The Roman Origins of Modern Migration*

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Abstract

Some of the factors that affect the location choices of new immigrants, such as the existence of ethnic networks and cultural diversity of the destination city, may have deep historic roots. In order to better understand the determinants of modern migration in Europe, this paper conducts an empirical analysis to find out which historical characteristics of European cities contributed to immigration. The analysis reveals that the presence of historic Roman roads and forts increases the share of immigrants in modern cities. These structures contributed to migration both by enhancing economic opportunities and affecting cultural values of their residents. Individual-level regressions reveal that the presence of the Roman legacy has positive effect on residents' attitudes towards immigrants.

Keywords: Migration, Roman roads, Forts.

JEL code: F22, J61, R23.

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1 Introduction

The literature on migration has found that the existing stock of immigrants in the destination city plays a key role in explaining the location choices of new migrants (e.g., Bartel (1989)). Another line of the literature has shown that attitudes towards minorities have deep historical determinants (e.g., Voigtlander and Voth (2012)). These findings indicate that the formation of modern migrant communities is a very persistent process and may be affected by historical factors. In order to better understand the determinants of modern migration in Europe, this paper conducts an empirical analysis to find out which historic characteristics of European cities contributed to migration, and had long-lasting consequences by affecting the demographics of modern cities. Along with geographic features and contemporary socio-economic conditions, historical factors also contributed to the movement of people, goods and ideas. Using data for Roman roads and forts, the paper finds that the existence of such structures in the vicinity of modern cities has a large positive effect on the share of immigrant population. A close examination of the specific purposes for which Roman roads and forts were built and what implications they had on economic activity and demographics helps to develop better understanding of these empirical findings.

Roman roads were primarily built for military purposes, they were used by the army for the movement of soldiers and supplies (Smith, Wayte, and Marindin (1891)). Recent studies have documented that Roman roads have played a crucial role in the economic development process of European cities and regions (e.g., Bosker, Buringh, and van Zanden (2013) and Wahl (2016)). According to these studies, early infrastructure investments made by the Romans introduced path dependence and contributed to the concentration of economic activity across the roads because they offered better communication links. There are several reason that could lead to relatively larger formation of migrant communities in these areas. First, higher levels of economic activity could attract more people into such places both in the past and now. Second, being located across main roads, these cities were more likely to be visited by soldiers, traders, travelers and people fleeing persecution or relocating for other reasons. Third, among soldiers that served in Roman forts many were foreigners and historical sources indicate that there was a high tendency among retiring veterans to spend the remaining parts of their lives in places where their service took place which is similar to the formation of early migrant communities. The estimations of various specifications show that both economic incentives and cultural channels were vital.

To bolster the case for the existence of cultural channel, the paper uses data from the European Value Survey and shows that the presence of historic Roman forts and roads has a positive effect on residents' attitudes towards immigrants. The effect is more robust for forts than for roads which indicates that forts had relatively more important cultural effect than roads.

The northern border of the Roman Empire was in the territory of modern Germany. As a result, there was a high concentration of forts and many modern cities were founded for strategic purposes. For this reason, the paper dedicates a special attention to it. Another advantage of Germany is that Voigtlander and Voth (2012) have collected data on Jewish settlements in German towns for 1349. Using these data as a proxy for migration, the paper finds that the Roman legacy had a positive effect on the existence of medieval Jewish settlements, which indicates that the link between Roman forts and migration existed in earlier periods. The analysis in the paper is not limited to Germany only, the results regarding the effect of Roman roads on the share of immigrants in modern cities are confirmed in a sample of thirteen European countries.

This paper is related to recent studies that have investigated the link between Roman roads and modern economic development. Wahl (2016) uses nightlight satellite images to investigate the luminosity level among both sides of the former Roman border and finds that it is higher on the Roman side. The author shows that this phenomenon can be explained by the existence of the Roman road network. The key mechanism is that existing road networks made the construction of new roads and renovation relatively cheaper and introduced path dependance (see also Garcia-Lopez (2016)). Dalgaard, Kaarsen, and Selaya (2017) also establish a causal link between Roman roads and modern economic development in a larger set of European countries.

The literature on the factors affecting the location decisions of migrants is rather large. As already mentioned, existing networks play a crucial role in this process. This pattern exists both within countries (e.g., Bartel (1989)) and across countries (e.g., Beine, Docquier, and Ozden (2011)). Bredtmann, Nowotny, and Otten (2017) using regional data for EU countries, contribute to this literature by finding that the linguistic proximity between the source country and the destination has positive effect on migration.

