 % significance level. For the dependent variable Q3 – Household economy, column 5 and 6 show the results for the OLS and 2SLS results respectively. The results are very similar, with the only difference that the coefficient for the unemployment rate goes from the 10 % significance level to the 5 % significance level.

In column 7 and 8, the results for Q4 – General economy are presented. The results in the 2SLS are generally in line with the OLS. The coefficient for my main explanatory variable, the import shock, goes from a 10 % significance level in the OLS model to a 5 % significance level in the 2SLS model. Since the estimation of the import shock increases in significance level and increases somewhat in size in the 2SLS, these results indicate that there might be some signs of endogeneity in the baseline regressions. The coefficient for the immigrant share is insignificant in the OLS regression, but in the 2SLS regression it becomes statistically significant at the 10 % level and with a negative sign. Additionally, the coefficient for the unemployment rate goes from a 10 % to a 5 % significance level. Finally, the results for Q5 – Immigration are presented in column 9 and 10. As shown, the results of the 2SLS regression are generally in line with OLS regression. As for the coefficient for share with below secondary education, it goes from a statistical significance at the 5 % level to the 1 % level.

To conclude, the results of the 2SLS regressions are similar to the baseline regression results apart from some possible signs of endogeneity regarding Q4 – General economy. Since the 2SLS estimate coefficients that increase both in significance level and size compared to the OLS, this indicates that the

OLS might underestimate the effects of the import shock and consequently that endogeneity might exist as also discussed in section 6.2.4.

Table 11: Regression results – OLS and Fractional Logit (FL)

VARIABLES	OLS	FL	OLS	FL	OLS	FL	OLS	FL	OLS	FL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Free trade		Free movement		Household economy		General economy		Immigration	
Import shock	0.001 (0.908)	0.020 (0.876)	0.005 (0.723)	0.020 (0.715)	-0.015 (0.203)	-0.072 (0.189)	-0.030* (0.092)	-0.128* (0.074)	0.015 (0.496)	0.065 (0.483)
Immigrant share	0.034 (0.703)	0.500 (0.760)	0.196 (0.253)	0.792 (0.245)	-0.169 (0.269)	-0.739 (0.286)	-0.338 (0.137)	-1.357 (0.134)	-0.064 (0.823)	-0.284 (0.808)
Median age	0.001 (0.501)	0.023 (0.537)	0.008** (0.045)	0.033** (0.035)	0.001 (0.809)	0.004 (0.794)	-0.005 (0.360)	-0.019 (0.355)	0.005 (0.434)	0.021 (0.431)
Share with below secondary education	0.095 (0.475)	1.688 (0.489)	1.396*** (0.000)	5.715*** (0.000)	0.178 (0.434)	0.822 (0.427)	-0.343 (0.307)	-1.429 (0.291)	1.129** (0.013)	4.701*** (0.007)
Household income per capita	-0.000 (0.872)	-0.000 (0.846)	0.000 (0.591)	0.000 (0.591)	0.000 (0.671)	0.000 (0.714)	-0.000 (0.208)	-0.000 (0.178)	0.000 (0.673)	0.000 (0.681)
Unemployment rate	0.064 (0.830)	1.114 (0.840)	-1.286** (0.031)	-5.300** (0.021)	1.003* (0.057)	4.556* (0.051)	1.332* (0.084)	5.462* (0.073)	0.031 (0.974)	-0.021 (0.996)
Constant	-0.021 (0.866)	-4.123* (0.074)	-0.181 (0.450)	-2.776*** (0.004)	0.210 (0.329)	-1.257 (0.199)	0.793** (0.017)	1.229 (0.337)	-0.090 (0.823)	-2.422 (0.143)
Observations	33	33	33	33	33	33	33	33	33	33
R-squared	0.095		0.661		0.393		0.506		0.430	

Table 11 shows the regression results for the OLS and the Fractional Logit (FL) model respectively. In this table, only the results when testing all explanatory variables including the full set of control variables are shown. For the regression results for each model, each question and each explanatory variable, see the appendix section A8.

