Migration from East to West:
Investigation from the EU Enlargements
on the city-size level

Author: Fabian Kranebitter and Carolin Wild
Supervisor: Univ.-Prof. Mag. Dr. Michael Pfaffermayr

A thesis submitted in fulfillment of the requirements
for the degree of Master of Science
in the
Faculty of Economics and Statistics
Department of Economic Theory, Policy and History

Submission date: February 7, 2017
Migration from East to West: 
Investigation from the EU Enlargements on the 
city size-level 

Fabian Kranebitter and Carolin Wild 

February 7, 2017
List of Figures

1 Growth of European cities ........................................ 20
2 Population in European Cities ..................................... I
3 Core City and the Larger Urban Zone ............................. II

List of Tables

1 Structure of our Master Thesis ................................. v
2 Difference-in-Difference ........................................... 32
3 Table of the Accession to the EU from the past 25 years .... III
4 Table of Treatment: General ....................................... IV
5 Table of Treatment: First Enlargement ......................... IV
6 Table of Treatment: Second Enlargement ....................... V
7 Table of Treatment: Third Enlargement ......................... V
8 Table of Treatment: Fourth Enlargement ....................... VI
9 Table of Hausman Test ........................................... VI
10 Table of LBI Test (Baltagi-Wu) ............................... VII
Declaration of Authorship

I, Fabian Krunebitter certify that the work presented here is, to the best of my knowledge and belief, original and the result of my own investigations, except as acknowledged. Where I have consulted the work of others, this is always clearly stated. It has not been submitted, either in part or whole, for a degree at this or any other university.

Date and place:

Signature:
Declaration of Authorship

I, Carolin Wild certify that the work presented here is, to the best of my knowledge and belief, original and the result of my own investigations, except as acknowledged. Where I have consulted the work of others, this is always clearly stated. It has not been submitted, either in part or whole, for a degree at this or any other university.

Date and place:

Signature:
Table 1: Structure of our Master Thesis

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>Fabian</td>
</tr>
<tr>
<td>2. Theories and Literature Survey</td>
<td>Fabian and Carolin</td>
</tr>
<tr>
<td>2.1. Definition of a City</td>
<td>Carolin</td>
</tr>
<tr>
<td>2.2. Agglomeration economics</td>
<td>Fabian</td>
</tr>
<tr>
<td>2.2.1. European Integration and Agglomeration economics</td>
<td>Fabian</td>
</tr>
<tr>
<td>3. Empirical Analysis</td>
<td>Fabian and Carolin</td>
</tr>
<tr>
<td>3.1. Descriptive Analysis</td>
<td>Carolin</td>
</tr>
<tr>
<td>3.1.1. Data Description</td>
<td>Fabian</td>
</tr>
<tr>
<td>3.2. Diff-in-Diff</td>
<td>Carolin</td>
</tr>
<tr>
<td>4. Results</td>
<td>Fabian</td>
</tr>
<tr>
<td>5. Conclusion and Discussion</td>
<td>Carolin</td>
</tr>
</tbody>
</table>
Abstract

In our thesis we tried to investigate the influence of the accession to the European Union on the city growth. We took the last four enlargement rounds beginning in 1995 and took the first difference to find if the accession has an consequence on the population growth in their cities. The data was provided by the Urban Audit database from Eurostat and displayed over 600 cities. Subsequently we found an link mostly for the eastern enlargements on the city growth, which declined over the time. Finally our thesis supports the migration from Eastern EU members to the Western member states.
1 Introduction

Through the accession of Croatia in 2013 the EU reached a size of over 4 million square kilometers. This in combination with the principal of free movement — which was developed over the past sixty years as the EU was buildup — created for the citizens of the EU now innumerable opportunities to life and work inside the EU boarders. So a massive area is now available for the people and they can now choose where they want to study, work, or start a family. This might lead to an somewhat concentration of several centers of living, since the most attractive cities might gain the most of the free movement principal. This is why we focused our thesis on this issue if the Enlargements of the past twenty years, especially for the Baltic and former USSR members in East Europe, changed the population in the cities.

We especially focused on the city-level since a newly database of Eurostat is focusing on cities including characteristics, like crime rate or education.

Cities play an important role for the national economy and innovation capacity. So they are highly attractive for poorer people to live a better life. Subsequently in 2011 more than half of the worldwide population is urban (Glaeser, 2011) and the UN predicts and rise of in this number for the next decades. (United Nations, 2013)

This development puts pressure on the urban planning and the city authorities since with more influx of people the city has to manage this. Further cities itself are constantly changing through the cultural and societal changes. Although the fascinating part is here the reinventing of these cities and the potential it can hold to flourish and become an vibrant and innovative place again.

Our thesis as aforementioned is focusing on the topic of city growth and the influence of the accession to the EU. To measure if there is an difference between before the enlargement and afterwards we use the Difference-in-Difference method, or first difference. In our descripive analysis of the Data and Model
we are discussing this in more detail. To put it simple we are looking at the population growth in the city before the EU membership and compare it with the growth after the countries joined the EU.

Further with this method we hope to find also a result on the process of the European Integration. So if the principal of free movement is seen as an incentive for the European citizens which they can profit from or if the possible disadvantages are to high — like language differences — to limit the migration process within the EU. This discussion will be briefly described in the following and also which programs the EU Commission developed to tackle these issues.

The approach we are taken in this thesis is somewhat different to the most papers on this topic in two regards. The first one is the use of the Database which is focused on cities rather than the approach of most papers which are taking the NUTS regions into account. (Artis, Curran, and Sensier, 2011; Ciccone, 2002) And the second one is the Difference-in-Difference method we are using to investigate the city growth. (Bosker and Marlet, 2006)

Nevertheless before we will discuss the results and the implications we draw from them our thesis begins with the theoretical approach on urban economics. In our case we initially looked at the definition of a city and thought outside the box for the definition of cities. Which is followed by the infamous concept of Agglomeration effects in cities. Through the forming of clusters in dense areas firms which frequently operate with each other experience a decrease in transport costs since they are located near supplementary firms and also close to the consumer.

This was the classical view on the advantages of agglomeration. Although with the development of transport vehicles, like ships, trains and trucks, the associated costs decreased dramatically and so the concept of agglomeration suggests no real advantage for clustering in an area. To put in other words with the sharp fall of transport costs in the last century it does not matter anymore where a firm is located which has certain implications for cities, like urban sprawl. Urban sprawl means in this context that people which where living in a city move to low density
rural land (Glaeser, 2011). But as we see nowadays this effect did not really affect the development of cities that much and they still are places of innovation and attractive to life.

We did not account for the British referendum on leaving the EU, which occurred on the 23. June 2016. Since the Brexit and its further implications on the economy is an ongoing discussion, especially in our case the change for the British cities in the next years, and pure speculation we won’t go into more detail. Nevertheless the issue of what will happen with about 3 million EU citizens which are living in the U.K. is interestingly enough and will post as an attractive topic for future research. (White, 2016)
2 Theories and Literature Survey

To introduce our work we think that it is important to explain first of all the concept of a city and a definition on it. Finding a uniform definition would extend the scope of our thesis, but we try to give a short overview of various definitions determining the harmonized definition of a city of the OECD as given. Furthermore we want to represent the concept of a city from different points of view. Especially from the historic, economic geographic and sociological point. In the next session of our work we want to capture the topic of agglomeration in relation with city growth and European integration.

2.1 General Definition of a City

As we just underlined in the introduction of this chapter finding a uniform definition of a city is not as easy as it seems at the first moment. The difficulty is to find a tangible clarification of what a city constitutes, given the diversity of urban realities around the world. Fact is that since 2007, more than half of the world’s population is already located in cities and it is estimated to exceed 70 percent in 2050. (United Nations, 2013)

This was the view on the whole world, but how does the situation in Europe looks like? In Europe \( \frac{3}{4} \) of the population life in so called build up areas. (Eurostat, 2016b) These are cities, towns and suburbs. Living in a city has a lot of advantages for its inhabitants and provides therefore a lot of socioeconomic benefits. The concentration of people, investments and resources increase economic development and therefore innovation and social interaction. (Dijkstra and Poelman, 2012)

Cities provide to their inhabitants public services such as water and sanitation, health care, education emergency, etc. But what cities are, is already not defined. (United Nations, 2013)
In this context the OECD (Economic Cooperation and Development) in collaboration with Directorate-General for Regional and Urban Policy (DG REGIO) and Eurostat has tried to harmonize the definition of a city for their member states to facilitate the comparability between cities but also to underline the credibility of cross country analysis. (Dijkstra and Poelman, 2012)

“A city consists of one or more local administrative unit (LAU) where the majority of the population lives in an urban center of at least 50,000 inhabitants (previously known as the core city)”. (Eurostat, 2016b)

This definition we have taken as given for our work because it fits best for our dataset which we have selected from the Eurostat database.

2.1.1 Further definitions

The concept of a city given by the new economic geography is similar to the previous definition but emphasizes other perspectives which helps us to explain the concept of a city more precisely. The new economic geography includes growth in their explanations in connection with innovation that:

“...The new economic growth theory suggests that cities should be understood as centers of idea creation and transmission. If this is so, then cities will grow when they are producing new ideas or when their role as intellectual centers is increasing in importance.” (Glaeser, 2000)

Meaning that this authors see cities as places where new idea creation is conglomerated. This has the additional benefits that firms and workers are concentrated at one special place where ideas where brought to the firms. The result of this mechanism is therefore faster growing of the cities. (Glaeser, 2000)

Sociologists describe cities for example as “...a state of mind, a body of customs and traditions, and of the organized attitudes and sentiments that inhere these custom and are transmitted with this tradition.” (Park, Burgess, and McKenzie, 1984).

This point of view, underlines moreover the cultural and emotional background
of the inhabitants of a city and brings out, that cities are not only centers of idea creation and growth but are also central point of tradition and cultural development.

We think that with this definitions we have given a brief overview and simultaneously demonstrated how broad the spread of diverse viewpoints is and want to conclude this section of our work.

2.2 Agglomeration

One of the most discussed issues regarding the urban economics are the agglomeration economics. Whether as in our case to find a reason behind the growth or development of the European cities or for whole regions. The discussion on these effects lead to various research in the last decades and not surprisingly to many different results. Further the research on European countries only recently got more attention. It started with the paper of Ciccone (2002). Where he examined the agglomeration of five European countries: Germany, United Kingdom, the Netherlands, Spain and France. His results suggest approximately an agglomeration effect of 4.5 %. Which is about the same as for the U.S.(Ciccone and Hall, 1996)

2.2.1 Agglomeration economics and the relation to city growth

For cities though one of the first and most respected paper was from Glaeser et al. (1992). There they wanted to find a reason why cities grow and moreover if the agglomeration has an effect on the growth and development of a city. The result of this work proposed a mixed result. So no clear effect of agglomeration economics on the growth of cities was detected. These findings where supported by the analysis of Melo, Graham, and Noland (2009).

Before we go deeper in the analysis of agglomeration economics we first need to define these effects. Agglomeration effects theoretical define the clustering of
economic activity, created and sustained by some circular logic. (Fujita, Krugman, and Venables, 2001)

In other words firms with the same goods or in the same industry are in close proximity to one another. Through this clustering the firms benefit from each other in the means cost effectiveness or human capital. Further these effects can lead to advantages for the city as a whole and especially the economy in the city. Since through the effects of agglomerations new firms and civil services will locate near to the clustered area. The most famous example is Silicon Valley. For the European Area examples include the City of London or the Ruhrgebiet in Germany.

One of the first how gave thoughts about agglomeration economics was Alfred Marshall in Principal of Economics. There Marshall (1890) describes three types of agglomeration: sharing of inputs, labor market pooling and knowledge spillover.

A larger market allows for more efficient sharing of local infrastructure and facilities. So a variety of intermediate input suppliers or a pool of workers with similar skill are shared in this areas. When industries buys a lot from other industries the importance of input sharing for its concentration will depend on whether those other industries are, in turn, spatially concentrated or dispersed. (Puga, 2009)

For instance, the meat processing industries is a large buyer from farms and plastic film industry. However farms and the plastic industry are dispersed across the country and not concentrated in one area. This means now for the meat processing industry they have no reason to spatially concentrate because they get their inputs everywhere. (Puga, 2009)

Since the clustering of an industry also leads to an cluster of labour skills, also known as labour pooling. So not only a specific industry is clustered but also the people working there have all similar skills. On the one side an sudden unemployment can be easier dealt with since other firms with possible need for these skills are nearby. On the other side we have also to think about the consequences
of concentration of one industry in a city, like for example the city of Detroit.

In Detroit since the 20th century the automobile industry played a very big role until the foreign competition caught up to the production in Detroit until they could produce cheaper than Detroit’s firms. So the industry crumbled which than lead to an rise in unemployment and finally to migration out of the city. Detroit lost about $\frac{1}{3}$ of it’s city size since than. (Glaeser, 2011)

So an ideal concept for an city would be to have some clusters of industries around the city. Since an negative shock in one of these industries can easier be lifted by the rest of the city.

But also the firms could undergo the process of expansion or — positive shock — which than will increase the wages. This now can lead to higher consumption within the city and further attract new people — since new jobs are created — and in the end the city heads to more growth. (Puga, 2009)

This effect also concerns the better matching between the employees and employers or business partner due to the large market access. With the higher market access the chance of mismatches can be decreased and from the point of the employee the chance of finding an suitable job can be increased. (Puga, 2009)

The last type of agglomeration regarding Marshall describes the knowledge spillover or learning within a city or industry. Then besides this purposeful transmission of knowledge also the casual and unintended flow of information emphasized and facilitates in big cities. In other words bars, locals and other amenities in the city can lead to social interaction besides work, to discussions or exchange of ideas. Which than can lead to new products. We have to assume that this workers do not trade secrets but instead talk about work and their issues. So knowledge will be shared through the employees of the same industry. (Puga, 2009)

We now only described the positive effects of the agglomeration effect. But in large and dense area congestion surrounding and within cities is an recurrent issue. For people driving to work in the city this means they have to add extra
time for these congestions to arrive in time to their job. So these people lose a portion of their leisure time due to these congestions.

Another prominent example is the crime rate in cities, which can be higher in large cities. So the people living there have to bear the cost of securing their homes or the cost of getting robbed.

In the literature these negative effects are often known as congestion agglomeration. We already described two of these types of agglomeration but there are many more, like air pollution. Which can all be seen as costs for the people living in cities and further these negative effects now restrain the overall effect of agglomeration on the development of a city.

So the congestion issues surrounding the city limits the growth.(Puga, 2009) Which means the more the people migrate to cities the more the negative effect will rise until a point is reached where the positive and the negative effects will cancel each other out and migrating to the city has mostly negative effects. On the other side a very attractive city has more incentive to migrate to this area which will consequently lead to growth of this city.

Kahn (2010) describes in his paper three negative effects of agglomeration, namely commute time, urban air pollution and crime. Further the author looked at this three effects over time in the U.S. and his results suggest that the air pollution and the crime rate declined and the commute time was stable over time in the cities.