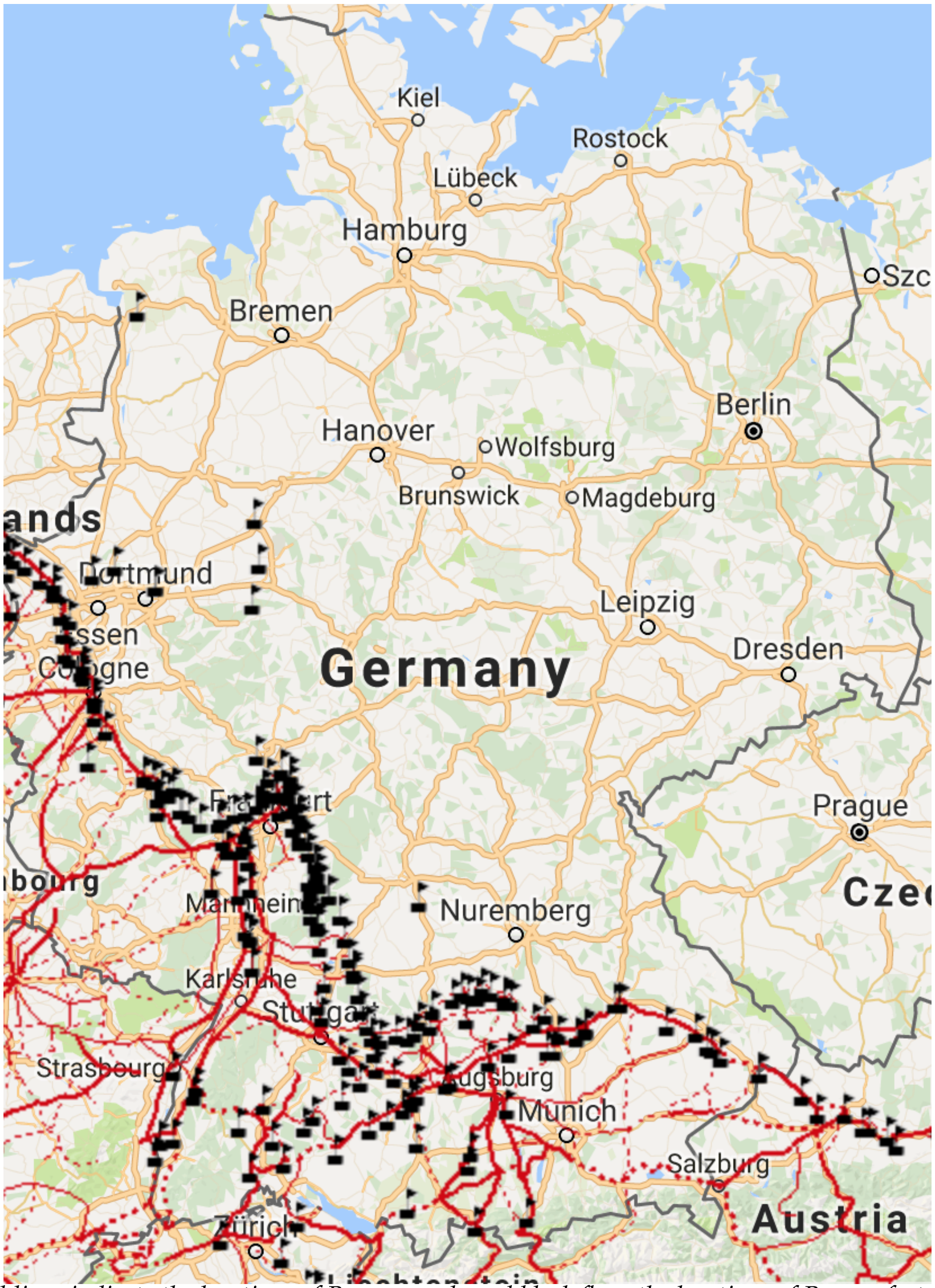
Researchers have studied migration and ethnic communities in historical context as well. Among those studies this paper is related to Voigtlander and Voth (2012), who investigate the attitudes towards ethnic minorities in the Middle Ages and their persistence over centuries (see also Becker and Pascali (2016)). The paper is also related to Ager and Bruckner (2013), who use the inflow of immigrants to the US during the 1870-1920 period to examine the effects that within-county changes in the cultural composition of the US population had on output growth. The authors find that cultural fractionalization significantly increased output. A more detailed example is studied by Hornung (2014). The author shows that the Huguenot migration to Prussia increased the productivity of textile manufactories. Current paper provides evidence that cities with Roman legacy attract migrants not only because they were wealthier but also because it had direct effect on their ethnic composition and cultures. Consequently, it can be one of the channels explaining the link between Roman legacy and economic growth documented in the literature.

The rest of the paper is organized as follows: Section 2 provides historical information on Roman roads and forts. Section 3 presents the estimation strategy and describes the data used in the paper. Section 4 presents the results for Germany and a set of European countries. It also provides estimations for internal migration in Germany. Section 5 uses data from the European Values Survey to show that the presence of Roman roads and forts positively affects the attitudes of individuals towards immigrants. Section 6 investigates the relationship between Roman forts and the existence of Jewish communities in German towns in the Middle Ages. The last section offers concluding remarks.

2 Historical Background

The Roman Empire was extensively engaged in the construction of roads, they have constructed over 100,000 km of main and secondary roads in Europe (Garcia-Lopez (2016)). These roads played a crucial role in the process of governing the vast empire. According to historians mentioned above, Roman roads were primarily designed and served for military purposes. This property provides significant advantages for econometric inference because it alleviates possible endogeniety concerns. This is especially true for the territory of Germany where the northern border of the Empire was located. As can be seen from the map (figure 1), most of the roads were built along the border or connecting to it. One may also notice that several modern large cities are located along the border but it is important to note that some of them were established by the Romans for military and strategic reasons rather than the opposite. In the case of other countries, especially those in the South, relatively large cities existed before the rise of the Roman Empire. They had their own infrastructure and ethnic communities. So, various factors from earlier periods had affected locations of those cities and their demography that are harder to control.

As already mentioned, the presence of Roman roads could positively affect economic activity, trade, the accessibility of cities and attract migrants. In addition to



Notes: Red lines indicate the locations of Roman roads and black flags the locations of Roman forts on the map of modern Germany. Source: McCormick, Huang, Zambotti, and Lavash (2013).

Figure 1: Roman roads and forts in Germany.

these channels, there are some aspects that require more discussion. These have to do with the army and other arrangements that were made to protect the borders. The Roman army included representatives of different nations and ethnicities. It consisted of two main parts: the legions and the auxilia. The auxilia was composed of non-citizen soldiers and accounted for the significant part of total fighting force. In the later periods of the Roman Empire, non-citizens were also allowed to join the legions.

The auxiliary took active participation during military campaigns and were located in different parts of the Empire where their services were needed. According to Holder (1980), in the early Julio-Claudian period efforts were made to preserve the ethnic integrity of units, even when the regiment was posted in a faraway provinces. At the end of their military service the auxiliaries received an honorable discharge. Their discharge papers guaranteed the rights as citizens to soldiers and their family members. Mattingly (2007) indicates that the sons of auxiliary veterans, who were enfranchised, preferred to join their fathers' regiments rather then the legion, despite the fact that the later paid higher salaries. A plausible explanation is that they had developed relations with their regiment and local environment. Further evidence is provided by Mann (1956) who studies the records on the sources of recruitment and retirement of Roman soldiers. The records reveal that most veterans preferred to retire in the vicinity of the fortresses in which they had served. The author also provides evidence that in some cases even if veterans were officially settled away from the place where they served, they returned back after some period.