The results for the regressions Fractional Logit are shown in table 11 together with the OLS baseline results. In column 1 and 2, the results for dependent variable Q1 – Free trade are presented. As shown, there are no differences between the two models as the coefficients for all variables continue to be statistically insignificant. In column 3 and 4, the results for Q2 – Free movement indicates that there is no difference between the two models since the coefficients providing significant result in the OLS model continues to do so in the Fractional Logit model at the same significance levels and with the same sign. In column 5 and 6, the results for Q3 – Household economy is presented. The Fractional Logit results suggest the same results as in the OLS model, since the coefficient for the Unemployment rate is found to be statistically significant at the same 1 % significance level in both models.

As for Q4 – General economy in column 7 and 8, the results from the Fractional Logit model are in line with OLS model. In column 9 and 10, the result for Q5 – Immigration in the Fractional Logit model is very similar to the OLS model. The coefficient for share with below secondary education is statistically significant and with a positive sign in both models, with the difference that it goes from 5 % significance level in the OLS to 1 % significance level in the Fractional Logit. As in the case of the results of the first part of my analysis, the Brexit referendum results, this indicates that the OLS estimates somewhat smaller effects than the Fractional Logit model. Nevertheless, the fact that the Fractional Logit model gives very similar results to the OLS model, strengthens the baseline OLS regressions.

7.2.3 Robustness test – Control variables

In the first part of my analysis covering the Leave share as the independent variable, running the regressions with the full set of control variables does not affect the import shock since it continues to be insignificant. This suggests that while the set of control variables in some regressions have significant effect on the dependent variable Leave share, it is not the main driving factor behind the impact of the explanatory variable import shock. Regarding the second part of my analysis on attitudes, the import shock shows significant effects in some of the regressions. Nevertheless, when running the regressions with the full set of control variables the significant effects of the import shock disappear in all cases except for Q4 – General economy. This indicates that in the second part, the effects that the model firstly estimated to be caused by the import shock instead could be better explained by one or several of the control variables.

7.3 Discussion of the results

The aim of this study is to investigate whether globalization in terms of increased trade exposure, measured as the China import shock, had impact on the voting behavior in Brexit referendum on the one hand, and on British voters' attitudes on the other hand.

The results of my analysis show that the import shock has no significant effect on the share of Leave votes. Hence, I cannot find any support for my hypothesis that regions experiencing a stronger import shock would vote for Leave to a higher extent. Consequently, the results suggest that the import shock did not affect voting behavior. This is not in line with the previous research by Colantone and Stanig (2018a). The most straightforward explanation would be that their study examines the import shock on a more disaggregated level, with the advantage of being able to link regional variation in the share of Leave votes with the import shock on a more local level. For example, I had to define London as one region, while there is probably rather large variation in industrial structure, employment level and Brexit results across different disaggregated London areas. Nevertheless, the regression results when including the full set of control variables suggest that education level and age have explanatory effect on the referendum result even at this aggregated level. This is in line with previous research and with my theoretical prediction that older and less educated population to higher extent would vote for Leave.

The second part of my analysis focus on the voters' attitudes and the correlation with trade exposure. The results show that overall, the import shock is not found to have a statistically significant effect on attitudes except for Q4 – General economy. This suggests that the import shock does provide some explanatory power and a significant negative relationship between the import shock and the view on the development of the general economy. Apart from this result, no correlation has been found and consequently there is no support for that the import shock had impact on voters' attitudes. When

including the control variables, education, age and unemployment rate is found to have significant positive effect on several of the included survey questions. This confirms the expectation that individual characteristics such as age, education level and unemployment rate do affect attitudes on international trade and economic integration. Additionally, it is in line with previous research (see e.g. Becker et al. 2017).

Worth notifying in this context is that the dependent variable Q5 – Free trade covers the views on free trade *with the EU*. This question was included to measure the attitudes to trade in the UK and be able to connect this with the import shock. The disadvantage with this question is that it does not cover trade in general but instead is biased towards trade with EU, which might be viewed as more beneficial for UK citizens than trade with low-income countries such as China, which the import shock measures. Consequently, including a question on trade in general or trade with low-income countries might have generated different results.