With that said we now described the agglomeration effects on all their sides. Now our thesis is concentrated upon on the growth of European cities which will be further discusses in more detail. First we will state some facts about the migration within the EU and draw our conclusion to the agglomeration effects. Further an short history about the principal of free movement and the integration in the EU over time will be presented. And lastly we will briefly discuss the issues and possible approach for the ongoing process of integration.
2.2.2 European Integration and Agglomeration economics

The Integration or migration within in the EU is rather low compared to the U.S. Annually the migration in the EU is about 0.3% and about 3-5% of citizen in the union live in another region from where they where born. The interregional migration accounted for about 1%. For the U.S. the ratio is about eight to ten times higher, in comparison. (Bashund and Busse, 2014)

As mentioned in the beginning of this section the agglomeration in Europe according to the study of Ciccone (2002) is about as big as in the U.S.

The question here now is if agglomeration and the accompanied effect can become an incentive for people to move away from cities where the possibilities for firms and workers are strongly limited, due to the size. Put in other words we want to find out of what does the city growth depend in the EU. Further we likely see a migration from the new member states in eastern Europe to the western members.

This possible scenario can happen since we recall that firms have an incentive to locate where firms of the same industry are located. The workers have a better chance and subsequently a more suitable job in a larger city than compared to a small town. So from this theoretical points on we should see a migration from the poorer regions of the EU — at least from the young people — to the richer ones.

Further we want to look into other variables which might affect the city growth, like education or the unemployment rate. Also as stated above we will look into the possible implication of the foreign EU citizens.

From the theoretical stance in the European context integration accompanied with agglomeration may lead to different possibilities. If trade costs remain relatively high, due to for example language differences, markets will remain segmented. Here we have to keep in mind that also other issues can be the cause for the disincentive to move within the EU. These will be later discussed in more
If EU markets are more integrated, but not enough to create agglomeration, several centers may coexist, each with an area to influence. Finally if the point of total agglomeration is reached there will be greater efficiency through lower costs and greater scales of economies in the long run. Further adjustment of costs, like the reduction of the real wages in those countries that lose industry and/or employment. (Marques, 2008)

The main effect of integration would be concentration of economic activity in those regions that allow for greater reduction in trade costs and greater scale economies through market access and affecting negatively the peripheral regions.

Therefore the main lesson for Europe is not the fear the de-industrialization of the periphery but to map the distribution of industrial sectors to the geography of countries to match the differences characteristics of each state. (Marques, 2008)

In other words through the possible scenario of the clustering of a few centres in the European Union we should not stop this development rather the EU should foster the advantages of the different regions inside the Union for the different industrial sectors. Subsequently we should also think about the implications on the concentration of a few big cities, the rural depopulation, which will be discussed further in this thesis.

After we now laid down the theoretical approach and research which was done to display the migration within the area of the European Union. The following will briefly describe the history behind the migration and additionally discuss some issues regarding the low level of the free movement in the EU.

### 2.2.3 European Integration

With the formation of the single market the EU encourages the mobility within the union. First of with the introduction of the principle of free movement — as one of the four cornerstones of the EU’s internal market — for citizens within
the EU initiated by the Treaty of Rome in 1958. This was then taken further with the extension of the Maastricht Treaty enforced 1993. There it was stated “Every citizen of the Union shall have the right to move and reside freely within the territory of the Member States.

In 1997 with the Amsterdam Treaty and the Schengen agreements this concept of free movement within the EU was developed further. (Riso, Secher, and Andersen, 2014)

As was stated in some papers Raines (2000) and Baslund and Busse (2014) the integration since the principle of movement was developed is increasing. As an example since the first eastern enlargement in 2004 about 1% more EU citizen leave in abroad regions. So we see slowly over time the single market of the EU is getting more cohesive. Although the union has still steps to undergo to fully grasp the potential which lies within the integration. In the sense that in some regions and cities skills shortage is an issue, which could be dealt with if the integration would work as an incentive to live abroad. (Baslund and Busse, 2014)

Now the question arises why the lack of mobility in the EU is still a current problem. This issue is there since the beginning of the EU and although some measures have been taken since the principal of movement was developed in the 1960’s the integration is still at a very low point nowadays.

In the following we will briefly discuss the different problems and the disincentive to move within the EU. After we state some approaches taken from the EU commission to tackle the low integration within the EU.

2.2.4 Issues of mobility within the EU

In the Eurobarometer of 2010 EU citizen have been asked about issues to migrate within the EU. The first and most famous issue is the cultural and linguistic differences across the EU, which accounts for about $\frac{2}{3}$ in the survey. This is
followed by finding a job, 24% and the finding of an suitable home, 16%. (Riso, Secher, and Andersen, 2014)

So we see a big chunk of the associated issues are caused by the sometimes rather big differences in language and culture between the member states. Even the more alike countries in western Europe, like the Scandinavian countries, have not seen much mobility between the members. A suggestion of the EU is to emphasis on multi-lingualism. That means from an early age on the people should be exposed to foreign languages. The EU’s target is the people should besides the domestic language interact in two additional languages. (Riso, Secher, and Andersen, 2014)

One approach to find a job in another European country is the EURES online portal. This platform collects vacancies of public employment services from EU member states. Although only a fraction of the population knows about this side — about 12% — and even less so already used this service, around 2%. (Riso, Secher, and Andersen, 2014) This can be seen as an first important step towards a more cohesive union.

Another issue regarding jobs is the regulatory barriers of some professions. These mostly affect profession like medical professions, educators and the transport sector. Additionally as is in most European members it is common as an qualification in the public service sector to speak the domestic language. So if say an Bulgarian nurse wants to work in Spain, than other to have the qualification for this job she also has to speak Spanish to even be considered for this job.

Now to counteract this last issue the national governments developed some language courses. To overcome the first problem the EU commission has set up an list all the regulated professions so that mobile citizens can be aware of the qualification requirements beforehand. (Riso, Secher, and Andersen, 2014)

Here as an example the EU has taken an step further with the development of the Bologna program for higher education and the ECTS system for universities. (Raines, 2000)
With this new established system students now can take an semester abroad without worrying about the acceptance of the courses in the domestic university and foremost the degrees got standardized over the whole EU area.

An further example of why the integration is so low can also be seen by the transitional clauses in 2004 created by the "old" member states — except the UK, Ireland and Sweden. The established members were worried about the drastic changes their national market could undergo with the opening to the East. So with this clauses the labour markets of the older members can hold an restriction upon the newer members — up to 7 years from the start of the accession. So from the first big eastern enlargement the transitional clauses were held until May 2011 and in Austria and Germany even the rest of 2011. (Riso, Secher, and Andersen, 2014)

With this clauses they slowed the integration process down and so the national labour market can slowly adapt to the foreign workers. (Bashlund and Busse, 2014)

An especially big issue can be the question about pension rights in the host country. Here we talk mostly about the portability of pension entitlements if crossing the boarder. Which was tackled by the EU commission. Now it states that the minimum requirement for enhancing worker mobility between Member States can be reached by improving the acquisition and preservation of supplementary pension rights (Riso, Secher, and Andersen, 2014).

This means only labour market pension schemes are concerned and not voluntary made pension schemes. Additionally if leaving the domestic country the citizens are entitled to get their value of pension paid out (Bashlund and Busse, 2014).

Further a political discussion also emerged with the eastern enlargements about the welfare tourism. So citizens move to a other country to receive without contributing to the society — hence having a job — welfare money. To prevent this from happening the member states have taken an approach to ban this people from the country within a certain amount of time without working (Bashlund and Busse, 2014).
2.3 Core-Periphery Model

This model was first developed by Krugman (1991) to show that regions inside a country can become different. Further it looks at one region to be the core, so the industrial region, and the periphery, the agricultural region. So it analyses the development for the two regions if as an example a shock occurs. In our thesis the core will be associated with the city and the rural area with the periphery.

Further the model assumes through the wage difference the people are willing to migrate to the regions which has an higher level of a relative real wage. To research this further assumptions are made about the transport costs, or trade costs and wages.

Since the pre-industrial era — where the trade costs were high the economic activity was very dispersed — on the one side free trade emerged and on the other the transport costs decreased sharply. Up until today where cities got more agglomerated. Subsequently we will look at the theoretical framework which stays behind the low costs (transport and trade). (Fujita, Krugman, and Venables, 2001)

There the model describes two effects. First the price index effect describes the change in costs of living if migration to the city is occurring. Even if a small part migrates which are attracted by the low costs of living n cities, which in turn raises the costs in the periphery and further raises the relative real wage in the city. In the end this effects will lead to more migration towards the city. An opposing effect, the local competition will decrease the before describes effect up to a certain point. Than since through the raise in population in the city the firms will face more local competition which in turn puts pressure on the nominal wage. So the workers will get paid less and in the end the city will get less attractive. In the end this leads to a dispersion of the industrial activity. (Fujita, Krugman, and Venables, 2001)
3 Empirical analysis

In this chapter we will describe the source of our data more precisely giving also some critical aspects, describing the variables especially what they contain and what they help us to figure out. This will be the base of our empirical analysis which we want to continue further on.

3.1 Data Description

Our work is based on data which we have selected on the Urban Audit Database of Eurostat. From this database we have chosen the dataset of functional urban areas which includes cities and larger urban zones (LUZ) which are by definition of the Eurostat: “... an approximation of the functional urban area extending beyond the core city.” (Eurostat, 2016a)

To illustrate better context of LUZ and moreover the distribution of European cities we have inserted the graph from Eurostat (2016b) and Eurostat (2016a). The circles in the first graph of the Appendices show us the population of European cities. The blue circles display an population of 1 million and above the green ones have an population between 1 million and 500,000. So to put it in other words the smaller the circles the less populated is this city. The other graph displays the difference between the LUZ — declared as the yellow areas surrounding the city — and the core city, shown be the red. We see the LUZ are mostly much broader areas. Extreme examples are the difference from Paris or Berlin.

This is caused by the definition of the LUZ itself and not like other definitions based on the historical background of the city. As seen by the LUZ of Innsbruck. Here the LUZ inhabits also parts of the surrounding districts, which in the national statistics would not count to the city of Innsbruck caused also by the history and development of the states.
The dataset on it gives a variety of choosing possibilities like the special selection of ages or education statuses but moreover also environmental data which we didn’t especially worked on. On the other hand the data set was providing a lot of difficulties like to find a data set which provided suitable conditions for doing our work. Additionally we have created from this comprehensive data set a panel data set. This had the advantage for us that this kind of data were collected in periodic time intervals, and in our case were balanced.

But what does this mean especially for our analysis?

The data set provides data from about 600 cities from 31 countries including also cities from countries which are not or not yet EU member states. (Switzerland, Norway and Turkey)

In this thesis every city contained in the Eurostat data file independent of the completeness of the data set was used. So we did not have an issue with the selection of certain cities and further have overall more data available for our analysis. Although it is to say that none of the data sets of the single cities from 1990 to 2014 was complete. The years which were left empty for the reason of missing values where also included. A replace by 0 is in this case unrewarding because this would declare that the city population in this given year was 0 and this leads to a falsification of our results.

The authors of the paper from Bosker and Marlet (2006), mentioned also the lack of data points in the Urban Audit database as one of their bigger issues.

We can only assume the reasons why this problem has occurred namely that some countries doesn’t provide their data for the public access, are not interested in collecting data or hasn’t collected data before their entrance in the EU. We have chosen explicitly the Eurostat data because this data is standardized an we had not therefore to collect the data from every single national statistic institute. This data selection should guaranty us that the data is collected under homogeneous methods and therefore satisfies the definition of the LUZ.

The reason that our sample contains data from 1990 until 2014 is that we wanted
to capture all the periods of the EU enlargements. Therefore we took into count
the period before the EU15 namely when the EU was compounded only in its
member states (U-12 + Finland (FI), Austria (AT) and Sweden (SE)), the EU25
— the most meaningful enlargement in the history of the EU — (EU-15 + Estonia
(EE), Latvia (LV), Lithuania (LT), Malta (MT), Poland (PL), Slovakia (SK),
Slovenian (SI), Czech Republic (CZ), Hungary (HU) and Cyprus (CY)), the EU
27 (EU-25 + Bulgaria (BG) and Romania (RO)) and EU28 (EU-27 + Croatia
(HR)).

Another motive why we chose these years was the lack of data for the forthcoming
years 2015 and 2016. So we did not see any advantage for our data set if we
included these years also. Although these years would maybe help support our
analysis. Especially for the case of the accession of Croatia in 2013.

We wanted to figure out especially which impact the entry in the European Union
has for cities in the affected countries but also on the cities in the EU member
states. The main question in this context is to investigate if cities which where al-
ready member states of the EU increased in population after the EU enlargement
and if population in the cities of the included states where therefore increasing.
So in other words if we see European Integration or if the migration from East
to West is not happening and which issues may cause this.

The scope of our work was to display this assumption. In this connection we did
our analysis not only on population related but also on education, unemployment
and foreign EU citizens specific data, to also figure out these aspects.

Intuitively countries with a lower or inferior social system, infrastructure and
education opportunities in comparison to the countries which has already been
EU members are increasing in they population because especially young and
educated people are leaving their home country to improve their living standards
or to find better jobs and therefore more prosperity. For this group of people
named before, the western part of Europe and its cities which provide this living
standard is more attractive.
3.2 Descriptive analysis

Before we take a look at our models we firstly will show in the graph below the implications of the enlargement rounds on the growth. The years are displayed on the x-axis — where the enlargement rounds are separately shown. On the y-axis the logarithm of the city growth is featured. So it should display us if the European cities are actually growing or shrinking over the past 25 years.

Further the blue dots display us the treatment cities, so which ones are in the EU, so we can see that with ongoing time the number of blue is increasing. The red dots show us the control cities in this graph. So it displays the cities which are not members in the EU, yet.

The first thing which we can see in the graph is the noise, or the large differences. Which is mostly caused by the lack of data points for some of the years. And as we recall that the growth is calculated by the difference between $y_t$ and $y_{t-1}$.

Additionally the green line, which displays the fitted values, does not hold any additional information for the influence of the enlargement on the city growth. So with the shock of the entry to the whole EU single market we would expect and shrinking in size for the most of eastern European countries. Mostly people, especially the highly skilled, leave their homes to achieve a better life. This has the effect for the western member states that the city population should increase through this influx from the east.

The paper of Atoyan et al. (2016) illustrates that this process of emigration might affect the eastern members since often the old and less skilled domestic population is left behind. They stated that the economical growth is through this emigration process restraint and further the national governments have to finance more towards the elderly and unemployed. Which in turn afflicts the national budget more and more.

Although through our graph here we cannot either support nor really deny the described theory.
3.3 Specification

We are interested on the effect of the city growth. In our case this displays the difference in the population from one year to the following year — in the model shown by $\Delta y_{it}$ — using the logarithm of the inhabitants. The time period we are interested in spans from 1990 to 2014. The indices of $i$ and $t$ describe the city and the time.