These retirement patters are very similar to the formation of early migrant communities. The formation of such groups could have repercussions for modern migration through two channels. First, the tendency of migrants to go to places where members of their ethnicity are located. Second, residents in towns/settlements with representatives of different ethnicities may had became more tolerant towards foreigners and other cultures.

Another important phenomena that existed in the Roman Empire was *receptio* - the right to settle within Roman territory. In most cases this right was granted to tribes and their leaders that were attacked by enemies and were seeking refuge. The motives of the Empire were mainly strategic rather than humanitarian. The origins of Cologne trace back to this kind of resettlement. According to Tacitus (1970), the Ampsivarii were settled along the Rhine to create a buffer zone against enemies. These kinds of resettlements also resemble formations of early migrant communities. The fact that some of the cities in Germany were established by the Romans and different tribes or ethnic groups were settled there, make it relatively more appropriate in the context of the analysis conducted in this paper.

One concern that may arise with this logic is that as a result of wars and the displacement of nations after the collapse of the Roman Empire, populations of old towns may have been replaced by other people which means that their cultural traits and ethnic communities could not have continuous impact. However, a closer examination of the events around the so called collapse of the Roman Empire reveal that in many areas of the Empire the transition was very smooth without any battles and displacement of people. It is well known that many of the barbarian warlords and their armies that turned against the Empire were former commanders in the Roman army. Ghosh (2015) notes that many of the barbarian-Roman military commanders were among the groups labelled (by the Romans) "Franks" or "Goths". Gibbon and Milman (1868), in his influential study of the fall of the Roman Empire, documents that as a result of improper conduct of the Roman authorities, thirty thousand soldiers transferred from the scale of the Romans into that of the Goths. A thesis put forward by Henri Pirenne, argues that Roman cities, trade links and networks were not destroyed by German invaders. In his influential book on medieval cities (Pirenne and Halsey (1925)), the author argues that the objective of the Merovingians was not to destroy the Roman Empire but rather to concur it and use its existing systems. From this discussion follows that the perception that all Roman soldiers and citizens that served in the forts or located around them were fighting against invaders and lost the battle is not well grounded. In many places these people have just switched their nominal affiliation.

These developments emphasize another reason why the cultural effects are more likely to be more visible in Germany, compared with other modern countries, through the territories of which the border passed. The point is that many of these countries such as Hungary, and Slavic countries were settled by tribes coming from the East which had little prior cultural contact with the Romans, so they inherited the physical infrastructure but did not inherit the human relations and networks.

Section 6 provides further discussion of ethnic communities in German towns based on the experience of Jewish communities. There are relatively more abundant sources on the history of Jewish diaspora which help us to better understand and test some of the ideas of the current paper.

3 Empirical Specification and Data

3.1 Empirical Specification

To investigate the role of historical factor on modern migration the following specification is estimated:

$$Mig_{ij} = \alpha + \beta Roads_{ij} + \gamma' X_{ij} + \lambda_j + \epsilon_{ij}, \quad (1)$$

where Mig_{ij} is the ratio of migrants to total population in city or NUTS 3 region i in NUTS 1 (NUTS 2) region j, $Roads_{ij}$ is a dummy variable that takes a value of 1 if there was a Roman road in a given region, X_{ij} is a vector of control variables which is described below. The specification also includes NUTS 1 (NUTS 2) fixed effects (λ_j) to control for different regional policies and a number of other characteristics that affect migration.[1] In all regressions errors are clustered at NUTS 2 level.

The main focus of the paper is the Roman legacy which in captured by the Roman roads variable in specification (1). Alternative specifications look at the effect of Roman forts. Because it is possible to count forts the paper uses the log of the number of forts plus one. The idea is that in regions with more forts the effects discussed in section 2 may be stronger. However, specifications that use a dummy variable regardless of the number of forts yield very similar results.

3.2 Data

Specification (1) is estimated for two different samples: Germany and thirteen European countries including Germany. This is primarily dictated by the specific experience of Germany discussed in section 2. Data sources for both samples are described below. In order to make the estimation consistent, for the second sample the data for Germany is taken from the European sources rather than from the German ones.

The dependent variable in the main specification is the ratio of foreign citizens in total population. For Germany these data come from the Regional Database Germany. The data are at the regional NUTS 3 level. NUTS 3 regions for Germany and for some European countries are sufficiently disaggregated and include a single city. Another indicator that is available from the same source and can be valuable for the current study is the gross inflows of people into regions. This measures internal migration flows rather than international ones. It should be noted that this is a flow

[1] In the case of Germany they can also eliminate both economic and social differences between eastern and western parts.

variable not a stock. For the sample of European countries the data on the fraction of foreign citizens are taken from the Eurostat's Cities (Urban Audit) database. This database defines cities at two different spatial units: Greater Cities and Functional Urban Areas. The Greater City is an approximation of the urban centre when this stretches far beyond the administrative city boundaries. The Functional Urban Area consists of a city and its commuting zone. Estimation results for both spatial units yield very similar results.

The first set of explanatory variables includes geographic ones. Among those are a dummy variable for cities located on navigable rivers, a dummy variable for costal cities, elevation, a variable that measures the ruggedness of the terrain - based on the standard deviation of the the elevation around a given region/city (Nunn and Puga (2012)). Additionally, a dummy variable is generated for cities that are located within 40km distance from a border of another country. For the sample of European countries a distinction is drawn whether the border is with an EU or non-EU country. Finally, a dummy variable indicating capital cities is used for the sample of European countries.

The second set includes historic variables. The data on Roman roads for both samples come from the digitized map of McCormick et al. (2013). On the map (figure 1) some roads appear as dashed lines which indicates that there is no unanimous agreement among historian regarding their existence. Following other empirical papers, this paper considers only those roads that existed with certainty (solid lines). The locations of Roman forts are also taken from the same source. It is worthwhile to point out that Roman forts are very densely concentrated along the borders of the Empire, while that is not the case for roads. Those countries that were in the interior of the Empire have very few forts, for example France. The sample of European countries includes only those that have at least some roads. This choice is made in order to make sure that there is some variation within each country.