To contribute to existing literature, this study intends to compare the impact of the import shock on attitudes and voting behavior. This is done since it will be possible to analyze if a vote for Leave was a way for British voters to express their disapproval of the effects of trade and globalization (due to the import shock) or if it rather was a way of expressing general dissatisfaction with the political and economic situation. The regression results for both the first and second part of my analysis indicates that the possible negative effects of international trade in terms of increased competition and depressed labor markets have not affected neither voting behavior nor attitudes. Since there are no observed differences between the results in the two parts in my analysis regarding the impact of the import shock, this suggests that a vote for Leave was not a direct consequence of increased international trade nor a protest vote against any of the topics included in the survey questions. Consequently, the British people's attitudes to free trade with EU, free movement of workers within the EU, the household economy or general economy or immigration has not been directly affect by increased trade.

8. Summary and conclusion

Globalization, economic integration and international trade have become increasingly questioned as the support for political forces offering opposite alternatives such as protectionism, anti-globalization and stronger nation-states has increased. A clear example of this development is the growing support for parties promoting these views in many European countries, the election of President Trump and the success for the Leave option in the Brexit referendum.

The intention of this study has been to investigate whether increased trade exposure, measured as the China import shock, had any effect on the voting behavior in the Brexit referendum on the one hand, and on the British voters' attitudes on the other hand. This study mainly contributes to existing literature

by investigating whether any causal linkages can be found between the import shock and the British voters' attitudes on questions regarding international trade and economic cooperation, and if there are any differences with the voting behavior in the referendum. The underlying interest has been to investigate whether increased international trade and import competition have resulted specifically in higher opposition to trade and imports, or if a vote for Leave rather was a way of expressing general dissatisfaction.

The regression results of this paper suggest three main findings. Firstly, no support can be found for that the import shock in general had any effect on neither voting behavior nor voters' attitudes (apart from Q4 – General Economy). This is an interesting result since it is not in line with the common conception that increased support for anti-globalization movements, protectionism and populism stems from international trade. Secondly, the overall regression results suggest that there are no major differences between voting behavior and attitudes in the Brexit context. This indicates that a vote for Leave was not a way of protest voting against any of the topics covered in the included survey questions.

Finally, support can on the other hand be found for that education level and age manage to provide significant results and explain some of the variation in how the British people voted in the referendum and what attitudes they expressed. Also, the unemployment level proves to have significant effect regarding especially the economic questions. This is highly relevant since it confirms that individual and regional characteristics have impact on both voting behavior and attitudes.

For further research, more disaggregated regional data should be used to be able to draw conclusions about the correlation between import shocks and voting behavior and attitudes. It would possibly also lead to more significant results and increase the efficiency of the estimates. My main contribution to previous literature, the perspective of including individual attitudes, could be further developed by studying other survey questions and the development of these over a larger time period. Further analysis of the regional and individual effects of globalization and international trade is needed to understand the redistributing effects and anti-globalization and protectionist movements. It would therefore be of interest to not only study the Brexit referendum but also examine other political and economic events where globalization and trade might affect the outcome. One suggestion would be to study other national elections in European countries or the elections to the European parliament with the same methodology as in this study, since it makes it possible to outline regional effects.

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10. Appendix

A.1 Variables, definitions and data sources

Variable	Definition and data source
Leave share	Share of Leave votes out of total valid votes in the Brexit referendum in each NUTS 2 region Data source: The Electoral Commission (2016)
Attitudes	Share of included respondents out of total respondents, divided into NUTS 2 regional level Data source: British Election Study (2018a)
Employment, total	The total number of employed in each manufacturing industry in 2000 Data source: Eurostat (2018a)
Employment, industrial and for each region	The total number of employed in each manufacturing industry and on NUTS 2 regional level in 2000 Data source: Eurostat (2018a)
Employment, total for each region	The total number of employed in each NUTS 2 region in 2000 Data source: Eurostat (2018a)
Imports from China (UK) Imports from China (USA)	Imports in nominal USD for UK and US respectively, measured as the difference between 2000-2007 Data source: OECD Statistics (2018)
Immigrant share	The share foreign-born out of the total population in each NUTS 2 region in 2015 Data source: Office for National Statistics (2018b) (UK except Scotland) and National Records of Scotland (2018) (only Scotland)
Median age	Median age at NUTS 2 regional level Data source: Eurostat (2018b)
Share with below secondary education	The share out of the total population in each NUTS 2 region with below secondary education in 2015 Data source: Eurostat (2018b)
Household income per capita	Household income per capita in each NUTS 2 region in 2015 Data source: Eurostat (2018b)
Unemployment rate	Unemployment rate in each NUTS 2 region in 2015 Data source: Eurostat (2019)