3.3.1 Difference-in-Difference

Difference in difference is a method in economics to determine a causal effect and moreover to describe the strength’s of it. Difference-in-Difference (DiD) works with a treatment and a control group. We did our DiD model based on the analysis of Card and Krueger (1993), where they tried to examine the effects of a minimum wage on unemployment in two different countries in the US. In their case the minimum wage in New Jersey increased from 4,25 to 5,05 Dollar. Card an Krueger collected the data from the same Fast Food restaurants in February and November of the year 1992 (before and after the reform) an similar data in Pennsylvania, a neighbor state of New Jersey, where the minimum wage remained in this time on 4,26 dollar. In this case the authors could not find any evidence between the increase in the minimum wage and unemployment. (Card and Krueger, 1993)
With the help of this method we tried to figure out the effect on the city population before and after the EU enlargement. We have used the four enlargement rounds comparing and them with a control group which consist in this case of the three countries which are not already EU — Switzerland, Norway and Turkey — and of these countries which at this time were members in the EU. So as an example for the third enlargement the two treatment states are Bulgaria and Romania. The control group consists of the EU25 and the three European non-members states. Subsequently the number of the control group will increase with the years.

Diff-in-Diff Model:

\[
\Delta y_{it} = x_{it}'\beta + \pi_i + \lambda_t + \mu_{EU-it} + \mu_{2EU-it} + \varepsilon_{it} \tag{1}
\]

Where:

\[x_{it}' = [1, H_{it}, U_{it}, Fr_{it}] \]

The DiD equation above exhibits more precisely on what we focused. We tried to find out the change in the growth rate denoted with the indizes state and time. Therefore \(x_{it}\) is the intercept of the model, \(\lambda_t\) displays our time variable. The most important variable in these models is the \(\mu_{2EU-it}\). Since for the country is a member in the EU, the dummy variable is 1. For the the country is not a member in the EU, so it is displayed with a 0. The \(\mu_{2}\) now shows us the difference between the member country and the country outside of the EU.

\[
\Delta y_{it} - \Delta y_{c-it} = \mu \tag{2}
\]

In we see the treatment effect of the enlargement for the new members which is denoted as \(\mu_{2}\). So we would possibly see an negative effect on the growth for the most of the eastern European member states since as already established the citizens their will migrate, which according to the study of Atoyan et al. (2016) is almost a quarter from the inhabitants of the eastern members.
3.3.2 Characteristics

The research also focused besides the Diff-in-Diff analysis on some variables which could explain the city growth. In these characteristics include Education \((H_{it})\), Unemployment \((U_{it})\) and foreign EU citizens \((F_{rgi})\).

In our model we had two different approaches on the design off the dummy variable. The first we constructed under the following scheme. Countries which were EU foundation states and therefore EU members before the enlargement rounds — we only consider enlargements beginning in 1995 and following — have the value of 1. The countries which are not — until their accession — part of the EU are displayed by 0. Which also includes non EU-members which where included in the dataset, like Switzerland or Turkey.

We created the dummy variables with the 0 and 1 system. This means that the 0 portrays the time without the membership in the EU and 1 present the year of the accession of the countries and afterwards.

The other way was to split the dummy variable up to five times. So every enlargement round has an own number, beginning with 2 for the first enlargement in 1995 and further until up to latest enlargement in 2013, which is denoted with 5 in our design. To illustrate the second approach we take, as an example, two cities Munich and Prague. Munich is a city in Germany, which is member of the European Union from the beginning of our dataset, in 1990. Therefore it is associated with the number 1 throughout the whole time. On the other side the Czech Republic entered in 2004 the European union and so the city of Prague receives in this dummy variable approach the number 3 before the enlargement and with the beginning of 2004 the dummy switches to 1. This process now is made for all the incorporated cities.

The difference being that the first approach should show us the effect of the enlargement on the city growth as a whole and with the latter design we try to find especially the effect of each enlargement on the associated cities.
If we go back to [1] The education variable — we use the Human capital equivalently — is only taken from the highest education levels, the ISCED level five and above. Which means based on the definitions of these levels we are looking at, by the lowest one specific training, like a nurse or an engineer and goes on to the academic degrees. (UNESCO, 2012)

As in the chapter 2.2 we discussed the agglomeration effect as a whole and than especially for cities. There we also argued about labor pooling, or the cluster of skilled people. So it states that through the pooling of labor agglomeration effects emerge and with the knowledge spillover or learning effect the productivity in a city rises. Which means through the higher ration of highly skilled people the creativity and potential energy for innovations attract investments for the city, like better social services or amenity services. Further the city will grow since it is getting more attractive to life and work.

Glaeser and Saiz (2003) stated in their paper an difference in the effect of the education on the city growth. They described for the MSA (Metropolitan Statistical Area) an positive effect of the education on the growth but for the city itself they did not find such an clear effect. There the focused on the low skilled share of the citizen, which predicted an decline in urban growth.

Their argument for why there is an difference in the effect between the MSA and the city is driven by the higher productivity in the MSA. So the rising population has more to do with the gain in productivity and less so with the rise in amenities. When a city is strongly rising in population it has to deal with the increase in housing and the affiliated costs. Although these costs also rise for the citizens, the growth is still ongoing. So the incentive to live and work in such a high cost city has to be very high to upset the high costs of living. Additionally Moretti (2003) mentioned some implications on the human capital. As he stated that with an higher ratio of high skilled people in cities or MSA the criminal rates will decrease.

As we saw skilled cities attract new people. So for our thesis the highly productive
LUZ’s in western Europe attract the high skilled people from the “new” members of eastern Europe. This process now puts pressure on the labour market in the skilled cities since new people arrive and compete on the market for a job. So it could lead through the influx of foreign people to an higher unemployment rate in the city. Although as mentioned before the transitional clauses was established exactly for this to manage the national labour markets for the vast expansion of the EU in 2004 and forthcoming.

If we go back to the labour pooling, which not only stated a cluster of highly skilled people but also an better matching of people in bigger cities. Since the probability to get a suitable job in a big city is much higher than in a rural area. So in the case of higher unemployment rates it could mean that the efficient allocation between the employee and employer is not found or that a shock occurred and the city labour market did not adjust for it already.

For skilled cities the issue of attractiveness can also lead to an negative effect since the low unemployment rate can send a signal that it is easy to find a job their. So when people migrate to the city it can be that the unemployment rate is stable or even rising although jobs are created. This phenomenon is called the Todaro paradox. (Zenou, 2011)

But our attention is more on the economic side since a high rate of unemployment could mean a city is in economic distress and so an disincentive to migrate their and finally can lead to decline in city growth. So we would according to the labour pooling see a lower unemployment rate in a big city or LUZ. And so if a city suffers a especially higher unemployment rate than the matching process is not really working and as the Todaro paradox suggest the migrants can now put extra pressure on the labour market.

And on the other side as the report of the IMF Atoyan et al. (2016) argues that their domestic country are more and more unattractive and as a consequence mostly the highly skilled and ambitious people are migrating to the Western member states. Subsequently in the eastern member states often a decline in
investments is a response to the migration from the people.

The citizens living in a foreign EU city we suspect an positive effect on the city growth the higher the ratio of the EU foreign is. Since this suggests an growth of foreign citizens and further and easier integration in the society if an vibrant functioning sub-culture already is established. So these can act as incentive for people to move into the new foreign city seeing that it looks easier for "Newcomers" to settle down in the new place.

What in this regard would lead to a more interesting discussion is knowing from which city to which city the people really move. This is not really declared in the Urban Audit database but it might be an interesting issue for further research. We only can say on a national base from which new member state the people are emigrating.

For the first dummy design we argue that the overall effect depends on the migration from the East to West and if this process can overcome the decrease of population in the western countries. If this is not the case, so if we see an negative sign in the results, this could explain the lack of integration into the EU although also the eastern members are decreasing in size but not strong enough to really matter for the city growth in the west.

Additionally we should keep in mind the natural growth of cities which is mostly caused by the difference between birth and death rates. We won’t discuss this topic here since our thesis mostly is focused on the growth rate of cities caused by an shock, like after the accession to the EU considering the new possibilities.

In the second dummy approach we will see there is a negative effect for the first enlargement since in this round only countries where included which already count to the richest countries in the world. So the people mostly do not have so much incentive to move within the EU. Since the already live in an country with high education and one of the best living standards. And as we already briefly explained that the population in the west is slowly decreasing we suggest an negative effect.
For the remainder of the enlargement rounds we argue an positive effect of the accession of the EU membership. Since here we mostly deal with countries that lack high living standards and maybe most important better job opportunities outside of their domestic country.

As we now will further discuss the results in grade detail we have to remember that the already discussed lack of data — where no city has complete data sets — may lead to rather mixed results.

4 Results

In the table below we listed our collective results on our models. The first column displays the basic model including the three characteristics — education, unemployment and foreign EU citizens — and the effect of the enlargement on the city growth. This is followed by the Diff-in-Diff analysis for the four enlargement rounds consisting of the treatment effect for each of these enlargements.

The effect of the dummy variable on the city growth shows us an negative development of the population. With the accession the population of the cities declined about 3.55% within the EU. This strong negative result can come from the natural decrease of population, which we are not looking at specifically in our thesis.

Subsequently this negative development can also be partly caused by the migration from the East to the West. Considering people leave their home city and migrate to the Western member states for the reasons we already discussed in the pages above. Although we can not say with these results and available data anything about the exact migration of people.

Additionally we have to consider the rural depopulation in the western cities. So that unattractive regions in a country are falling in population and other regions or cities gain from this phenomenon. (Gaulhofer, 2016)
For the other explanatory variables we included in our Model[1], the results firstly show a very weak effect on the city growth. Secondly, the expected outcomes are displayed, except for the educational variable. Here we see an negative sign, which if we remember Glaeser and Saiz (2003) which mentioned an positive effect of the education, the highly skilled people, on the city growth. In our case with an increase of the highly skilled citizens of 1% we would experience an decline of $-0.0096\%$ of the city population. On possible scenario of why this occurs can be the migration from the highly skilled people from the Eastern member states to the West and also the overall effect of an higher attractiveness of another city.

As for example the city of Innsbruck represents. Where about a fifth of the population are students. After their graduated students mostly leave Innsbruck caused also by the lack of opportunities in this city.

Although in our case the significant is at the 10% level. Which leads to another argument that the lack of data, we only have about 600 data points for the whole data set, might cause issue with our results here.

If we look at the ”EU foreign” variable we initially see the high significant of the variable followed by the weak effect of this characteristic on the city growth. With an rise of 1% of the EU foreign citizens the city population will increase about 0.22%. So our implications we have already drawn about the possible increasing effect of the foreign EU citizens is affirmed. Subsequently we see with a rise in foreign citizens an increase in the city growth. So the city itself can benefit from an higher degree of communities inside its boarders. Thereby other foreigners are more attracted and drawn to this city if an vibrant community already exists in the city which then can makes the relocating easier.

The last variable in our model, the unemployment, shows the expected negative sign although in our results it is not significant. Nevertheless would a gain of 1% of the unemployment rate decrease the city growth of about 0.034%. So we see here an rather intuitive result on the effect of an possible negative shock — the rise in the unemployment— on the city growth. Albeit as stated above here
we could also consider the unemployment rate in the surrounding rural areas. If there was an relative high rate we would see an influx of unemployed people to the city which can lead to even more pressure on the city labour market. We just wanted to point out here that many issues can cause in this specific case the unemployment rate a change in the city growth.

The second dummy creation stated in our results only the city growth before the accession. So it really does not contribute anything to our question regarding the migration. Subsequently we will only briefly describe this results.

For the enlargement of 1992 — the first EU enlargement we looked at — which included the countries Austria, Finland and Sweden we found a negative effect on the city growth, of about -2.5% , at the 5% level significance. A possible explanation for the fall of population could be the demographic changes in the society — we grow older, life longer and the birth rates are low. Secondly as stated above the urban sprawl or the rural depopulation is occurring in some of the Western member states. This phenomenon suggest a cluster of a few cities which inhabits the vast majority of the national population. So other cities become more and more depopulated which among other things lead to an higher cost of maintaining these unpopulated cities. (Gaulhofer, 2016)

For the future this issue can evolve to on of the major issues and discussions in the public with the ulterior motive to cut public spending if for example ”Dörferzusammenschlüsse” looks as an appropriate goal to tackle this problem, for unpopulated regions in the future.

For the successive enlargements we inspected a difference in city growth to the first enlargement. There a gain in city growth for the Eastern members is displayed. So this only states something about the population growth in the cities and does not display any value on the effect of the enlargement. Subsequently we can not say anything about an possible migration from East to the West. Although we can state that the urban growth also occurs caused by the better opportunities for their national rural population. So a part of the city growth is due to the
migration from the rural regions to the cities.

Albeit as the paper of Atoyan et al. (2016) stated that nearly 20 million people left the Eastern European countries and \( \frac{2}{3} \) migrated to EU countries. Further we see an vast influx of people from former USSR and Baltic countries to the Western members of the EU. Although in this paper they reviewed the whole process of the migration in the past 25 years. (Atoyan et al., 2016)

As we described above we do not see any difference for the enlargement especially, which now turns us to the Diff-in-Diff model. In this analysis we want to find if the positive "shock" of the accession to the EU has also an increasing effect on the city growth.

4.1 Diff-in-Diff Analysis

Now we focus our investigation on the analysis of our Diff-in-Diff model. In the table we review the second to fifth column. Each of these columns display our calculations on the treatment of the different enlargements. So treat1 displays the treatment effect of the first enlargement round in 1995. As we stated in the model we wanted to find the first difference with the enlargement rounds.

So the effect of the treatment for the first enlargement we see in the table an shrinkage since the accession to the EU of about 3.8%. Subsequently for these involved countries, which are all having a high GDP level, the city size is declining which can not purely be caused by the accession itself but also by the demographic changes in the societies and the issues we already broadly discussed in the section above.

For the first big eastern enlargement — which involved ten countries — we identified also an negative effect on the city growth. So the third column displays us an decrease of city population of about 4.1%. Here we can argue this is caused through the migration from these countries to the Western members. Subse-
quently this process is almost in line with the decline of the population stated in Atoyan et al. (2016). Where 5.5% of the population left the regions. Albeit also discussed in the paper of Atoyan et al. (2016) the implications for these countries are damaging the domestic economy and society. As said in the IMF report with the brain drain the economy of these member states will stagnate and possible diminish in the years to come. Further implications on this development are the decreasing level of tax revenues which finally limits the government actions on financing pensions among others.

Secondly through the leaving of the highly skilled young people the governance of the government will get weaker. This makes the accountability for the national institutions worse and a higher possibility of corruption will likely occur. This finally lead to more and more ineffectiveness of the government and a rise in trust issues regarding these institutions from the population.

So through the accession to the EU not only advantages for the new member states are displayed. There also negative effects like the brain drain are brought out by the free movement principal. In the future the EU institutions has to help these member states to overturn the decline in their economy.