To capture the effect of medieval trade, dummy variables are introduced for Hanseatic or trade centers taken from Voigtlander and Voth (2012) for Germany. For other countries a dummy variables are used for those cities that are located on medieval trade routes based on Ciolek (2005)'s digital map.

The last set of variables includes modern social and economic characteristics. All these variables are take from the Regional Database Germany and Eurostat's regional statistics database. One of the crucial variables that needs to be taken into account is the level of income. To this end, GDP per capita is included. Estimations also include the population weighted GDP per capita of regions that are within 50km distance to take into account the possibility of commuting an other spillovers. City size may also positively contribute to migration. This is captured by including total population of cities/regions into equation (1).

Although in the first sample there is only one country while in the second there are thirteen, sample sizes are similar in both cases. This is primarily due to the fact that the Eurostat's Cities database does not cover relatively small towns. For the German sample there are 393 observations out of which 116 are located on Roman roads (table 1).[2] The average share of migrants is about 6 %. The inflow of workers in a given region in a year is also approximately at the same level. Table 2 presents the summary statistics for the sample of European countries. The means are reported for the total sample and for individual countries.

Table 1: Summary Statistics for Germany

Number of observations	393
Mean fraction of migrants	0.063
Mean inflow of residents	0.059
Cities with Roman roads	116
Cities with Roman forts	120

Notes: Summary statistics for German NUTS 3 regions. Inflow of residents are measured as the ratio gross inflows of people to total population in a given region.

4 Results

4.1 Migration in Germany

Table 3 presents the results of estimations that study the effect of Roman roads on the fraction of migrants in German NUTS 3 regions. The first column, along with Roman roads, includes the set of geographic variables. According to this specification, the coefficient on Roman roads is statistically highly significant and its economic effect is substantial. The presence of a Roman road increases the share of migrants by 2 percentage points which is a rather large value, given that the mean share of migrants is 6%. Among geographic factors, ruggedness has a negative effect and navigable rivers have positive effect. Both results are in line with basic intuition.

[2]It should be pointed out that in Regional Database Germany for few regions data on some variables are missing (especially foreign population), however if anything this fact makes the results more consistent because these are predominately rural regions that significantly differ from the remaining sample. Furthermore, in such cases the data are missing for all subregions within a NUTS 2 region not separate NUTS 3 regions. The inclusion of fixed effects at the NUTS 2 level further eliminates remaining concerns.

Table 2: Summary Statistics for Europe

	Obs	Roads	Migrants
Austria	6	6	0.178
Belgium	11	10	0.146
Bulgaria	16	9	0.006
Germany	80	32	0.114
Greece	8	4	0.083
Spain	58	39	0.101
France	77	68	0.058
Croatia	5	3	0.006
Hungary	9	5	0.015
Italy	68	54	0.080
Netherlands	30	7	0.061
Portugal	3	1	0.057
United Kingdom	39	24	0.097
Total	410	262	0.074

Notes: Summary statistics for Europe and individual countries. Migration variables are measured as the ratios of migrants to total population in a given city.

Next column adds an indicator variable for Hanseatic cities. As can be seen, Hanseatic cities have a positive effect on the share of immigrants, the effect is somewhat lower than that of Roman roads. This result indicates that medieval trade also contributed to modern migration. Estimations that use trade centers instead of Hanseatic cities yield similar results.[3] One concern with trade centers is that the presence of a Roman road may have helped some cities to become trade centers because they had better market access and communication links. For this reason, the paper focuses on Hanseatic cites because these cities are located in the northern part of Germany, especially on the shores of the Baltic Sea, so the intersection with Roman roads is minimal. The inclusion of medieval trade variables has little effect on the coefficient of Roman roads.

The results are extended by the inclusion of a dummy for Episcopal cities and modern economic indicators. In these specifications the effect of Roman roads is half as large as in previous cases but still the effect is substantial. The significance of Hanseatic cities decreases. There could be some concerns with this specification because some of modern economic indicators are influenced by historical variables. Anyway, from the table it can be noticed that there is a positive link between GDP per capita and migration. The same is true for GDP per capita in regions within

[3] It should be noted that most Hanseatic cities form a subset of trade centers.

50km range. Alternative specifications with other distances, such as 100km, have much lower effect. This result is very intuitive because many immigrants are relatively poor and may choose to live in more affordable places around rich cities which have more job opportunities, and 50km seems to be a reasonable distance for commuting, while 100km is too much. The size of population is also positively associated with migration.

The fifth column of table 3 replaces the Roman roads variable with Roman forts. The magnitudes of the coefficients cannot be directly compared across specifications because the log of the number of forts is used in column 4, however in specifications that use a categoric variable for forts show that the coefficient for forts is only slightly lower than the one for roads. These findings indicate that in addition to economic incentives provided by roads, retirement patterns of soldiers also had long-run ethnic and cultural effects which contributed to migration. Estimation results for specifications in columns 1-2 for Roman forts yield similar results. As in the case of Roman roads, the estimated coefficients are twice larger in specifications without contemporary economic indicators.

The fifth column considers the effect of Roman roads and forts simultaneously. There is significant overlap between the two variables, however as can be seen both variables are significant. The following column includes an interaction term to take into account the multicollinearity concerns. As can be seen the significance levels of estimated coefficients increases and the interaction term is negative. The last column introduces NUTS 2 - level fixed effects instead of modern economic indicators to address the concern of endogenous dependence of these controls from Roman roads. For Germany, NUTS 2 regions are rather small and many regions are close to the MSA concept in terms of their size, and given that the transportation system is well developed, this specification is very demanding. As pointed out earlier many immigrants may not reside within administrative boundaries of cities because of housing costs, as a result the variation in the share of migrants within NUTS 2 regions is not high.

It is also important to point out that these results are not driven by some large agglomerations such as Frankfurt am Main, Mannheim, Munich and Stuttgart. Excluding these cites yields unnoticeable changes. Another concern could be that many forts are located on the Rhine and Danube rivers, so that may drive the results. First, it should be notices that there are many roads and forts that are located quite far from those rivers. Second, all specifications include controls for navigable rivers. Third, a placebo test that assumes that forts were located along the Elbe river every 10km fails to establish any significant effect. And it should be noticed that there are large cities along this river as well, such as Hamburg, which has a very large migrant population.