Note: This table shows the full set of variables, the definition and the data source.

A.2 Correlation Matrix

	Import shock	Immigration share	Import shock US	Median age	Share with below secondary education	Household income per capita	Unemployment
Import shock	1.0000						
Immigration share	-0.0064	1.0000					
Import shock US	0.9652	-0.0671	1.0000				
Median age	-0.3634	-0.7320	-0.3382	1.0000			
Share with below secondary education	0.4917	-0.2264	0.4471	-0.1781	1.0000		
Household income per capita	-0.4213	0.6683	-0.3895	-0.2756	-0.6922	1.0000	
Unemployment rate	0.3483	0.0646	0.3632	-0.4874	0.6342	-0.4456	1.0000

A.3 List of NUTS 2 regions and the corresponding NUTS 1 regions of the UK

UK NUTS 1	UK NUTS 2 - Full list of regions	UK NUTS 2 - Regions included in the sample
North East	Tees Valley and Durham North Humberland and Tyne and Wear	Tees Valley and Durham North Humberland and Tyne and Wear
North West	Cumbria Greater Manchester Lancashire Cheshire Merseyside	Cumbria Greater Manchester Lancashire Cheshire Merseyside
Yorkshire and the Humber	East Yorkshire and Northern Lincolnshire North Yorkshire South Yorkshire West Yorkshire	East Yorkshire and Northern Lincolnshire North Yorkshire South Yorkshire West Yorkshire
East Midlands	Derbyshire and Nottinghamshire Leicestershire, Rutland and Northamptonshire Lincolnshire	Derbyshire and Nottinghamshire Leicestershire, Rutland and Northamptonshire Lincolnshire
West Midlands	Herefordshire, Worcestershire and Warwickshire Shropshire and Staffordshire West Midlands	Herefordshire, Worcestershire and Warwickshire Shropshire and Staffordshire West Midlands
East (of England)	East Anglia Bedfordshire and Hertfordshire Essex	East Anglia Bedfordshire and Hertfordshire Essex
London	Inner London - West Inner London - East Outer London - East and North East Outer London - South Outer London - West and North West	London
South East	Berkshire, Buckinghamshire and Oxfordshire Surrey, East and West Sussex Hampshire and Isle of Wight Kent	Berkshire, Buckinghamshire and Oxfordshire Surrey, East and West Sussex Hampshire and Isle of Wight Kent
South West	Gloucestershire, Wiltshire and Bristol/Bath area Dorset and Somerset Cornwall and Isles of Scilly Devon	Gloucestershire, Wiltshire and Bristol/Bath area Dorset and Somerset Cornwall and Isles of Scilly Devon
Wales	West Wales and The Valleys East Wales	West Wales and The Valleys East Wales
Scotland	Eastern Scotland South Western Scotland North Eastern Scotland Highlands and Islands	Eastern Scotland South Western Scotland
Northern Ireland	Northern Ireland (UK)	

Table A3 shows the Eurostat NUTS 1 and corresponding NUTS 2 regional classification levels, followed by the set of regions included in the sample

A.4 List of included manufacturing industries

Nace Revision 1.1 - Manufacturing industries

Manufacture of food products, beverages and tobacco
 Manufacture of textiles and textile products
 Manufacture of leather and leather products
 Manufacture of wood and wood products
 Manufacture of pulp, paper and paper products; publishing and printing
 Manufacture of coke, refined petroleum products and nuclear fuel
 Manufacture of chemicals, chemical products and man-made fibres
 Manufacture of rubber and plastic products
 Manufacture of other non-metallic mineral products
 Manufacture of basic metals and fabricated metal products
 Manufacture of machinery and equipment n.e.c.
 Manufacture of electrical and optical equipment
 Manufacture of transport equipment
 Manufacturing n.e.c