When we go back to investigate the two remaining columns of the regression table it shows a rather different picture to the one we interpreted above. For these two enlargement we see an positive treatment effect of the membership to the EU. On the 2007 enlargement we inspect an rising effect of 5.6% on the city growth with the accession to the EU. For the latest enlargement which occurred in 2013 the outcome displays an strong gain of the city population, about 16%.

One possible explanation for the variation in the results of the last two accession rounds could be the lack of data, especially for Croatia. Another point which could describe the different results between the enlargements could lay in the time laps. The first eastern enlargement was more than ten years ago and so the adjustment process within the EU are more advanced than for example for the latest accession of Croatia which was only three years ago. The adaption to the
new opportunities takes time to process and fully fill their underlying potential.

If we recall the "old" members of the EU made the transitional clauses to control
the sudden influx of new labour population which held on for some years after.
So big changes and shocks often need time to acclimate to the new situation until
they are fully accepted and advantageous. Subsequently if this analysis would
be made in some years from now — so that the newer EU members can fully
accommodate inside the EU — the effect could be similar as we can observe now
for the second enlargement round in 2004.

4.2 Tests

The first test inspects if the panel data which is used shows random or fixed effects.
The Specification test by Hausman is such a test to investigate the difference
between these two aspects of the panel data modeling (Greene, 2008). In this
paper the result of the Hausman test shows to adopt the fixed effects for our
data. The LBI test is mostly the test we did on the regression we used on our model.
This test looks at the autocorrelation of the data set. So if a variable is correlated
with itself over the time period, the research is looking at (Greene, 2008). In our
Model we found for the Batagli-Wu an value of about 2.43. A rule of thumb
suggest no autocorrelation at a value around 2. As our value for the test is near
this benchmark of 2 our panel regression is considered to have no issue with
autocorrelation.

The results of these two test are shown in the appendices.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>1. Enlargement</th>
<th>2. Enlargement</th>
<th>3. Enlargement</th>
<th>4. Enlargement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eu=1</td>
<td>-0.036246** (0.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>-0.000098* (0.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>-0.000264 (0.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>frg</td>
<td>0.002203*** (0.00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treatn</td>
<td>0.023259* (0.01)</td>
<td>0.046222* (0.02)</td>
<td>0.004091 (0.01)</td>
<td>0.019187 (0.01)</td>
<td></td>
</tr>
<tr>
<td>treat1</td>
<td>-0.038846** (0.01)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treat2</td>
<td></td>
<td>-0.041491* (0.02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treat3</td>
<td></td>
<td></td>
<td>0.056575* (0.02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>treat4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.160915*** (0.03)</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.142661* (0.06)</td>
<td>-0.039773* (0.02)</td>
<td>-0.040881* (0.02)</td>
<td>-0.040171* (0.02)</td>
<td>-0.041209* (0.02)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.073</td>
<td>0.061</td>
<td>0.061</td>
<td>0.061</td>
<td>0.061</td>
</tr>
<tr>
<td>Observations</td>
<td>15233</td>
<td>15240</td>
<td>15240</td>
<td>15240</td>
<td>15240</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001 Standard error in parentheses; Year dummies not reported; Variables H, U and frg multiplied with 100
5 Conclusion

Our basic approach was to find out if the enlargement rounds of the European Union influenced the growth of their population. Choosing the functional data set of the Urban Audit Database, which is provided by Eurostat, we have tried to figure out the changes in population of the most cities which are located in the EU. For our purpose we also included the educational, unemployment and foreign EU citizens variables. With these characteristics we tried to figure out the influence of them on the city growth. Like the educational data we included to analyze, if a higher ratio of highly skilled people in a city has an incentive for others to move there. (Glaeser and Saiz, 2003)

Subsequently we found only small effects of these three variables. Where the largest impact was by the foreign citizens of about 0.22%. The other two displayed an declining effect on the city growth. Additionally this is odd as Glaeser and Saiz (2003) showed in their work an increase in city population when people are higher educated. Albeit we argued this result can partly be caused by the migration of the Eastern member states.

Further with the help of our regressions — especially the Diff-in-Diff analysis — we found, that the eastern enlargements had mixed influences on the cities population. The first eastern enlargement in 2004 showed us an decrease in the population of a city. This could have the cause in the lack of data or by the cultural differences which exists within the EU. So a transition from one city to an other within a country is not difficult, but from one country to another is rather more difficult and shows the biggest issued regrading the migration inside the EU. (Riso, Secher, and Andersen, 2014)

Adding to this the language barriers are also a big issue in the European Union. Which limits the potential of the working force. Since the people although can move freely inside the EU boarders mostly choose their domestic country to work. As was stated the migration within the EU is about 0.3% per year. (Baslund and Busse, 2014)
On the contrary in the United States this rate is much higher. Also due to the luxury — from the viewpoint of the EU — of having the same language.

We conducted for the following two enlargements an rather different outcome. For the accession of 2007 and 2013 — including Bulgaria, Romania and Croatia — our results displayed us an rise in city growth. This suggests an different picture than the enlargement before. Here the migration is not that strong or even not occurring. Our argumentation for this outcome was on the one hand the lack of data points and the other the time laps between the three accessions. So the potential underling this development of the latest enlargement rounds is up to today not fully grasped — which we consider for the future to be different.

For Europe the enlargements where an enrichment concerning the free movement of people inside a community. On the other hand, a possible consequence could be the formation of clusters around the big cities (Marques, 2008), and consequently a depopulation of some unattractive areas (Gaulhofer, 2016). Which as we briefly discussed may lead to further issues, like higher maintenance cost in this scarce populated regions. Subsequently the national and the supranational governments have in this matter some work to do in the next decades.

The progress with the European Integration does not only provide advantages for the cities. In this recently published research of Atoyan et al. (2016) they discussed the disadvantages of the emigration from the Eastern European countries. They share a concern of the brain drain on the future socioeconomic development in these EU member states.
Appendices

A Tables and Figures

Figure 2: Population in European Cities

Figure 3: Core City and the Larger Urban Zone
Table 3: Table of the Accession to the EU from the past 25 years

<table>
<thead>
<tr>
<th>Year</th>
<th>EU</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td></td>
<td>215</td>
<td>420</td>
</tr>
<tr>
<td>1991</td>
<td></td>
<td>215</td>
<td>420</td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td>215</td>
<td>420</td>
</tr>
<tr>
<td>1993</td>
<td></td>
<td>215</td>
<td>420</td>
</tr>
<tr>
<td>1994</td>
<td></td>
<td>215</td>
<td>420</td>
</tr>
<tr>
<td>1995</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>1996</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>1997</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>1998</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>1999</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>2001</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td>194</td>
<td>441</td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td>95</td>
<td>540</td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td>95</td>
<td>540</td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td>95</td>
<td>540</td>
</tr>
<tr>
<td>2007</td>
<td></td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>46</td>
<td>589</td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td>41</td>
<td>594</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>3,469</td>
<td>12,406</td>
</tr>
</tbody>
</table>
### Table 4: Table of Treatment: General

<table>
<thead>
<tr>
<th>EU</th>
<th>Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1,025</td>
</tr>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>1,386</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>833</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>Total</td>
<td>13,431</td>
<td>2,444</td>
</tr>
</tbody>
</table>

### Table 5: Table of Treatment: First Enlargement

<table>
<thead>
<tr>
<th>EU</th>
<th>Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>1,386</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>833</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>15,770</td>
<td>105</td>
</tr>
</tbody>
</table>
Table 6: Table of Treatment: Second Enlargement

<table>
<thead>
<tr>
<th>EU</th>
<th>Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>1,386</td>
</tr>
<tr>
<td>4</td>
<td>833</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14,489</strong></td>
<td><strong>1,386</strong></td>
</tr>
</tbody>
</table>

Table 7: Table of Treatment: Third Enlargement

<table>
<thead>
<tr>
<th>EU</th>
<th>Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1,386</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>833</td>
</tr>
<tr>
<td>5</td>
<td>120</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,042</strong></td>
<td><strong>833</strong></td>
</tr>
</tbody>
</table>
Table 8: Table of Treatment: Fourth Enlargement

<table>
<thead>
<tr>
<th>EU</th>
<th>Treatment</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1,386</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>833</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td><strong>15,755</strong></td>
<td>120</td>
</tr>
</tbody>
</table>

Table 9: Table of Hausman Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Difference</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b</td>
<td>B</td>
<td>$(b - B)$</td>
</tr>
<tr>
<td>1.EU</td>
<td>-.0362456</td>
<td>-.0047698</td>
<td>-.0314758</td>
</tr>
<tr>
<td>H</td>
<td>-.0000978</td>
<td>-.0000909</td>
<td>-.6.97e-06</td>
</tr>
<tr>
<td>U</td>
<td>-.0002637</td>
<td>-.0003008</td>
<td>-.000037</td>
</tr>
<tr>
<td>frg</td>
<td>.0022035</td>
<td>.0019201</td>
<td>.0002834</td>
</tr>
</tbody>
</table>

*b stands for fixed and B for the random Model

Test: $H_0$: difference in coefficients not systematic

$$\chi^2(27) = (b - B)'[(V_b - V_B)' - 1](b - B)$$

$$= 27.23$$

Prob>$\chi^2 = 0.4515$
### Table 10: Table of LBI Test (Baltagi-Wu)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Std. Err.</th>
<th>t</th>
<th>P &gt; t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.EU</td>
<td>-.052125</td>
<td>.0153704</td>
<td>-3.39</td>
<td>0.001</td>
</tr>
<tr>
<td>H</td>
<td>.0000371</td>
<td>.0000239</td>
<td>1.55</td>
<td>0.121</td>
</tr>
<tr>
<td>U</td>
<td>-.000332</td>
<td>.0001105</td>
<td>-3.00</td>
<td>0.003</td>
</tr>
<tr>
<td>frg</td>
<td>.0015211</td>
<td>.0001467</td>
<td>10.37</td>
<td>0.000</td>
</tr>
<tr>
<td>Constant</td>
<td>-.164585</td>
<td>.0338926</td>
<td>-4.86</td>
<td>0.000</td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\rho_{ar}$</td>
<td>-.16375407</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma_u$</td>
<td>.04696116</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\sigma_e$</td>
<td>.52198783</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\rho_{fo}$</td>
<td>.0080289</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F test that all $u_i = 0: F(634, 139598) = 0.21$  \hspace{1cm} Prob>F = 1.000