4.2 Internal Migration in Germany

The previous subsection reported the results for the stock of international immigrants in Germany. It is also interesting to estimate the effect of Roman legacy on gross inflows of people into regions. It should be noted that there are no distinctions put on nationality of people, so these numbers are most likely to reflect internal flows. It is possible that Roman roads provided initial advantages which made cities richer and they continue to attract more people in general not just international immigrants. Thus, this specifications will shed more light on the existence of this channel and allow us to better understand the underlying mechanisms. The results are presented in table 7 and follow the same structure as in the previous subsection.

From the first three columns, one can observe that there are significant similarities with the results for international migrants but the coefficients are smaller. Once modern economic indicators are included, the statistical significance on the Roman roads coefficient decreases. This coefficient becomes insignificant when the gross inflow variable is replaced with net inflows (not reported here). The effects of GDP per capita in the region and neighboring regions are positive. The same is true about population size.

An interesting result emerges from the fourth column. In sharp contrast to the case of international migrants, here the coefficient on Roman forts is negative and insignificant. These results shed more light on the potential channels. Roads are important pieces of infrastructure that have played an important role in the development of cities and provided economic advantages. Better economic opportunities have historically attracted people of all types and continue to do so. On the other had, forts do not provide economic advantages and, as can be seen from the estimations, they have no impact on the inflows of people in general. However, they have a strong effect on the inflow of international immigrants which supports the cultural and ethnic diversity mechanism describe in the previous sections.

It is important to note that the coefficient on Roman forts is insignificant not only in the specification with full controls but also in all other specifications similar to columns 1 and 2. The last three columns with both fort and road controls and NUTS 2 fixed effects, further confirms that Roman forts have no effect on the inflow of workers, while the coefficients on Roman roads remain highly significant.

To provide further robustness to these results, the paper also defines a new dependent variable which is the ratio of foreign immigrants do domestic ones (i.e., the ratio of the dependent variable in table 3 to 7). The purpose of this specification is to control for the internal inflows and see whether the Roman legacy has impact on international migration. The results are reported in table 5 and confirm previous findings. Both Roman roads and forts have positive impact but the significance level for forts is higher, which indicates that once the general economic importance of regions is taken into account, the effect of the roads becomes weaker compared with forts.

4.3 Migration in Europe

This subsection extends the results regarding international migrants to European countries. The results are presented in table 6. The presence of Roman roads increases the share of migrants by 0.6 percentage points, which is smaller compared with the German case but still the effects are substantial, given that the average share migrants is 7.4%. It should be noted that these results are not driven by Germany. Excluding Germany from the sample reduces the significance of the estimated coefficient on Roman roads but they still remain significant at conventional levels. Navigable rivers also have positive effect on immigration but the coefficient is estimated less precisely compared with the German case. Columns 3 adds modern economic indicators. The coefficient on Roman roads does not change much. City size and GDP per capita are also positively associated with migration as in Germany but the coefficients are not estimated precisely. As in the case of Germany, there could be endogeniety concerns with these variables. For this reason column 4 estimates specifications with Roman roads with NUTS 2 fixed effects. The results are very similar to the ones with NUTS 1 fixed effects. As noted earlier, in the territories of some countries there are very few forts and even if there are they did not play the same role as in Germany. Thus, it is not strange that estimation results reveal that forts do not play any significant role in explaining migration patters in the European sample.[4]

For all specifications medieval trade has no significant effect on migration. This result is unlikely to be caused by the endogenous link between Roman roads and medieval trade because he effect of medieval trade remains insignificant even in specifications that exclude Roman roads. This result is different from what was found for Germany where medieval trade positively contributed to modern migration. Differences in medieval trade patterns across countries and regions may explain these findings. [5]

[4]Since the inclusion of forts also does not affect other variables the results are not reported.

[5]In the Middle Ages public institutions were not strong enough to create the environment to

5 Attitudes towards Immigrants

One of the key hypotheses of the current paper is that cities with Roman roads and forts attract migrants because they created more diverse ethnic networks and affected local culture. This section uses individual-level data from the European Values Survey for Germany to investigate the effect of the presence of Roman roads and forts on the attitudes towards immigrants. Specifications similar to equation (1) are estimated with the difference that the unit of observation is the individual living in NUTS 3 region and the dependent variable is the attitude of the individual towards immigrants. The survey asks a number of questions that can be used to proxy attitudes towards immigrants. In the regressions below the dependent variable is the response to the following statement: Today in Germany, there are too many immigrants. The answers very from agree strongly (1 point) to disagree strongly (5 points), i.e higher points indicating more positive attitudes. Estimations exclude all respondents who were born outside Germany or whose parents were born outside Germany. In addition to the list of regional variables used in section 4.1, the regressions include individual-level controls such as gender, age, income, education. Results of individual-level regressions are presented in table 6.

Specifications in the first two columns include individual and regional geographic controls and fixed effects. Both Roman roads and forts have positive effect on attitudes towards immigrants and the significance level of the fort variable is higher. These findings further corroborate the argument that the initial environment and patterns of settlements that existed around Roman forts played an important role in shaping cultures of settlers and persisted over centuries.

In the following two columns the explanatory variables of interest are GDP per capita and population size respectively, together with geographic and individual controls. Earlier it was discussed that it could be the case that Roman roads caused economic development and this lead to the inflow of immigrants. For this reason Roman variables are not included to avoid endogeniety issues. As can be seen, GDP per capita is not significant and population size is significant but the the level is not very high compared with Roman forts. These results are very robust and hold even in specifications that do not include geographic controls. Separate regressions for Hanseatic cities and trade centers also give similar results (not reported here), which

ensure the circulation of goods across cities. Medieval merchants were able to overcome these difficulties by establishing merchant guilds, which created the legal environment to ensure the smooth functioning of intercity commerce. The effectiveness of such networks relied on merchants' reputation. In some regions traders in such networks were members of some closed communities and they did not travel with their goods (see Greif (1993) for the discussion of the Maghribi traders and their practices).

indicates that trade cities attract more migrants because they were and continue to be relatively wealthy but the effect on cultural attitudes is not very strongl. Putting this together with the results in section 4.1, it can be concluded that wealthier cities attract more migrants because of job opportunities not because people have more positive attitudes towards immigrants.