Note: This table shows the defined manufacturing industries defined by Nace Rev.1.1. “Manufacturing of leather and leather products” and “Manufacturing of coke, refined petroleum products and nuclear fuel” had to be excluded in the study due to lack of data on employment levels in several UK NUTS 2 regions.

A.5 Variance Inflation Factor (VIF)

Variable	VIF	1/VIF
Household income per capita	5.60	0.178424
Median age	5.03	0.198985
Immigration share	4.40	0.227530
Unemployment rate	2.97	0.336701
Share with below secondary education	2.84	0.351922
Import shock	1.97	0.507294
Mean VIF	3.80	

A.6 Full results for robustness tests – Leave share with 2SLS and FL

VARIABLES	2SLS						FL					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	Leave share						Leave share					
Import shock	0.020 (0.393)	0.017 (0.444)	0.039 (0.130)	0.020 (0.337)	0.023 (0.307)	0.017 (0.453)	0.114 (0.232)	0.113 (0.213)	0.210** (0.045)	0.102 (0.246)	0.119 (0.208)	0.087 (0.384)
Immigrant share		-0.406** (0.026)	-0.064 (0.825)	0.481* (0.055)	0.409 (0.156)	0.406 (0.151)		-1.637** (0.034)	0.010 (0.994)	2.016* (0.065)	1.663 (0.196)	1.648 (0.200)
Median age			0.010 (0.137)	0.020*** (0.000)	0.021*** (0.000)	0.017*** (0.009)			0.048* (0.089)	0.085*** (0.000)	0.086*** (0.000)	0.071** (0.015)
Share with below secondary education				1.486*** (0.000)	1.617*** (0.000)	1.722*** (0.000)				5.921*** (0.000)	6.568*** (0.000)	6.976*** (0.000)
Household income per capita					0.000 (0.636)	-0.000 (0.984)					0.000 (0.589)	0.000 (0.945)
Unemployment rate						-1.087 (0.241)						-4.172 (0.320)
Constant	0.513*** (0.000)	0.558*** (0.000)	0.079 (0.807)	-0.694** (0.018)	-0.768** (0.023)	-0.522 (0.196)	0.002 (0.989)	0.164 (0.319)	-2.130 (0.117)	-4.946*** (0.000)	-5.348*** (0.000)	-4.330** (0.017)
Observations	33	33	33	33	33	33	33	33	33	33	33	33
R-squared	0.040	0.163	0.238	0.531	0.535	0.553						

Note: This table presents the full results when running the regressions with the 2SLS model and Fractional Logit (FL) model. It shows the relationship between the dependent variable, the Leave share, and the full set of explanatory variables.

A.7 Full results for robustness tests - Attitudes with 2SLS

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)						
	Free trade						Free movement					
Import shock	0.002 (0.676)	0.002 (0.716)	0.002 (0.673)	0.001 (0.914)	0.000 (0.975)	0.001 (0.936)	0.007 (0.632)	0.005 (0.702)	0.017 (0.292)	0.003 (0.827)	0.007 (0.585)	-0.000 (0.978)
Immigration share		-0.034 (0.372)	-0.024 (0.706)	0.020 (0.769)	0.033 (0.668)	0.034 (0.665)		-0.202* (0.080)	-0.019 (0.915)	0.335** (0.021)	0.201 (0.220)	0.194 (0.193)
Median age			0.000 (0.832)	0.001 (0.448)	0.001 (0.454)	0.001 (0.461)			0.005 (0.204)	0.012*** (0.000)	0.012*** (0.000)	0.007** (0.032)
Share with below secondary education				0.126 (0.151)	0.101 (0.369)	0.095 (0.411)				1.030*** (0.000)	1.267*** (0.000)	1.406*** (0.000)
Household income per capita					-0.000 (0.746)	-0.000 (0.840)					0.000 (0.134)	0.000 (0.669)
Unemployment rate						0.060 (0.820)						-1.359*** (0.007)
Constant	0.055*** (0.000)	0.058*** (0.000)	0.044 (0.534)	-0.018 (0.817)	-0.004 (0.960)	-0.018 (0.870)	0.426*** (0.000)	0.448*** (0.000)	0.192 (0.344)	-0.312* (0.066)	-0.443** (0.019)	-0.132 (0.535)
Observations	33	33	33	33	33	33	33	33	33	33	33	33
R-squared	0.008	0.031	0.034	0.091	0.094	0.095	0.022	0.102	0.170	0.553	0.587	0.659