Modified Bhargava et al. Durbin-Watson = 2.322511

Baltagi-Wu LBI = 2.4314669
B. Stata Code

capture log close
set more off, perm
use "C:\Users\Fabian\Desktop\master\stata\pop.dta", clear
log using "C:\Users\Fabian\Desktop\master\stata\pop", replace
reshape long x, i(cities) j(year)
rename x inhabitants
egen city=group(cities)
encode cities, gen (co)
encode inhabitants, gen (inhab)
xtset city year
gen  lpop=log(inhab)
gen  dpop=lpop-l.lpop
***generating of the countries***
gen state = "AUT" if cities=="Wien"
replace state = "GER" if cities=="Aachen"
replace state = "DEN" if cities=="Aalborg"
replace state = "UK" if cities=="Aberdeen"
replace state = "IT" if cities=="Acireale"
replace state = "TUR" if cities=="Adana"
replace state = "FR" if cities=="Ajaccio"
replace state = "HUN" if cities=="Alba Iulia"
replace state = "ESP" if cities=="Albacete"
replace state = "FR" if cities=="Albi"
replace state = "ESP" if cities=="Algeciras"
replace state = "ESP" if cities=="Alicante/Alacant"
replace state = "NL" if cities=="Alkmaar"
replace state = "NL" if cities=="Almelo"
replace state = "ESP" if cities=="Almeria"
replace state = "NL" if cities=="Amersfoort"
replace state = "FR" if cities=="Amiens"
replace state = "NL" if cities=="Amsterdam"
replace state = "IT" if cities=="Ancona"
replace state = "FR" if cities=="Angers"
replace state = "FR" if cities=="Angoulême"
replace state = "TUR" if cities=="Ankara"
replace state = "FR" if cities=="Annecy"
replace state = "TUR" if cities=="Antalya"
replace state = "BEL" if cities=="Antwerpen"
replace state = "NL" if cities=="Apeldoorn"
replace state = "ROU" if cities=="Arad"
replace state = "NL" if cities=="Arnhem"
replace state = "FR" if cities=="Arras"
replace state = "GER" if cities=="Aschaffenburg"
replace state = "IT" if cities=="Asti"
replace state = "GRE" if cities=="Athina"
replace state = "GER" if cities=="Augsburg"
replace state = "POR" if cities=="Aveiro"
replace state = "IT" if cities=="Avellino"
replace state = "DEN" if cities=="Århus"
replace state = "FR" if cities=="Avignon"
replace state = "ROU" if cities=="Bacau"
replace state = "ESP" if cities=="Badajoz"
replace state = "ROU" if cities=="Baia Mare"
replace state = "IT" if cities=="Balikesir"
replace state = "GER" if cities=="Bamberg"
replace state = "SLK" if cities=="Banská Bystrica"
replace state = "ESP" if cities=="Barcelona"
replace state = "IT" if cities=="Bari"
replace state = "IT" if cities=="Barletta"
replace state = "CH" if cities=="Basel"
replace state = "CH" if cities=="Basel transnational LUZ"
replace state = "FR" if cities=="Bayonne"
replace state = "GER" if cities=="Bayreuth"
replace state = "FR" if cities=="Beauvais"
replace state = "UK" if cities=="Belfast"
replace state = "FR" if cities=="Belfort"
replace state = "IT" if cities=="Benevento"
replace state = "IT" if cities=="Bergamo"
replace state = "NOR" if cities=="Bergen"
replace state = "NL" if cities=="Bergen op Zoom"
replace state = "GER" if cities=="Berlin"
replace state = "CH" if cities=="Bern"
replace state = "FR" if cities=="Besançon"
replace state = "PL" if cities=="Białystok"
replace state = "CH" if cities=="Biel/Bienne"
replace state = "GER" if cities=="Bielefeld"
replace state = "IT" if cities=="Biella"
replace state = "IT" if cities=="Biella"
replace state = "PL" if cities=="Bielsko-Biała"
replace state = "ESP" if cities=="Bilbao"
replace state = "HUN" if cities=="Bistrita"
replace state = "UK" if cities=="Blackburn with Darwen"
replace state = "UK" if cities=="Blackpool"
replace state = "BUL" if cities=="Blagoevgrad"
replace state = "IT" if cities=="Bologna"
replace state = "IT" if cities=="Bolzano"
replace state = "GER" if cities=="Bonn"
replace state = "FR" if cities=="Bordeaux"
replace state = "ROU" if cities=="Botosani"
replace state = "FR" if cities=="Boulogne-sur-Mer"
replace state = "FR" if cities=="Bourges"
replace state = "UK" if cities=="Bournemouth"
replace state = "UK" if cities=="Bradford"
replace state = "POR" if cities=="Braga"
replace state = "ROU" if cities=="Braila"
replace state = "GER" if cities=="Brandenburg an der Havel"
replace state = "ROU" if cities=="Brasov"
replace state = "SLK" if cities=="Bratislava"
replace state = "GER" if cities=="Braunschweig-Salzgitter-Wolfsburg"
replace state = "NL" if cities=="Breda"
replace state = "GER" if cities=="Bremen"
replace state = "GER" if cities=="Bremerhaven"
replace state = "IT" if cities=="Brescia"
replace state = "FR" if cities=="Brest"
replace state = "UK" if cities=="Brighton and Hove"
replace state = "UK" if cities=="Bristol"
replace state = "FR" if cities=="Brive-la-Gaillarde"
replace state = "CZE" if cities=="Brno"
replace state = "BEL" if cities=="Brugge"
replace state = "BEL" if cities=="Bruxelles / Brussel"
replace state = "ROU" if cities=="Bucuresti"
replace state = "HUN" if cities=="Budapest"
replace state = "BUL" if cities=="Burgas"
replace state = "ESP" if cities=="Burgos"
replace state = "UK" if cities=="Burnley"
replace state = "TUR" if cities=="Bursa"
replace state = "IT" if cities=="Busto Arsizio"
replace state = "ROU" if cities=="Buzau"
replace state = "PL" if cities=="Bydgoszcz"
replace state = "ROU" if cities=="Bârlad"
replace state = "FR" if cities=="Béziers"
replace state = "FR" if cities=="Caen"
replace state = "IT" if cities=="Cagliari"
replace state = "FR" if cities=="Calais"
replace state = "ROU" if cities=="Calarasi"
replace state = "UK" if cities=="Cambridge"
replace state = "IT" if cities=="Campobasso"
replace state = "UK" if cities=="Cardiff"
replace state = "IT" if cities=="Carrara"
replace state = "ESP" if cities=="Cartagena"
replace state = "IT" if cities=="Caserta"
replace state = "ESP" if cities=="Castellón de la Plana/Castelló de la Plana"
replace state = "IT" if cities=="Catania"
replace state = "IT" if cities=="Catanzaro"
replace state = "GER" if cities=="Celle"
replace state = "FR" if cities="Douai"
replace state = "GER" if cities="Dresden"
replace state = "ROU" if cities="Drobeta-Turnu Severin"
replace state = "IRE" if cities="Dublin"
replace state = "FR" if cities="Dunkerque"
replace state = "GER" if cities="Düsseldorf"
replace state = "UK" if cities="Edinburgh"
replace state = "TUR" if cities="Edirne"
replace state = "NL" if cities="Eindhoven"
replace state = "PL" if cities="Elblag"
replace state = "ESP" if cities="Elche/Elx"
replace state = "PL" if cities="Elk"
replace state = "NL" if cities="Enschede"
replace state = "GER" if cities="Erfurt"
replace state = "TUR" if cities="Erzurum"
replace state = "FR" if cities="Evreux"
replace state = "UK" if cities="Exeter"
replace state = "PRO" if cities="Faro"
replace state = "IT" if cities="Ferrara"
replace state = "IT" if cities="Firenze"
replace state = "GER" if cities="Flensburg"
replace state = "ROU" if cities="Focsani"
replace state = "IT" if cities="Foggia"
replace state = "IT" if cities="Forlì"
replace state = "FR" if cities="Fort-de-France"
replace state = "GER" if cities="Frankfurt (Oder)"
replace state = "GER" if cities="Frankfurt am Main"
replace state = "GER" if cities="Freiburg im Breisgau"
replace state = "GER" if cities="Friedrichshafen"
replace state = "FR" if cities="Fréjus"
replace state = "GER" if cities="Fulda"
replace state = "POR" if cities="Funchal"
replace state = "ROU" if cities="Galati"
replace state = "IRE" if cities="Galway"
replace state = "TUR" if cities="Gaziantep"
replace state = "PL" if cities="Gdansk"
replace state = "IT" if cities="Genova"
replace state = "BEL" if cities="Gent"
replace state = "CH" if cities="Genève"
replace state = "CH" if cities="Genève transnational LUZ"
replace state = "GER" if cities="Gera"
replace state = "GER" if cities="Gießen"
replace state = "ESP" if cities="Gijón"
replace state = "ROU" if cities="Giurgiu"
replace state = "UK" if cities="Glasgow"
replace state = "PL" if cities="Glogów"
replace state = "PL" if cities=="Gniezno"
replace state = "PL" if cities=="Gorzów Wielkopolski"
replace state = "NL" if cities=="Gouda"
replace state = "CRO" if cities=="Grad Zagreb"
replace state = "ESP" if cities=="Granada"
replace state = "AUT" if cities=="Graz"
replace state = "GER" if cities=="Greifswald"
replace state = "FR" if cities=="Grenoble"
replace state = "NL" if cities=="Groningen"
replace state = "PL" if cities=="Grudziadz"
replace state = "POR" if cities=="Guimarães"
replace state = "HUN" if cities=="Győr"
replace state = "GER" if cities=="Görlitz"
replace state = "SWE" if cities=="Göteborg"
replace state = "GER" if cities=="Göttingen"
replace state = "GER" if cities=="Halle an der Saale"
replace state = "GER" if cities=="Hamburg"
replace state = "GER" if cities=="Hannover"
replace state = "BUL" if cities=="Haskovo"
replace state = "UK" if cities=="Hastings"
replace state = "TUR" if cities=="Hatay"
replace state = "NL" if cities=="Heerlen"
replace state = "GER" if cities=="Heidelberg"
replace state = "GER" if cities=="Heilbronn"
replace state = "FIN" if cities=="Helsinki"
replace state = "GER" if cities=="Hildesheim"
replace state = "NL" if cities=="Hilversum"
replace state = "CZE" if cities=="Hradec Králové"
replace state = "ESP" if cities=="Huelva"
replace state = "FR" if cities=="Hénin - Carvin"
replace state = "ROU" if cities=="Iasi"
replace state = "GER" if cities=="Ingolstadt"
replace state = "AUT" if cities=="Innsbruck"
replace state = "PL" if cities=="Inowroclaw"
replace state = "GRE" if cities=="Ioannina"
replace state = "UK" if cities=="Ipswich"
replace state = "GER" if cities=="Irakleio"
replace state = "GER" if cities=="Iserlohn"
replace state = "TUR" if cities=="Istanbul"
replace state = "TUR" if cities=="Izmir"
replace state = "PL" if cities=="Jastrzebie-Zdrój"
replace state = "ESP" if cities=="Jaén"
replace state = "PL" if cities=="Jelenia Góra"
replace state = "LV" if cities=="Jelgava"
replace state = "GER" if cities=="Jena"
replace state = "ESP" if cities=="Jerez de la Frontera"
replace state = "CZE" if cities="Jihlava"
replace state = "FIN" if cities="Jyväskylä"
replace state = "SWE" if cities="Jönköping"
replace state = "GER" if cities="Kaiserslautern"
replace state = "GRE" if cities="Kalamata"
replace state = "PL" if cities="Kalisz"
replace state = "CZE" if cities="Karlovy Vary"
replace state = "GER" if cities="Karlsruhe"
replace state = "TUR" if cities="Kars"
replace state = "GER" if cities="Kassel"
replace state = "TUR" if cities="Kastamonu"
replace state = "PL" if cities="Katowice"
replace state = "LIT" if cities="Kaunas"
replace state = "GRE" if cities="Kavala"
replace state = "TUR" if cities="Kayseri"
replace state = "HUN" if cities="Kecskemét"
replace state = "GER" if cities="Kempten (Allgäu)"
replace state = "GER" if cities="Kiel"
replace state = "PL" if cities="Kielce"
replace state = "UK" if cities="Kingston upon Hull"
replace state = "AUT" if cities="Klagenfurt"
replace state = "GER" if cities="Koblenz"
replace state = "TUR" if cities="Kocaeli"
replace state = "PL" if cities="Konin"
replace state = "GER" if cities="Konstanz"
replace state = "TUR" if cities="Konya"
replace state = "BEL" if cities="Kortrijk"
replace state = "SLK" if cities="Kosice"
replace state = "PL" if cities="Koszalin"
replace state = "PL" if cities="Kraków"
replace state = "GER" if cities="Krefeld"
replace state = "NOR" if cities="Kristiansand"
replace state = "FIN" if cities="Kuopio"
replace state = "GER" if cities="Köln"
replace state = "NOR" if cities="København"
replace state = "FR" if cities="La Rochelle"
replace state = "IT" if cities="La Spezia"
replace state = "FIN" if cities="Lahti"
replace state = "GER" if cities="Landshut"
replace state = "GRE" if cities="Larisa"
replace state = "ESP" if cities="Las Palmas"
replace state = "IT" if cities="Latina"
replace state = "CH" if cities="Lausanne"
replace state = "FR" if cities="Le Havre"
replace state = "FR" if cities="Le Mans"
replace state = "IT" if cities="Lecce"
replace state = "IT" if cities="Lecco"
replace state = "UK" if cities="Leeds"
replace state = "NL" if cities="Leeuwarden"
replace state = "CY" if cities="Lefkosia"
replace state = "PL" if cities="Legnica"
replace state = "UK" if cities="Leicester"
replace state = "NL" if cities="Leiden"
replace state = "GER" if cities="Leipzig"
replace state = "FR" if cities="Lens - Liévin"
replace state = "PL" if cities="Leszno"
replace state = "BEL" if cities="Leuven"
replace state = "ESP" if cities="León"
replace state = "CZE" if cities="Liberec"
replace state = "LV" if cities="Liepaja"
replace state = "FR" if cities="Lille"
replace state = "IRE" if cities="Limerick"
replace state = "FR" if cities="Limoges"
replace state = "UK" if cities="Lincoln"
replace state = "SWE" if cities="Linköping"
replace state = "AUT" if cities="Linz"
replace state = "POR" if cities="Lisboa"
replace state = "UK" if cities="Liverpool"
replace state = "IT" if cities="Livorno"
replace state = "BEL" if cities="Liège"
replace state = "SLN" if cities="Ljubljana"
replace state = "ESP" if cities="Lleida"
replace state = "ESP" if cities="Logroño"
replace state = "PL" if cities="Lomza"
replace state = "UK" if cities="London"
replace state = "FR" if cities="Lorient"
replace state = "PL" if cities="Lubin"
replace state = "PL" if cities="Lublin"
replace state = "CH" if cities="Lugano"
replace state = "LUX" if cities="Luxembourg"
replace state = "CH" if cities="Luzern"
replace state = "FR" if cities="Lyon"
replace state = "PL" if cities="Łódz"
replace state = "GER" if cities="Lübeck"
replace state = "GER" if cities="Lüneburg"
replace state = "NL" if cities="Maastricht"
replace state = "ESP" if cities="Madrid"
replace state = "GER" if cities="Magdeburg"
replace state = "GER" if cities="Mainz"
replace state = "TUR" if cities="Malatya"
replace state = "SWE" if cities="Malmö"
replace state = "UK" if cities="Manchester"
replace state = "TUR" if cities=="Manisa"
replace state = "GER" if cities=="Mannheim-Ludwigshafen"
replace state = "ESP" if cities=="Marbella"
replace state = "GER" if cities=="Marburg"
replace state = "SLN" if cities=="Maribor"
replace state = "FR" if cities=="Marseille"
replace state = "FR" if cities=="Martigues"
replace state = "IT" if cities=="Massa"
replace state = "IT" if cities=="Matera"
replace state = "FR" if cities=="Melun"
replace state = "IT" if cities=="Messina"
replace state = "FR" if cities=="Metz"
replace state = "NL" if cities=="Middelburg"
replace state = "UK" if cities=="Middlesbrough"
replace state = "IT" if cities=="Milano"
replace state = "HUN" if cities=="Miskolc"
replace state = "IT" if cities=="Modena"
replace state = "BEL" if cities=="Mons"
replace state = "FR" if cities=="Montbéliard"
replace state = "FR" if cities=="Montpellier"
replace state = "CZE" if cities=="Most"
replace state = "UK" if cities=="Mulhouse"
replace state = "ESP" if cities=="Murcia"
replace state = "ESP" if cities=="Málaga"
replace state = "GER" if cities=="Mönchengladbach"
replace state = "GER" if cities=="München"
replace state = "GER" if cities=="Münster"
replace state = "BEL" if cities=="Namur"
replace state = "FR" if cities=="Nancy"
replace state = "FR" if cities=="Nantes"
replace state = "IT" if cities=="Napoli"
replace state = "GER" if cities=="Neubrandenburg"
replace state = "GER" if cities=="Neumünster"
replace state = "TUR" if cities=="Nevşehir"
replace state = "UK" if cities=="Newcastle upon Tyne"
replace state = "UK" if cities=="Newport"
replace state = "FR" if cities=="Nice"
replace state = "NL" if cities=="Nijmegen"
replace state = "FR" if cities=="Niort"
replace state = "SLK" if cities=="Nitra"
replace state = "UK" if cities=="Norwich"
replace state = "UK" if cities=="Nottingham"
replace state = "IT" if cities=="Novara"
replace state = "PL" if cities=="Nowy Sacz"
replace state = "HUN" if cities=="Nyíregyháza"
replace state = "FR" if cities=="Nîmes"
replace state = "GER" if cities=="Nürnberg"
replace state = "DEN" if cities=="Odense"
replace state = "GER" if cities=="Offenburg"
replace state = "GER" if cities=="Oldenburg (Oldenburg)"
replace state = "CZE" if cities=="Olomouc"
replace state = "PL" if cities=="Olshuty"
replace state = "BEL" if cities=="Oostende"
replace state = "PL" if cities=="Opole"
replace state = "ROU" if cities=="Oradea"
replace state = "FR" if cities=="Orléans"
replace state = "CRO" if cities=="Osijek"
replace state = "NOR" if cities=="Oslo"
replace state = "GER" if cities=="Osnabrück"
replace state = "CZE" if cities=="Ostrava"
replace state = "PL" if cities=="Ostrowiec Swietokrzyski"
replace state = "PL" if cities=="Ostrów Wielkopolski"
replace state = "FIN" if cities=="Oulu"
replace state = "ESP" if cities=="Ourense"
replace state = "ESP" if cities=="Oviedo"
replace state = "PL" if cities=="Pabianice"
replace state = "IT" if cities=="Paderborn"
replace state = "IT" if cities=="Padova"
replace state = "IT" if cities=="Palermo"
replace state = "ESP" if cities=="Palma de Mallorca"
replace state = "ESP" if cities=="Pamplona/Iruña"
replace state = "LIT" if cities=="Panevezys"
replace state = "CZE" if cities=="Pardubice"
replace state = "FR" if cities=="Paris"
replace state = "IT" if cities=="Parma"
replace state = "GER" if cities=="Passau"
replace state = "GRE" if cities=="Patra"
replace state = "FR" if cities=="Pau"
replace state = "IT" if cities=="Pavia"
replace state = "BUL" if cities=="Pazardzhik"
replace state = "FR" if cities=="Perpignan"
replace state = "IT" if cities=="Perugia"
replace state = "IT" if cities=="Pesaro"
replace state = "IT" if cities=="Pescara"
replace state = "GER" if cities=="Pforzheim"
replace state = "IT" if cities=="Piacenza"
replace state = "ROU" if cities=="Piatra Neamț"
replace state = "PL" if cities=="Pila"
replace state = "PL" if cities=="Piotrków Trybunalski"
replace state = "IT" if cities=="Pisa"
replace state = "ROU" if cities=="Pitesti"
replace state = "GER" if cities=="Plauen"
replace state = "BUL" if cities=="Pleven"
replace state = "PL" if cities=="Plock"
replace state = "GER" if cities=="Plauen"
replace state = "ROU" if cities=="Ploiesti"
replace state = "BUL" if cities=="Plovdiv"
replace state = "BUL" if cities=="Plovdiv_c"
replace state = "CZE" if cities=="Plzen"
replace state = "FR" if cities=="Poitiers"
replace state = "POR" if cities=="Ponta Delgada"
replace state = "IT" if cities=="Pordenone"
replace state = "POR" if cities=="Porto"
replace state = "UK" if cities=="Portsmouth"
replace state = "IT" if cities=="Potenza"
replace state = "PL" if cities=="Poznan"
replace state = "CZE" if cities=="Praga"
replace state = "IT" if cities=="Prato"
replace state = "SLK" if cities=="Presov"
replace state = "UK" if cities=="Preston"
replace state = "PL" if cities=="Przemysl"
replace state = "HUN" if cities=="Pécs"
replace state = "IT" if cities=="Póvoa de Varzim"
replace state = "FR" if cities=="Quimper"
replace state = "PL" if cities=="Radom"
replace state = "ROU" if cities=="Ramnicu Valcea"
replace state = "IT" if cities=="Ravenna"
replace state = "UK" if cities=="Reading"
replace state = "GER" if cities=="Regensburg"
replace state = "IT" if cities=="Reggio di Calabria"
replace state = "IT" if cities=="Reggio nell'Emilia"
replace state = "FR" if cities=="Reims"
replace state = "GER" if cities=="Remscheid"
replace state = "FR" if cities=="Rennes"
replace state = "ESP" if cities=="Reus"
replace state = "GER" if cities=="Reutlingen"
replace state = "CRO" if cities=="Rijeka"
replace state = "IT" if cities=="Rimini"
replace state = "FR" if cities=="Roanne"
replace state = "IT" if cities=="Roma"
replace state = "ROU" if cities=="Roman"
replace state = "NL" if cities=="Roosendaal"
replace state = "GER" if cities=="Rosenheim"
replace state = "GER" if cities=="Rostock"
replace state = "NL" if cities=="Rotterdam"
replace state = "FR" if cities=="Rouen"
replace state = "GER" if cities=="Ruhrgebiet"
replace state = "BUL" if cities=="Ruse"
replace state = "PL" if cities=="Rybnik"
replace state = "PL" if cities=="Rzeszów"
replace state = "GER" if cities=="Saarbrücken"
replace state = "FR" if cities=="Saint Denis"
replace state = "FR" if cities=="Saint-Brieuc"
replace state = "FR" if cities=="Saint-Etienne"
replace state = "FR" if cities=="Saint-Nazaire"
replace state = "FR" if cities=="Saint-Quentin"
replace state = "ESP" if cities=="Salamanca"
replace state = "IT" if cities=="Salerno"
replace state = "AUT" if cities=="Salzburg"
replace state = "TUR" if cities=="Samsun"
replace state = "IT" if cities=="Sanremo"
replace state = "ESP" if cities=="Santa Cruz de Tenerife"
replace state = "ESP" if cities=="Santander"
replace state = "ESP" if cities=="Santiago de Compostela"
replace state = "IT" if cities=="Sassari"
replace state = "ROU" if cities=="Satu Mare"
replace state = "IT" if cities=="Savona"
replace state = "GER" if cities=="Schweinfurt"
replace state = "GER" if cities=="Schwerin"
replace state = "POR" if cities=="Setúbal"
replace state = "ESP" if cities=="Sevilla"
replace state = "UK" if cities=="Sheffield"
replace state = "BUL" if cities=="Shumen"
replace state = "ROU" if cities=="Sibiu"
replace state = "PL" if cities=="Siedlce"
replace state = "GER" if cities=="Siegen"
replace state = "TUR" if cities=="Sibır"
replace state = "IT" if cities=="Siracusa"
replace state = "NL" if cities=="Sittard-Geleen"
replace state = "ROU" if cities=="Slatina"
replace state = "CRO" if cities=="Slavonski Brod"
replace state = "BUL" if cities=="Sliven"
replace state = "PL" if cities=="Slupsk"
replace state = "BUL" if cities=="Sofia"
replace state = "GER" if cities=="Solingen"
replace state = "UK" if cities=="Southampton"
replace state = "CRO" if cities=="Split"
replace state = "CH" if cities=="St. Gallen"
replace state = "PL" if cities=="Stalowa Wola"
replace state = "BUL" if cities=="Stara Zagora"
replace state = "PL" if cities=="Stargard Szczecinski"
replace state = "NOR" if cities=="Stavanger"
replace state = "SWE" if cities=="Stockholm"
replace state = "UK" if cities=="Stoke-on-Trent"
replace state = "IT" if cities=="Udine"
replace state = "GER" if cities=="Ulm"
replace state = "SWE" if cities=="Umeå"
replace state = "SWE" if cities=="Uppsala"
replace state = "NL" if cities=="Utrecht"
replace state = "FR" if cities=="Valenciennes"
replace state = "ESP" if cities=="Valladolid"
replace state = "ML" if cities=="Valletta"
replace state = "TUR" if cities=="Van"
replace state = "FR" if cities=="Vannes"
replace state = "IT" if cities=="Varese"
replace state = "BUL" if cities=="Varna"
replace state = "BUL" if cities=="Veliko Tarnovo"
replace state = "IT" if cities=="Venezia"
replace state = "NL" if cities=="Venlo"
replace state = "IT" if cities=="Verona"
replace state = "POR" if cities=="Viana do Castelo"
replace state = "IT" if cities=="Viareggio"
replace state = "IT" if cities=="Vicenza"
replace state = "BUL" if cities=="Vidin"
replace state = "IT" if cities=="Vigevano"
replace state = "ESP" if cities=="Vigo"
replace state = "GER" if cities=="Villingen-Schwenningen"
replace state = "LIT" if cities=="Vilnius"
replace state = "POR" if cities=="Viseu"
replace state = "ESP" if cities=="Vitoria/Gasteiz"
replace state = "LIT" if cities=="Vilnius"
replace state = "GRE" if cities=="Volos"
replace state = "BUL" if cities=="Vratsa"
replace state = "PL" if cities=="Walbrzych"
replace state = "PL" if cities=="Warszawa"
replace state = "IRE" if cities=="Waterford"
replace state = "GER" if cities=="Weimar"
replace state = "UK" if cities=="West Midlands urban area"
replace state = "GER" if cities=="Wetzlar"
replace state = "GER" if cities=="Wiesbaden"
replace state = "GER" if cities=="Wilhelmshaven"
replace state = "CH" if cities=="Winterthur"
replace state = "PL" if cities=="Wloclawek"
replace state = "PL" if cities=="Wroclaw"
replace state = "GER" if cities=="Wuppertal"
replace state = "GER" if cities=="Würzburg"
replace state = "BUL" if cities=="Yambol"
replace state = "PL" if cities=="Zamosc"
replace state = "ESP" if cities=="Zaragoza"
replace state = "PL" if cities=="Zielona Góra"
replace state = "SLK" if cities=="Zilina"
replace state = "CZE" if cities=="Zlín"
replace state = "TUR" if cities=="Zonguldak"
replace state = "GER" if cities=="Zwickau"
replace state = "NL" if cities=="Zwolle"
replace state = "CH" if cities=="Zürich"
replace state = "NL" if cities=="s' Gravenhage"
replace state = "NL" if cities=="s-Hertogenbosch"
replace state = "SWE" if cities=="Örebro"
replace state = "CZE" if cities=="Ústí nad Labem"