The signs of individual-level controls are in line with economic intuition. Higher income and education level improve attitudes towards immigrants. Female respondents and younger people tend to have more positive attitudes but the significance levels are not high.

Columns 5 and 6 include the full list of controls. The coefficient on Roman forts remains highly significant. The last column shows the results for regressions that include both forts and roads. As can be seen both variables are significant.

The survey contains some other questions that are related to migration. For example, it asks a question regarding the group of people that respondents would not like to have as neighbors and the answers include migrants, representatives of minorities, etc., along with other social groups. With this variable the sample is somewhat smaller and there could be issues with selection because those people who prefer not to answer may belong to a specific group. Anyway, probit and OLS models based on this question delivers very similar results.

6 Evidence from the Middle Ages

To assess whether the link between the Roman heritage and migration is a recent phenomenon or it existed in earlier periods, this section uses the dataset of Voigtlander and Voth (2012) and estimates regressions that try to establish a link between Roman forts and Jewish settlements in German towns in 1349. Jews represent a specific community of migrants and in the absence of data on general migration in earlier periods Jewish settlements may be a good proxy. The history of Jewish diaspora is relatively well-studied by scholars which opens the possibility of carrying out empirical tests and discussing the mechanisms described in this paper. The presence of Jewish settlements in the territory of modern Germany goes back to the Roman period. There is documented evidence that in 321 CE, Emperor Constantine the Great appointed Jews to the Cologne's Town Senate. This is the first evidence of the existence of a Jewish community but it is evident that by that time Jewish community was well-established in the city. According to Toch (2012), in addition to Cologne, signs of Jewish presence in the Roman period were found in Augsburg, Burgaltendorf (part of Essen), Burghofe (40 km north of Augsburg) and Trier. These findings are based on historical documents and archeological excavations. It is notable that in Burghofe, remnants of Jewish culture were found around a Roman fort.

With the arrival of Christianity in Europe the situation of Jews worsened and they were deprived from some of their rights, especially during the reign of Justinian (527-565). However, Jews adapted to the changing environment and responded to Justinian's attacks by joining Germanic invaders and fighting agains the Empire in different territories (Katz (2006)). There are also documents that confirm the presence of Jews in Germany during the Early Middle Ages period. With declining urban population and commerce across Europe, the sizes of Jewish communities and their role evolved accordingly but historical sources indicate that there was a continuous Jewish presence in the region.

To estimate the persistent effect of ethnic networks, the first two columns of table 8 combine the Roman fort data with the dataset of Voigtlander and Voth (2012) and investigates whether Roman forts had a positive effect on the existence of Jewish settlements in 1349.[6] For detailed description of variables the reader is referred to the original paper by Voigtlander and Voth (2012). The first column, in addition to Roman forts, includes geographic controls and a dummy for Staufer cities because these are exogenous variables. The second column includes a number of other variables characterizing political and economic status of towns in 1349. Since some of those variables may rise endogeniety concerns, the results are reported separately. For both specifications Roman forts have positive effect on the existence of Jewish settlements. Estimations with Roman roads variable produce similar results but significance levels are lower, which is consistent with the idea that roads improved economic opportunities and increased incentives of immigrants to go to such placed but they were less likely to affect culture directly.

In the following columns, an alternative approach is used to explore the persistent effect of ethnic communities. Here the key explanatory variable (Distance) is the minimal distance (in logs) from one of the five locations with sings of Jewish presence in the Late Antiquity period taken from Toch (2012) (see the discussion above). The results show that the increasing distance from cities with Jewish communities in Roman Germany had a negative effect on the existence of Jewish communities in 1349.

In the following four columns the dependent variable is the age of Jewish communities and the sample includes only towns with Jewish communities in the Mid-

[6] In the study by Voigtlander and Voth (2012) the choice of the year 1349 is motivated by the pogroms that occurred as a result of the Black Death. In the context of the current study it provides the advantage that this year precedes the Protestant Reformation which, according to Becker and Pascali (2016), increased persecutions of Jews in some areas.

dle Ages. For this measure estimations fail to establish a positive effect of Roman forts on the age of Jewish communities. However, from the seventh column it can be seen that the minimal distance from the locations with Jewish presence in the Antiquity had a negative effect on the age of Jewish communities in the Middle Ages, which indicates that other things being equal, towns located closer to one of those locations tend to have older Jewish communities. This result further corroborates the persistent effect of diasporas. In the specification with full controls the significance of the estimated coefficient is lower.

Table 3: The Effect of Roman Legacy on Migration in Germany

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Roman road	0.022***	0.022***	0.011**		0.016***	0.026***	0.011*
	(0.006)	(0.006)	(0.005)		(0.006)	(0.007)	(0.006)
Roman fort				0.009**	0.009*	0.015***	0.009*
				(0.003)	(0.005)	(0.005)	(0.006)
Coastal city	-0.011	-0.013*	-0.004	-0.002	-0.009	-0.008	-0.013
	(0.008)	(0.007)	(0.011)	(0.010)	(0.007)	(0.007)	(0.009)
Ruggedness	-0.009*	-0.010**	-0.005	-0.006	-0.009*	-0.009**	-0.006
	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
Elevation	0.002	0.002	0.003	0.004*	0.003	0.003	-0.001
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)
Navigable river	0.010**	0.010**	0.003	0.003	0.009**	0.010**	0.015***
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)
Border	-0.006*	-0.005	0.002	0.004	-0.004	-0.004	-0.006
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
Hanseatic city		0.017***	0.003	0.003			
		(0.006)	(0.004)	(0.004)			
Episcopal city			-0.000	0.001			
			(0.003)	(0.003)			
GDP per capita			0.062***	0.063***			
			(0.005)	(0.005)			
GDP 50km			0.037***	0.038***			
			(0.012)	(0.010)			
Size			0.008**	0.008**			
			(0.003)	(0.003)			
Interaction						-0.020**	-0.016*
						(0.009)	(0.009)
NUTS 1 effects	Yes	Yes	Yes	Yes	Yes	Yes	No
NUTS 2 effects	No	No	No	No	No	No	Yes
R-squared	0.507	0.514	0.693	0.695	0.518	0.526	0.605
N	393	393	393	393	393	393	393

Notes: OLS regressions where the dependent variable is the fraction of foreigners in in total population. All regressions include NUTS 1 (NUTS 2) - level fixed effects. Errors are clustered at NUTS 2 level and reported in parentheses. * (**) (***) indicates significance at the 10 (5) (1) percent level.