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)						
	Household economy						General economy					
Import shock	-0.003 (0.766)	-0.004 (0.651)	-0.015 (0.162)	-0.020* (0.062)	-0.021* (0.062)	-0.015 (0.161)	0.000 (0.998)	-0.003 (0.856)	-0.027* (0.091)	-0.031* (0.062)	-0.039** (0.015)	-0.032** (0.044)
Immigration share		-0.154** (0.043)	-0.321*** (0.007)	-0.206* (0.093)	-0.174 (0.222)	-0.169 (0.204)		-0.328*** (0.006)	-0.706*** (0.000)	-0.614*** (0.001)	-0.346* (0.095)	-0.339* (0.083)
Median age			-0.005* (0.078)	-0.003 (0.326)	-0.003 (0.319)	0.001 (0.780)			-0.011*** (0.007)	-0.009** (0.030)	-0.010** (0.015)	-0.005 (0.273)
Share with below secondary education				0.336** (0.037)	0.280 (0.177)	0.177 (0.371)				0.269 (0.287)	-0.206 (0.493)	-0.339 (0.245)
Household income per capita					-0.000 (0.684)	0.000 (0.627)					-0.000** (0.018)	-0.000 (0.136)
Unemployment rate						1.004** (0.025)						1.306** (0.048)
Constant	0.322*** (0.000)	0.339*** (0.000)	0.572*** (0.000)	0.408*** (0.004)	0.439*** (0.008)	0.209 (0.271)	0.411*** (0.000)	0.447*** (0.000)	0.978*** (0.000)	0.846*** (0.000)	1.110*** (0.000)	0.810*** (0.004)
Observations	33	33	33	33	33	33	33	33	33	33	33	33
R-squared	0.007	0.117	0.195	0.294	0.299	0.393		0.186	0.324	0.345	0.444	0.506

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Immigration					
Import shock	0.032* (0.083)	0.029* (0.088)	0.025 (0.226)	0.011 (0.553)	0.013 (0.503)	0.013 (0.527)
Immigration share		-0.285** (0.045)	-0.350 (0.132)	0.000 (0.999)	-0.065 (0.796)	-0.065 (0.796)
Median age			-0.002 (0.723)	0.005 (0.323)	0.005 (0.315)	0.005 (0.407)
Share with below secondary education				1.018*** (0.000)	1.133*** (0.002)	1.133*** (0.002)
Household income per capita					0.000 (0.635)	0.000 (0.669)
Unemployment rate						-0.003 (0.997)
Constant	0.371*** (0.000)	0.403*** (0.000)	0.494* (0.057)	-0.004 (0.988)	-0.068 (0.815)	-0.067 (0.852)
Observations	33	33	33	33	33	33
R-squared	0.100	0.197	0.197	0.425	0.430	0.430

Note: This table presents the full results when running the regressions with the 2SLS model. It shows the relationship between the dependent variables, survey questions Q1-Q5, and the full set of explanatory variables.