**Dummy Variable: EU-Enlargement in whole**
gen Eu=1
replace Eu=0 if (cities=="Helsinki" | cities=="Turku" | cities=="Tampere" | cities=="Wien" |
cities=="Graz" | cities=="Stockholm" | cities=="Göteborg" | cities=="Malmö" | cities=="Innsbruck" |
cities=="Klagenfurt" | cities=="Salzburg" | cities=="Jyväskylä" | cities=="Kuopio" | cities=="Lahti" | cities=="Oulu" | cities=="Jönköping" | cities=="Linköping" | cities=="Umeå" | cities=="Uppsala" | cities=="Örebro") &
year <=1994
replace Eu=0 if (cities=="Tallinn" | cities=="Tartu" | cities=="Daugavpils" | cities=="Jelgava" |
cities=="Kaunas" | cities=="Vilnius" | cities=="Panevėžys" | cities=="Liepaja" | cities=="Valetta" |
cities=="Bialystok" | cities=="Bielsko-Biała" | cities=="Bydgoszcz" | cities=="Chelm" | cities=="Częstochowa" |
cities=="Elbląg" | cities=="Elk" |
cities=="Gdańsk" | cities=="Głogów" | cities=="Gniezno" | cities=="Gorzów Wielkopolski" |
cities=="Grudziądz" | cities=="Inowrocław" |
cities=="Jastrzebie-Zdrój" | cities=="Jelenia Góra" | cities=="Kalisz" | cities=="Katowice" |
cities=="Kielce" | cities=="Konin" |
cities=="Koszalin" | cities=="Kraków" | cities=="Legnica" | cities=="Leszno" | cities=="Lomza" |
cities=="Lubin" | cities=="Lublin" |
cities=="Łódz" | cities=="Nowy Sacz" | cities=="Olsztyn" | cities=="Opole" | cities=="Ostrowiec Swietokrzyski" |
cities=="Ostrów Wielkopolski" | cities=="Pabianice" | cities=="Pila" | cities=="Piotrków Trybunalski" |
cities=="Płock" |
cities=="Poznań" | cities=="Przemyśl" | cities=="Radom" | cities=="Rybnik" | cities=="Rzeszów" |
cities=="Siedlc" |
cities=="Staffagota Wolga" | cities=="Stargard Szczeciński" | cities=="Suwałki" | cities=="Swidnica" |
cities=="Szczytnie" |
cities=="Tarnów" | cities=="Tczew" | cities=="Tomaszów Mazowiecki" | cities=="Torun" |
cities=="Walbryczyk" |
cities=="Warszawa" | cities=="Włocławek" | cities=="Wrocław" | cities=="Zamość" | cities=="Zielona Góra" |
cities=="Słupsk" |
cities=="Ceske Budejovice" | cities=="Chomutov" | cities=="Hradec Králové" | cities=="Jihlava" |
cities=="Karlov Vary" |
cities=="Liberec" | cities=="Most" | cities=="Olomouc" | cities=="Ostrava" | cities=="Pardubice" | cities=="Plzen" | ///
cities=="Praha" | cities=="Zlin" | cities=="Banska Bystrica" | cities=="Bratislava" | cities=="Nitra" | cities=="Presov" | ///
cities=="Trencin" | cities=="Trnava" | cities=="Zilina" | cities=="Ljubljana" | cities=="Kosice" | cities=="Maribor" | ///
cities=="Alba Iulia" | cities=="Bistrita" | cities=="Budapest" | cities=="Debrecen" | cities=="Györ" | cities=="Kecskemét" | ///
cities=="Miskolc" | cities=="Nyiregyhaza" | cities=="Pecs" | cities=="Szeged" | cities=="Szombathely" | ///
cities=="Székesfehérvár" | cities=="Lefkosia" ) & year <= 2003
replace Eu=0 if (cities=="Sofia" | cities=="Plovdiv" | cities=="Varna" | cities=="Blagoevgard" | cities=="Burgas" | cities=="Haskovo" | cities=="Pazardzhik" | cities=="Pleven" | cities=="Plovdiv_c" | cities=="Ruse" | cities=="Shumen" | cities=="Sliven" | cities=="Stara Zagora" | cities=="Veliko Tarnovo" | cities=="Vidin" | cities=="Vratsa" | cities=="Yambol" | cities=="Arad" | cities=="Bacau" | cities=="Baia Mare" | cities=="Botosani" | cities=="Braila" | cities=="Brasov" | cities=="Buzau" | cities=="Bârlad" | cities=="Calarasi" | cities=="Constanta" | cities=="Craiova" | cities=="Drobeta-Turnu Severin" | cities=="Focsani" | cities=="Galati" | cities=="Giurgiu" | cities=="Iasi" | cities=="Oradea" | cities=="Piatra Neamt" | cities=="Pitesti" | cities=="Ploiesti" | cities=="Ramnicu Valcea" | cities=="Roman" | cities=="Satu Mare" | cities=="Sibiu" | cities=="Slatina" | cities=="Suceava" | cities=="Tulcea" | cities=="Targoviste" | cities=="Targu Jiu" | cities=="Targu Mures" | cities=="Bucuresti" | cities=="Cluj-Napoca" | cities=="Timisoara") & year <= 2006
replace Eu=0 if (cities=="Osijek" | cities=="Rijeka" | cities=="Slavonski Brod" | cities=="Split" | /// | cities=="Grad Zagreb")& year <= 2013
replace Eu=0 if (cities=="Basel" | cities=="Basel transnational LUZ" | cities=="Bern" | cities=="Biel/Bienne" | cities=="Genève" | ///
cities=="Genève transationale LUZ" | cities=="Lausanne" | cities=="Lugano" | cities=="Luzern" | cities=="St. Gallen" | ///
cities=="Winterthur" | cities=="Bergen" | cities=="Kristiansand" | cities=="København" | cities=="Oslo" | cities=="Stavanger" | ///
cities=="Tromso" | cities=="Trondheim" | cities=="Adana" | cities=="Ankara" | cities=="Antalya" | cities=="Balikesir" | cities=="Bursa" | ///
cities=="Denizli" | cities=="Diyarbakir" | cities=="Edirna" | cities=="Erzurum" | cities=="Gaziantep" | cities=="Hatay" | ///
cities=="Istanbul" | cities=="Izmir" | cities=="Kars" | cities=="Kastamonu" | cities=="Kayseri" | cities=="Kocaeli" | cities=="Konya" | ///
cities=="Malatya" | cities=="Manisa" | cities=="Nevsehir" | cities=="Samsun" | cities=="Siirt" | cities=="Trabzon" | cities=="Van" | ///
cities=="Zonguldak")
**Dummy Variable: every Enlargement Round:
  gen eu=1
replace eu=2 if (cities=="Helsinki" | cities=="Turku" | cities=="Tampere" | cities=="Wien" | cities=="Graz" | ///
cities=="Linz" | cities=="Stockholm" | cities=="Göteborg" | cities=="Malmö" | cities=="Innsbruck" | cities=="Klagenfurt" | ///
cities=="Salzburg" | cities=="Jyväskylä" | cities=="Kuopio" | cities=="Lahti" | cities=="Oulu" | ///
Valcea" | cities=="Roman" | cities=="Satu Mare" | cities=="Sibiu" | cities=="Slatina" | cities=="Suceava" | cities=="Târgoviste" | cities=="Târgu Jiu" | cities=="Târgu Mures" | cities=="Bucuresti" | cities=="Cluj-Napoca" | cities=="Timisoara") & year <= 2006
replace eu=5 if (cities=="Osijek" | cities=="Rijeka" | cities=="Slavonski Brod" | cities=="Split" | cities=="Grad Zagreb")& year <= 2013
replace eu=0 if (cities=="Basel" | cities=="Basel transnational LUZ" | cities=="Bern" | cities=="Biel/Bienne" | cities=="Genéve" | cities=="Genéve transationale LUZ" | cities=="Lausanne" | cities=="Lugano" | cities=="Luzern" | cities=="St. Gallen" | cities=="Winterthur" | cities=="Bergen" | cities=="Kristiansand" | cities=="København" | cities=="Oslo" | cities=="Stavanger" | cities=="Tromsø" | cities=="Trondheim" | cities=="Adana" | cities=="Ankara" | cities=="Antalya" | cities=="Balikesir" | cities=="Bursa" | cities=="Denizli" | cities=="Diyarbakir" | cities=="Edirna" | cities=="Erzurum" | cities=="Gaziantep" | cities=="Hatay" | cities=="Istanbul" | cities=="Izmir" | cities=="Kars" | cities=="Kastamonu" | cities=="Kayseri" | cities=="Kocaeli" | cities=="Konya" | cities=="Malatya" | cities=="Manisa" | cities=="Nevsehir" | cities=="Samsun" | cities=="Siirt" | cities=="Trabzon" | cities=="Van" | cities=="Zonguldak" )
save "C:\Users\Fabian\Desktop\master\stata\all_cities.dta", replace