Table 4: The Effect of Roman Legacy on Regional Inflows of People in Germany

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Roman road	0.007***	0.006***	0.003*		0.008***	0.012***	0.007***
	(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)
Roman fort				-0.001	-0.002	0.000	-0.001
				(0.001)	(0.002)	(0.002)	(0.002)
Coastal city	-0.008**	-0.009***	-0.006	-0.006	-0.009**	-0.008**	-0.010**
	(0.004)	(0.003)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Ruggedness	-0.002	-0.003	-0.001	-0.002	-0.002	-0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Elevation	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Navigable river	0.001	0.001	-0.001	-0.001	0.001	0.002	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Border	-0.001	-0.000	0.002	0.002	-0.001	-0.001	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Hanseatic city		0.005*	-0.000	-0.000			
		(0.003)	(0.003)	(0.003)			
Episcopal city			0.005	0.005*			
			(0.003)	(0.003)			
GDP per capita			0.014***	0.015***			
			(0.003)	(0.003)			
GDP 50km			0.008	0.011**			
			(0.005)	(0.005)			
Size			0.004**	0.004***			
			(0.001)	(0.002)			
Interaction						-0.008***	-0.004
						(0.003)	(0.003)
NUTS 1 effects	Yes	Yes	Yes	Yes	Yes	Yes	No
NUTS 2 effects	No	No	No	No	No	No	Yes
R-squared	0.420	0.426	0.522	0.517	0.423	0.435	0.507
N	393	393	393	393	393	393	393

Notes: OLS regressions where the dependent variable is the ratio of incoming residents to total population. All regressions include NUTS 1 (NUTS 2) - level fixed effects. Errors are clustered at NUTS 2 level and reported in parentheses. * (**) (***) indicates significance at the 10 (5) (1) percent level.

Table 5: The Effect of Roman Legacy on Regional Inflows of People in Germany

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Roman road	0.235***	0.230***	0.112		0.114	0.222**	0.057
	(0.079)	(0.080)	(0.077)		(0.082)	(0.089)	(0.092)
Roman fort				0.159***	0.186***	0.246***	0.166*
				(0.046)	(0.060)	(0.072)	(0.093)
Coastal city	-0.097	-0.115	-0.017	0.017	-0.051	-0.048	-0.124
	(0.117)	(0.100)	(0.166)	(0.147)	(0.097)	(0.096)	(0.131)
Ruggedness	-0.073	-0.085	-0.028	-0.039	-0.081	-0.081	-0.010
	(0.077)	(0.081)	(0.080)	(0.074)	(0.074)	(0.074)	(0.096)
Elevation	0.020	0.020	0.039	0.063	0.048	0.050	-0.018
	(0.043)	(0.043)	(0.044)	(0.042)	(0.040)	(0.040)	(0.055)
Navigable river	0.114*	0.115**	0.052	0.037	0.095*	0.106*	0.161***
	(0.057)	(0.056)	(0.045)	(0.046)	(0.055)	(0.056)	(0.056)
Border	-0.088	-0.081	0.003	0.036	-0.046	-0.050	-0.100
	(0.057)	(0.057)	(0.052)	(0.058)	(0.061)	(0.062)	(0.102)
Hanseatic city		0.141	0.039	0.032			
		(0.144)	(0.137)	(0.134)			
Episcopal city			-0.087	-0.076			
			(0.085)	(0.081)			
GDP per capita			0.747***	0.735***			
			(0.061)	(0.059)			
GDP 50km			0.526**	0.497**			
			(0.218)	(0.196)			
Size			0.010	0.005			
			(0.067)	(0.068)			
Interact						-0.211*	-0.196*
						(0.120)	(0.114)
NUTS 1 effects	Yes	Yes	Yes	Yes	Yes	Yes	No
NUTS 2 effects	No	No	No	No	No	No	Yes
R-squared	0.520	0.522	0.619	0.630	0.536	0.540	0.626
N	393	393	393	393	393	393	393

Notes: OLS regressions where the dependent variable is the ratio of foreign immigrants to total incoming residents. All regressions include NUTS 1 (NUTS 2) - level fixed effects. Errors are clustered at NUTS 2 level and reported in parentheses. * (**) (***) indicates significance at the 10 (5) (1) percent level.

Table 6: The Effect of Roman Roads on Migration in Europe

	(1)	(2)	(3)	(4)
Roman road	0.006***	0.006***	0.005**	0.006**
	(0.002)	(0.002)	(0.002)	(0.002)
Coastal city	0.002	0.002	0.002	0.005
	(0.003)	(0.003)	(0.003)	(0.004)
Ruggedness	0.001	0.001	0.001	0.003
	(0.002)	(0.002)	(0.002)	(0.003)
Elevation	0.001	0.001	0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)
Navigable river	0.005*	0.005*	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.004)
EU border	0.000	0.000	0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.003)
Non-EU border	-0.003	-0.003	-0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)
Trade route		0.000	-0.001	
		(0.002)	(0.002)	
GDP per capita			0.005	
			(0.005)	
GDP 50km			-0.000	
			(0.001)	
Size			0.002	
			(0.002)	
Capital			-0.007	
			(0.007)	
NUTS 1 effects	Yes	Yes	Yes	No
NUTS 2 effects	No	No	No	Yes
R-squared	0.746	0.746	0.749	0.845
N	410	410	410	410

Notes: OLS regressions where the dependent variable is the fraction of immigrants in in total population. All regressions include NUTS 1 (NUTS 2) - level fixed effects. Errors are clustered at NUTS 2 level and reported in parentheses. * (**) (***) indicates significance at the 10 (5) (1) percent level.