A.8 Full results for robustness tests - Attitudes with FL

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)						
	Free trade						Free movement					
Import shock	0.043 (0.627)	0.048 (0.583)	0.064 (0.544)	0.024 (0.829)	0.011 (0.923)	0.020 (0.876)	0.057 (0.338)	0.057 (0.323)	0.113* (0.091)	0.034 (0.518)	0.062 (0.256)	0.020 (0.715)
Immigration share		-0.738 (0.322)	-0.470 (0.702)	0.214 (0.873)	0.486 (0.761)	0.500 (0.760)		-0.838* (0.086)	0.116 (0.882)	1.424** (0.026)	0.822 (0.263)	0.792 (0.245)
Median age			0.008 (0.783)	0.019 (0.517)	0.019 (0.532)	0.023 (0.537)			0.028 (0.120)	0.051*** (0.000)	0.053*** (0.000)	0.033** (0.035)
Share with below secondary education				2.263 (0.200)	1.815 (0.435)	1.688 (0.489)				4.095*** (0.000)	5.160*** (0.000)	5.715*** (0.000)
Household income per capita					-0.000 (0.757)	-0.000 (0.846)					0.000 (0.117)	0.000 (0.591)
Unemployment rate						1.114 (0.840)						-5.300** (0.021)
Constant	-2.862*** (0.000)	-2.798*** (0.000)	-3.171** (0.020)	-4.124*** (0.008)	-3.859*** (0.035)	-4.123* (0.074)	-0.342*** (0.000)	-0.260** (0.012)	-1.587* (0.065)	-3.426*** (0.000)	-4.079*** (0.000)	-2.776*** (0.004)
Observations	33	33	33	33	33	33	33	33	33	33	33	33

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)						
	Household economy						General economy					
Import shock	-0.023 (0.611)	-0.024 (0.585)	-0.069 (0.172)	-0.099** (0.049)	-0.108** (0.045)	-0.072 (0.189)	-0.009 (0.890)	-0.011 (0.858)	-0.100 (0.138)	-0.121* (0.088)	-0.172** (0.014)	-0.128* (0.074)
Immigration share		-0.709* (0.054)	-1.468** (0.012)	-0.953 (0.119)	-0.764 (0.292)	-0.739 (0.286)		-1.343*** (0.009)	-2.824*** (0.000)	-2.482*** (0.004)	-1.382 (0.142)	-1.357 (0.134)
Median age			-0.022* (0.096)	-0.013 (0.346)	-0.013 (0.336)	0.004 (0.794)			-0.043** (0.015)	-0.037* (0.052)	-0.040** (0.025)	-0.019 (0.355)
Share with below secondary education				1.617** (0.044)	1.286 (0.223)	0.822 (0.427)				1.094 (0.332)	-0.865 (0.528)	-1.429 (0.291)
Household income per capita					-0.000 (0.617)	0.000 (0.714)					-0.000** (0.024)	-0.000 (0.178)
Unemployment rate						4.556* (0.051)						5.462* (0.073)
Constant	-0.732*** (0.000)	-0.662*** (0.000)	0.401 (0.534)	-0.331 (0.641)	-0.126 (0.879)	-1.257 (0.199)	-0.345*** (0.001)	-0.211* (0.056)	1.862** (0.031)	1.375 (0.169)	2.580** (0.017)	1.229 (0.337)
Observations	33	33	33	33	33	33	33	33	33	33	33	33

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)						
	Immigration											
Import shock	0.140* (0.063)	0.140* (0.052)	0.132 (0.129)	0.052 (0.513)	0.065 (0.446)	0.065 (0.483)						
Immigration share		-1.218** (0.046)	-1.358 (0.178)	-0.003 (0.997)	-0.283 (0.805)	-0.284 (0.808)						
Median age			-0.004 (0.860)	0.020 (0.339)	0.021 (0.331)	0.021 (0.431)						
Share with below secondary education				4.202*** (0.001)	4.699*** (0.005)	4.701*** (0.007)						
Household income per capita					0.000 (0.641)	0.000 (0.681)						
Unemployment rate						-0.021 (0.996)						
Constant	-0.537*** (0.000)	-0.419*** (0.001)	-0.224 (0.841)	-2.123* (0.058)	-2.427* (0.064)	-2.422 (0.143)						
Observations	33	33	33	33	33	33						

Note: This table presents the full results when running the regressions with the Fractional Logit model. It shows the relationship between the dependent variables, survey questions Q1-Q5, and the full set of explanatory variables.