**Explanatory variables**
  *1. Education/Human capital*
use "C:\Users\Fabian\Desktop\master\stata\edu.dta", clear
reshape long x, i(cities) j(year)
egen city=group(cities)
encode cities, gen (co)
encode x, gen (edu)
drop x
save "C:\Users\Fabian\Desktop\master\stata\edu_panel.dta", replace

  *2. Unemployment*
use "C:\Users\Fabian\Desktop\master\stata\unemp.dta", clear
reshape long x, i(cities) j(year)
egen city=group(cities)
encode cities, gen (co)
encode x, gen (unemp)
drop x
save "C:\Users\Fabian\Desktop\master\stata\unemp_panel.dta", replace

  *3. Foreign EU citizens*
use "C:\Users\Fabian\Desktop\master\stata\eu_f.dta", clear
reshape long x, i(cities) j(year)
egen city=group(cities)
encode cities, gen (co)
encode x, gen(feu)
drop x

XVIII
**Merge of these variables to one big data set**

```stata
use "C:\Users\Fabian\Desktop\master\stata\all_cities.dta", clear
sort co year
save "C:\Users\Fabian\Desktop\master\stata\pop1_m.dta", replace

use "C:\Users\Fabian\Desktop\master\stata\edu_panel.dta", clear
sort co year
save "C:\Users\Fabian\Desktop\master\stata\edu_p.dta", replace

use "C:\Users\Fabian\Desktop\master\stata\unemp_panel.dta", clear
sort co year
save "C:\Users\Fabian\Desktop\master\stata\unemp_p.dta", replace

merge co year using C:\Users\Fabian\Desktop\master\stata\pop1_m.dta ///
C:\Users\Fabian\Desktop\master\stata\edu_p.dta ///
C:\Users\Fabian\Desktop\master\stata\unemp_p.dta ///
C:\Users\Fabian\Desktop\master\stata\eu_panel.dta

drop _merge
drop _merge1
drop _merge2
drop _merge3
drop _merge4
```

**Panel Analysis with the dummy variable (0 and 1) -> whole enlargement process**

```stata
use "C:\Users\Fabian\Desktop\master\stata\panel_reg.dta", clear
encode edu, gen(H)
encode unemp, gen(U)
encode feu, gen(frg)
xtset city year
xtreg dpop i.year i.eu H U frg, fe r
estimate store m1, title(Model 1)
*Durbin-Watson Test:
xtregar dpop i.eu H U frg, fe lbi
*Fixed or Random effects Test:
*Hausman test:*
quietly xtreg dpop i.year i.eu H U frg, fe
estimate store fix, title(Fixed)
quietly xtreg dpop i.year i.eu H U frg, re
estimate store ran, title(Random)
hausman fix ran
*if Prob>chi2 greater than 0.05 use fixed effects
**Panel Modell with all Enlargement rounds**
use "C:\Users\Fabian\Desktop\master\stata\panel_reg.dta", clear
xtset city year
xtreg dpop i.year i.eu H U frg if eu>=1, fe r
```
**Difference-in-Difference:**
gen treatn = (eu>1)
gen treat1 = (eu>1) & (eu<3)
gen treat2 = (eu>2) & (eu<4)
gen treat3 = (eu>3) & (eu<5)
gen treat4 = (eu>4)

*General Diff-in-Diff*

xtset city year
xtreg dpop i.year treatn, fe r

*1. Erweiterung*

xtreg dpop i.year treatn treat1, fe r
estimate store m2, title(1. Enlargement)
test _b[treatn] + [treat1]=0

*2. Erweiterung*

xtreg dpop i.year treatn treat2, fe r
estimate store m3, title(2. Enlargement)
test _b[treatn] + [treat2]=0

*3.Erweiterung*

xtreg dpop i.year treatn treat3, fe r
estimate store m4, title(3. Enlargement)
test _b[treatn] + [treat3]=0

*4.Erweiterung*

xtreg dpop i.year treatn treat4, fe r
estimate store m5, title(4. Enlargement)
test _b[treatn] + [treat4]=0

***Regression Table***
estout m1 m2 m3 m4 m5, cells(b(star fmt(6)) se(par fmt(2))) ///
legend label collabels(none) varlabels(_cons Constant) ///
stats (r2 N, fmt(3 0) label(R-squared Observations)) ///
style(tex)

***Tables***

*1. Enlargements*
tab year Eu

*2. Treatments*
tab treatn eu
tab treat1 eu
tab treat2 eu
tab treat3 eu
tab treat4 eu

***Graphes for descriptive Analysis***

*Treated vs. Untreatet characteristics*

xtset city year
xtreg dpop i.year i.Eu H U frg, fe r
gen tdpop=dpop if Eu==1
gen cdpop=dpop if Eu==0
scatter tdpop cdpop year, title("City Growth") ytitle(growth) xtitle(Year) ylab(8 [1] -8) ///
legend(order(1 "Treatment" 2 "Control") region(lwidth(none) lcolor(none) lstyle(none)) ring(0) pos(7)) ///
xsize(20) ysize(8) || lfit tdpop year
graph save Graph "C:\Users\Fabian\Desktop\master\stata\Graph_treatment.gph", replace
graph export "C:\Users\Fabian\Dropbox\Masterarbeit\Latex\Screenshots\treat.png", as(png) replace
C. smcl File