Table 7: Attitudes towards Immigrants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Roman road	0.660*				0.727		0.843***
	(0.379)				(0.451)		(0.235)
Roman fort		0.335***				0.332***	0.357*
		(0.116)				(0.113)	(0.190)
GDP per capita			0.099		-0.153	-0.174	
			(0.308)		(0.353)	(0.356)	
Size				0.263*	0.213*	0.263**	
				(0.131)	(0.124)	(0.121)	
Hanseatic city					0.226	0.149	
					(0.199)	(0.166)	
Episcopal city					-0.278	-0.155	
					(0.297)	(0.304)	
GDP 50km					-0.463	-0.351	
					(0.281)	(0.266)	
Coastal city	0.036	0.031	0.025	0.030	-0.128	-0.086	0.030
	(0.208)	(0.208)	(0.228)	(0.203)	(0.220)	(0.210)	(0.211)
Ruggedness	-0.030	-0.032	-0.074	-0.071	-0.028	-0.038	0.007
	(0.138)	(0.145)	(0.171)	(0.155)	(0.144)	(0.147)	(0.142)
Elevation	-0.004	-0.010	-0.016	0.007	0.048	0.034	-0.022
	(0.136)	(0.133)	(0.140)	(0.121)	(0.123)	(0.117)	(0.134)
Navigable river	0.079	0.077	0.129	0.098	0.069	0.063	0.067
	(0.118)	(0.118)	(0.154)	(0.135)	(0.163)	(0.170)	(0.117)
Border	0.144	0.153	0.204	0.213*	0.126	0.150	0.101
	(0.124)	(0.137)	(0.143)	(0.124)	(0.138)	(0.132)	(0.130)
Income	0.057***	0.058***	0.060***	0.062***	0.060***	0.062***	0.058***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Gender	-0.068	-0.070	-0.077	-0.066	-0.053	-0.056	-0.067
	(0.061)	(0.063)	(0.062)	(0.064)	(0.063)	(0.065)	(0.062)
Age	-0.164	-0.178	-0.177	-0.178	-0.180	-0.190	-0.166
	(0.137)	(0.140)	(0.139)	(0.136)	(0.123)	(0.125)	(0.138)
Education	0.433***	0.421***	0.425***	0.438***	0.431***	0.426***	0.418***
	(0.110)	(0.110)	(0.111)	(0.111)	(0.108)	(0.109)	(0.105)
Interaction							-0.569*
							(0.289)
R-squared	0.229	0.229	0.223	0.230	0.241	0.239	0.234
N	1360	1360	1360	1360	1360	1360	1360

Notes: OLS regressions where the dependent variable is the answer to the survey question (higher values mean more positive attitudes towards immigrants). All regressions include NUTS 2 - level fixed effects. Errors are clustered at NUTS 2 level and reported in parentheses. * (**) (***) indicates significance at the 10 (5) (1) percent level.

Table 8: Medieval Jewish Settlements

	Jewish comm. existed in 1349				Age of Jewish comm. in 1349			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Roman fort	0.192***	0.169***			-0.068	-0.072		
	(0.042)	(0.044)			(0.100)	(0.094)		
Distance			-0.067***	-0.046**			-0.111*	-0.056
			(0.020)	(0.021)			(0.058)	(0.051)
Navigable river	0.146***	0.084*	0.161***	0.098**	0.178	0.071	0.206	0.085
	(0.047)	(0.046)	(0.046)	(0.045)	(0.131)	(0.123)	(0.135)	(0.126)
Isolated town	0.109**	0.102*	0.103*	0.097*	-0.291**	-0.233*	-0.235*	-0.203*
	(0.055)	(0.054)	(0.056)	(0.056)	(0.121)	(0.121)	(0.126)	(0.121)
Staufer city	0.408***	0.227**	0.406***	0.226**	0.112	-0.128	0.136	-0.098
	(0.075)	(0.091)	(0.069)	(0.089)	(0.188)	(0.201)	(0.191)	(0.200)
Age of City in 1349		0.086***		0.090***		0.184***		0.174***
		(0.020)		(0.020)		(0.066)		(0.067)
Hanseatic city		0.193***		0.190***		-0.118		-0.081
		(0.070)		(0.068)		(0.204)		(0.206)
Incorporated 1349		0.138***		0.138***		0.142		0.152
		(0.036)		(0.037)		(0.096)		(0.095)
Free Imperial city		0.218***		0.214***		0.365**		0.350**
		(0.058)		(0.057)		(0.156)		(0.154)
Market town 1349		0.117**		0.121**		0.142		0.140
		(0.046)		(0.047)		(0.108)		(0.108)
Episcopal city		0.078		0.055		0.598**		0.576**
		(0.086)		(0.087)		(0.251)		(0.255)
R-squared	0.064	0.164	0.051	0.150	0.067	0.206	0.079	0.208
N	702	700	702	700	270	269	270	269

Notes: All regressions run by OLS. Standard errors in parentheses (clustered at the county level). "Isolated town" is a dummy set to 1 for cities with above-median ruggedness (calculated within a 20 km perimeter); for cities located on a navigable river, this dummy is set to 0. "Distance" measures the log of smallest distance from the locations where some signs of Jewish presence had been found in the Antiquity. All age variables are in logs. Further details on variables and their sources can be found in the paper by Voigtlander and Voth (2012). * (**) (***) indicates significance at the 10 (5) (1) percent level.

7 Conclusions

This paper shows that Roman roads and forts have positive effect on the share of migrants in modern cities. Clearly the tendency of migrants to go to places with relatively higher levels of income has played a role over the historical process. However, the results presented in the paper provide strong support for the argument that Roman roads and especially forts affected cultures of cities directly and this contributed to the inflow of immigrants. Given the earlier studies have established a positive effect of cultural diversity on economic growth, the findings of the current paper may help us better understand the channels through which the Roman legacy affects the economic performance of modern European cities/regions.

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