Log_file

--------------------------------------------------------
name:  <unnamed>
log:  C:\Users\Fabian\Desktop\master\ stata\pop.smcl
log type:  smcl
opened on:   11 Dec 2016, 16:18:15
. reshape long x, i(cities) j(year)
Data    wide   ->   long
--------------------------------------------------------
Number of obs.                      635   ->   15875
Number of variables                  26   ->       3
j variable (25 values)              ->   year
xij variables:
            x1990 x1991 ... x2014   ->   x
--------------------------------------------------------
. rename x inhabitants
. egen city=group(cities)
. encode cities, gen (co)
. encode inhabitants, gen (inhab)
. xtset city year
   panel variable:  city (strongly balanced)
   time variable:  year, 1990 to 2014
   delta:  1 unit
. gen  lpop=log(inhab)
. gen  dpop=lpop-l.lpop
(635 missing values generated)
. ***generieren der länder***
. gen state = "AUT" if cities="Wien"
(15,850 missing values generated)
. replace state = "GER" if cities="Aachen"
(25 real changes made)
. replace state = "DEN" if cities="Aalborg"
(25 real changes made)
. replace state = "UK" if cities="Aberdeen"
(25 real changes made)
. replace state = "IT" if cities="Acireale"
(25 real changes made)
. replace state = "TUR" if cities="Adana"
(25 real changes made)
. replace state = "FR" if cities="Ajaccio"
(25 real changes made)
. replace state = "HUN" if cities="Alba Iulia"
(25 real changes made)
. replace state = "ESP" if cities="Albacete"
(25 real changes made)
. replace state = "FR" if cities="Albi"
(25 real changes made)
. replace state = "ESP" if cities="Algeciras"
(25 real changes made)
. replace state = "ESP" if cities="Alicante/Alacant"
(25 real changes made)
. replace state = "NL" if cities="Alkmaar"
(25 real changes made)
. replace state = "NL" if cities="Almelo"
(25 real changes made)
. replace state = "ESP" if cities="Almería"
(25 real changes made)
. replace state = "NL" if cities="Amersfoort"
(25 real changes made)
. replace state = "FR" if cities="Amiens"
(25 real changes made)
. replace state = "NL" if cities="Amsterdam"
(25 real changes made)
. replace state = "IT" if cities="Ancona"
(25 real changes made)
. replace state = "FR" if cities="Angers"
(25 real changes made)
. replace state = "FR" if cities="Angoulême"
(25 real changes made)
. replace state = "TUR" if cities="Ankara"
(25 real changes made)
. replace state = "FR" if cities="Annecy"
(25 real changes made)
. replace state = "TUR" if cities="Antalya"
(25 real changes made)
. replace state = "BEL" if cities="Antwerpen"
(25 real changes made)
. replace state = "NL" if cities="Apeldoorn"
(25 real changes made)
. replace state = "ROU" if cities="Arad"
(25 real changes made)
. replace state = "NL" if cities="Arnhem"
(25 real changes made)
. replace state = "FR" if cities="Arras"
(25 real changes made)
. replace state = "GER" if cities="Aschaffenburg"
(25 real changes made)
. replace state = "IT" if cities=="Asti"
(25 real changes made)
. replace state = "GRE" if cities=="Athina"
(25 real changes made)
. replace state = "GER" if cities=="Augsburg"
(25 real changes made)
. replace state = "POR" if cities=="Aveiro"
(25 real changes made)
. replace state = "IT" if cities=="Avellino"
(25 real changes made)
. replace state = "DEN" if cities=="Århus"
(25 real changes made)
. replace state = "FR" if cities=="Avignon"
(25 real changes made)
. replace state = "ROU" if cities=="Bacau"
(25 real changes made)
. replace state = "ESP" if cities=="Badajoz"
(25 real changes made)
. replace state = "ROU" if cities=="Baia Mare"
(25 real changes made)
. replace state = "TUR" if cities=="Balikesir"
(25 real changes made)
. replace state = "GER" if cities=="Bamberg"
(25 real changes made)
. replace state = "SLK" if cities=="Banská Bystrica"
(25 real changes made)
. replace state = "ESP" if cities=="Barcelona"
(25 real changes made)
. replace state = "IT" if cities=="Bari"
(25 real changes made)
. replace state = "IT" if cities=="Barletta"
(25 real changes made)
. replace state = "CH" if cities=="Basel"
(25 real changes made)
. replace state = "CH" if cities=="Basel transnational LUZ"
(25 real changes made)
. replace state = "FR" if cities=="Bayonne"
(25 real changes made)
. replace state = "GER" if cities=="Bayreuth"
(25 real changes made)
. replace state = "FR" if cities=="Beauvais"
(25 real changes made)
. replace state = "UK" if cities=="Belfast"
(25 real changes made)
. replace state = "FR" if cities=="Belfort"
(25 real changes made)
replace state = "IT" if cities="Benevento"
(25 real changes made)
replace state = "IT" if cities="Bergamo"
(25 real changes made)
replace state = "NOR" if cities="Bergen"
(25 real changes made)
replace state = "NL" if cities="Bergen op Zoom"
(25 real changes made)
replace state = "GER" if cities="Berlin"
(25 real changes made)
replace state = "CH" if cities="Bern"
(25 real changes made)
replace state = "FR" if cities="Besançon"
(25 real changes made)
replace state = "PL" if cities="Bialystok"
(25 real changes made)
replace state = "CH" if cities="Biel/Bienne"
(25 real changes made)
replace state = "GER" if cities="Bielefeld"
(25 real changes made)
replace state = "IT" if cities="Biella"
(25 real changes made)
replace state = "IT" if cities="Biella"
(0 real changes made)
replace state = "PL" if cities="Bielsko-Biała"
(25 real changes made)
replace state = "ESP" if cities="Bilbao"
(25 real changes made)
replace state = "HUN" if cities="Bistriţa"
(25 real changes made)
replace state = "UK" if cities="Blackburn with Darwen"
(25 real changes made)
replace state = "UK" if cities="Blackpool"
(25 real changes made)
replace state = "BUL" if cities="Blagoevgrad"
(25 real changes made)
replace state = "IT" if cities="Bologna"
(25 real changes made)
replace state = "IT" if cities="Bolzano"
(25 real changes made)
replace state = "GER" if cities="Bonn"
(25 real changes made)
replace state = "FR" if cities="Bordeaux"
(25 real changes made)
replace state = "ROU" if cities="Botosani"
(25 real changes made)
. replace state = "FR" if cities=="Boulogne-sur-Mer"
  (25 real changes made)
. replace state = "FR" if cities=="Bourges"
  (25 real changes made)
. replace state = "UK" if cities=="Bournemouth"
  (25 real changes made)
. replace state = "UK" if cities=="Bradford"
  (25 real changes made)
. replace state = "POR" if cities=="Braga"
  (25 real changes made)
. replace state = "ROU" if cities=="Braila"
  (25 real changes made)
. replace state = "GER" if cities=="Brandenburg an der Havel"
  (25 real changes made)
. replace state = "ROU" if cities=="Brasov"
  (25 real changes made)
. replace state = "SLK" if cities=="Bratislava"
  (25 real changes made)
. replace state = "GER" if cities=="Braunschweig-Salzgitter-Wolfsburg"
  (25 real changes made)
. replace state = "NL" if cities=="Breda"
  (25 real changes made)
. replace state = "GER" if cities=="Bremen"
  (25 real changes made)
. replace state = "GER" if cities=="Bremerhaven"
  (25 real changes made)
. replace state = "IT" if cities=="Brescia"
  (25 real changes made)
. replace state = "FR" if cities=="Brest"
  (25 real changes made)
. replace state = "UK" if cities=="Brighton and Hove"
  (25 real changes made)
. replace state = "UK" if cities=="Bristol"
  (25 real changes made)
. replace state = "FR" if cities=="Brive-la-Gaillarde"
  (25 real changes made)
. replace state = "CZE" if cities=="Brno"
  (25 real changes made)
. replace state = "BEL" if cities=="Brugge"
  (25 real changes made)
. replace state = "BEL" if cities=="Bruxelles / Brussel"
  (25 real changes made)
. replace state = "ROU" if cities=="Bucuresti"
  (25 real changes made)
. replace state = "HUN" if cities=="Budapest"
  (25 real changes made)
. replace state = "BUL" if cities=="Burgas"
(25 real changes made)
. replace state = "ESP" if cities=="Burgos"
(25 real changes made)
. replace state = "UK" if cities=="Burnley"
(25 real changes made)
. replace state = "TUR" if cities=="Bursa"
(25 real changes made)
. replace state = "IT" if cities=="Busto Arsizio"
(25 real changes made)
(25 real changes made)
. replace state = "ROU" if cities=="Buzau"
(25 real changes made)
. replace state = "PL" if cities=="Bydgoszcz"
(25 real changes made)
. replace state = "ROU" if cities=="Bârlad"
(25 real changes made)
. replace state = "FR" if cities=="Béziers"
(25 real changes made)
. replace state = "FR" if cities=="Caen"
(25 real changes made)
. replace state = "IT" if cities=="Cagliari"
(25 real changes made)
. replace state = "FR" if cities=="Calais"
(25 real changes made)
. replace state = "ROU" if cities=="Calarasi"
(25 real changes made)
. replace state = "UK" if cities=="Cambridge"
(25 real changes made)
. replace state = "IT" if cities=="Campobasso"
(25 real changes made)
. replace state = "UK" if cities=="Cardiff"
(25 real changes made)
. replace state = "IT" if cities=="Carrara"
(25 real changes made)
. replace state = "ESP" if cities=="Cartagena"
(25 real changes made)
. replace state = "IT" if cities=="Caserta"
(25 real changes made)
. replace state = "ESP" if cities=="Castellón de la Plana/Castelló de la Plana"
(25 real changes made)
. replace state = "IT" if cities=="Catania"
(25 real changes made)
. replace state = "IT" if cities=="Catanzaro"
(25 real changes made)
. replace state = "GER" if cities=="Celle"
(25 real changes made)
. replace state = "IRE" if cities=="Cork"
(0 real changes made)
. replace state = "ESP" if cities=="Coruña (A)"
(25 real changes made)
. replace state = "IT" if cities=="Cosenza"
(25 real changes made)
. replace state = "GER" if cities=="Cottbus"
(25 real changes made)
. replace state = "UK" if cities=="Coventry"
(25 real changes made)
. replace state = "ROU" if cities=="Craiova"
(25 real changes made)
. replace state = "FR" if cities=="Creil"
(25 real changes made)
. replace state = "IT" if cities=="Cremona"
(25 real changes made)
. replace state = "PL" if cities=="Częstochowa"
(25 real changes made)
. replace state = "ESP" if cities=="Cádiz"
(25 real changes made)
. replace state = "ESP" if cities=="Córdoba"
(25 real changes made)
. replace state = "GER" if cities=="Darmstadt"
(25 real changes made)
. replace state = "LIT" if cities=="Daugavpils"
(25 real changes made)
. replace state = "HUN" if cities=="Debrecen"
(25 real changes made)
. replace state = "NL" if cities=="Delft"
(25 real changes made)
. replace state = "TUR" if cities=="Denizli"
(25 real changes made)
. replace state = "UK" if cities=="Derby"
(25 real changes made)
. replace state = "GER" if cities=="Dessau-Roßlau"
(25 real changes made)
. replace state = "NL" if cities=="Deventer"
(25 real changes made)
. replace state = "FR" if cities=="Dijon"
(25 real changes made)
. replace state = "TUR" if cities=="Diyarbakir"
(25 real changes made)
. replace state = "ESP" if cities=="Donostia-San Sebastián"
(25 real changes made)
. replace state = "NL" if cities=="Dordrecht"
(25 real changes made)
. replace state = "FR" if cities=="Douai"
(25 real changes made)
. replace state = "GER" if cities=="Dresden"
(25 real changes made)
. replace state = "ROU" if cities=="Drobeta-Turnu Severin"
(25 real changes made)
. replace state = "IRE" if cities=="Dublin"
(25 real changes made)
. replace state = "FR" if cities=="Dunkerque"
(25 real changes made)
. replace state = "GER" if cities=="Düsseldorf"
(25 real changes made)
. replace state = "UK" if cities=="Edinburgh"
(25 real changes made)
. replace state = "TUR" if cities=="Edirne"
(25 real changes made)
. replace state = "NL" if cities=="Eindhoven"
(25 real changes made)
. replace state = "PL" if cities=="Elblag"
(25 real changes made)
. replace state = "ESP" if cities=="Elche/Elx"
(25 real changes made)
. replace state = "PL" if cities=="Elk"
(25 real changes made)
. replace state = "NL" if cities=="Enschede"
(25 real changes made)
. replace state = "GER" if cities=="Erfurt"
(25 real changes made)
. replace state = "TUR" if cities=="Erzurum"
(25 real changes made)
. replace state = "FR" if cities=="Evreux"
(25 real changes made)
. replace state = "UK" if cities=="Exeter"
(25 real changes made)
. replace state = "PRO" if cities=="Faro"
(25 real changes made)
. replace state = "IT" if cities=="Ferrara"
(25 real changes made)
. replace state = "IT" if cities=="Firenze"
(25 real changes made)
. replace state = "GER" if cities=="Flensburg"
(25 real changes made)
. replace state = "ROU" if cities=="Focsani"
(25 real changes made)
. replace state = "IT" if cities=="Foggia"
(25 real changes made)
. replace state = "IT" if cities=="Forlì"
(25 real changes made)
. replace state = "FR" if cities=="Fort-de-France"
(25 real changes made)
. replace state = "GER" if cities=="Frankfurt (Oder)"
(25 real changes made)
. replace state = "GER" if cities=="Frankfurt am Main"
(25 real changes made)
. replace state = "GER" if cities=="Freiburg im Breisgau"
(25 real changes made)
. replace state = "GER" if cities=="Friedrichshafen"
(25 real changes made)
. replace state = "FR" if cities=="Fréjus"
(25 real changes made)
. replace state = "GER" if cities=="Fulda"
(25 real changes made)
. replace state = "POR" if cities=="Funchal"
(25 real changes made)
. replace state = "ROU" if cities=="Galati"
(25 real changes made)
. replace state = "IRE" if cities=="Galway"
(25 real changes made)
. replace state = "TUR" if cities=="Gaziantep"
(25 real changes made)
. replace state = "PL" if cities=="Gdansk"
(25 real changes made)
. replace state = "IT" if cities=="Genova"
(25 real changes made)
. replace state = "BEL" if cities=="Gent"
(25 real changes made)
. replace state = "CH" if cities=="Genève"
(25 real changes made)
. replace state = "CH" if cities=="Genève transnational LUZ"
(25 real changes made)
. replace state = "GER" if cities=="Gera"
(25 real changes made)
. replace state = "GER" if cities=="Gießen"
(25 real changes made)
. replace state = "ESP" if cities=="Gijón"
(25 real changes made)
. replace state = "ROU" if cities=="Giurgiu"
(25 real changes made)
. replace state = "UK" if cities=="Glasgow"
(25 real changes made)
. replace state = "PL" if cities=="Glogów"
(25 real changes made)
. replace state = "PL" if cities="Gniezno"
(25 real changes made)
. replace state = "PL" if cities="Gorzów Wielkopolski"
(25 real changes made)
. replace state = "NL" if cities="Gouda"
(25 real changes made)
. replace state = "CRO" if cities="Grad Zagreb"
(25 real changes made)
. replace state = "ESP" if cities="Granada"
(25 real changes made)
. replace state = "AUT" if cities="Graz"
(25 real changes made)
. replace state = "GER" if cities="Greifswald"
(25 real changes made)
. replace state = "FR" if cities="Grenoble"
(25 real changes made)
. replace state = "NL" if cities="Groningen"
(25 real changes made)
. replace state = "PL" if cities="Grudziadz"
(25 real changes made)
. replace state = "POR" if cities="Guimarães"
(25 real changes made)
. replace state = "HUN" if cities="Győr"
(25 real changes made)
. replace state = "GER" if cities="Görlitz"
(25 real changes made)
. replace state = "SWE" if cities="Göteborg"
(25 real changes made)
. replace state = "GER" if cities="Göttingen"
(25 real changes made)
. replace state = "GER" if cities="Halle an der Saale"
(25 real changes made)
. replace state = "GER" if cities="Hamburg"
(25 real changes made)
. replace state = "GER" if cities="Hannover"
(25 real changes made)
. replace state = "BUL" if cities="Haskovo"
(25 real changes made)
. replace state = "UK" if cities="Hastings"
(25 real changes made)
. replace state = "TUR" if cities="Hatay"
(25 real changes made)
. replace state = "NL" if cities="Heerlen"
(25 real changes made)
. replace state = "GER" if cities="Heidelberg"
(25 real changes made)
. replace state = "GER" if cities=="Heilbronn"
(25 real changes made)
. replace state = "FIN" if cities=="Helsinki"
(25 real changes made)
. replace state = "GER" if cities=="Hildesheim"
(25 real changes made)
. replace state = "NL" if cities=="Hilversum"
(25 real changes made)
. replace state = "CZE" if cities=="Hradec Králové"
(25 real changes made)
. replace state = "ESP" if cities=="Huelva"
(25 real changes made)
. replace state = "FR" if cities=="Hénin - Carvin"
(25 real changes made)
. replace state = "ROU" if cities=="Iasi"
(25 real changes made)
. replace state = "GER" if cities=="Ingolstadt"
(25 real changes made)
. replace state = "AUT" if cities=="Innsbruck"
(25 real changes made)
. replace state = "PL" if cities=="Inowroclaw"
(25 real changes made)
. replace state = "GRE" if cities=="Ioannina"
(25 real changes made)
. replace state = "UK" if cities=="Ipswich"
(25 real changes made)
. replace state = "GRE" if cities=="Irakleio"
(25 real changes made)
. replace state = "GER" if cities=="Iserlohn"
(25 real changes made)
. replace state = "TUR" if cities=="Istanbul"
(25 real changes made)
. replace state = "TUR" if cities=="Izmir"
(25 real changes made)
. replace state = "PL" if cities=="Jastrzebie-Zdrój"
(25 real changes made)
. replace state = "ESP" if cities=="Jaén"
(25 real changes made)
. replace state = "PL" if cities=="Jelenia Góra"
(25 real changes made)
. replace state = "LV" if cities=="Jelgava"
(25 real changes made)
. replace state = "GER" if cities=="Jena"
(25 real changes made)
. replace state = "ESP" if cities=="Jerez de la Frontera"
(25 real changes made)
. replace state = "CZE" if cities="Jihlava"
  (25 real changes made)
. replace state = "FIN" if cities="Jyväskylä"
  (25 real changes made)
. replace state = "SWE" if cities="Jönköping"
  (25 real changes made)
. replace state = "GER" if cities="Kaiserslautern"
  (25 real changes made)
. replace state = "GRE" if cities="Kalamata"
  (25 real changes made)
. replace state = "PL" if cities="Kalisz"
  (25 real changes made)
. replace state = "CZE" if cities="Karlov Vary"
  (25 real changes made)
. replace state = "GER" if cities="Karlsruhe"
  (25 real changes made)
. replace state = "TUR" if cities="Kars"
  (25 real changes made)
. replace state = "GER" if cities="Kassel"
  (25 real changes made)
. replace state = "TUR" if cities="Kastamonu"
  (25 real changes made)
. replace state = "PL" if cities="Katowice"
  (25 real changes made)
. replace state = "LIT" if cities="Kaunas"
  (25 real changes made)
. replace state = "GRE" if cities="Kavala"
  (25 real changes made)
. replace state = "TUR" if cities="Kayseri"
  (25 real changes made)
. replace state = "HUN" if cities="Kecskemét"
  (25 real changes made)
. replace state = "GER" if cities="Kempten (Allgäu)"
  (25 real changes made)
. replace state = "GER" if cities="Kiel"
  (25 real changes made)
. replace state = "PL" if cities="Kielce"
  (25 real changes made)
. replace state = "UK" if cities="Kingston upon Hull"
  (25 real changes made)
. replace state = "AUT" if cities="Klagenfurt"
  (25 real changes made)
. replace state = "GER" if cities="Koblenz"
  (25 real changes made)
. replace state = "TUR" if cities="Kocaeli"
  (25 real changes made)
. replace state = "PL" if cities=="Konin"
(25 real changes made)
. replace state = "GER" if cities=="Konstanz"
(25 real changes made)
. replace state = "TUR" if cities=="Konya"
(25 real changes made)
. replace state = "BEL" if cities=="Kortrijk"
(25 real changes made)
. replace state = "SLK" if cities=="Kosice"
(25 real changes made)
. replace state = "PL" if cities=="Koszalin"
(25 real changes made)
. replace state = "PL" if cities=="Kraków"
(25 real changes made)
. replace state = "GER" if cities=="Krefeld"
(25 real changes made)
. replace state = "NOR" if cities=="Kristiansand"
(25 real changes made)
. replace state = "FIN" if cities=="Kuopio"
(25 real changes made)
. replace state = "GER" if cities=="Köln"
(25 real changes made)
. replace state = "NOR" if cities=="København"
(25 real changes made)
. replace state = "FR" if cities=="La Rochelle"
(25 real changes made)
. replace state = "IT" if cities=="La Spezia"
(25 real changes made)
. replace state = "FIN" if cities=="Lahti"
(25 real changes made)
. replace state = "GER" if cities=="Landshut"
(25 real changes made)
. replace state = "GRE" if cities=="Larisa"
(25 real changes made)
. replace state = "ESP" if cities=="Las Palmas"
(25 real changes made)
. replace state = "IT" if cities=="Latina"
(25 real changes made)
. replace state = "CH" if cities=="Lausanne"
(25 real changes made)
. replace state = "FR" if cities=="Le Havre"
(25 real changes made)
. replace state = "FR" if cities=="Le Mans"
(25 real changes made)
. replace state = "IT" if cities=="Lecce"
(25 real changes made)
. replace state = "IT" if cities=="Lecco"
(25 real changes made)
. replace state = "UK" if cities=="Leeds"
(25 real changes made)
. replace state = "NL" if cities=="Leeuwarden"
(25 real changes made)
. replace state = "CY" if cities=="Lefkosia"
(25 real changes made)
. replace state = "PL" if cities=="Legnica"
(25 real changes made)
. replace state = "UK" if cities=="Leicester"
(25 real changes made)
. replace state = "NL" if cities=="Leiden"
(25 real changes made)
. replace state = "GER" if cities=="Leipzig"
(25 real changes made)
. replace state = "FR" if cities=="Lens - Liévin"
(25 real changes made)
. replace state = "PL" if cities=="Leszno"
(25 real changes made)
. replace state = "BEL" if cities=="Leuven"
(25 real changes made)
. replace state = "ESP" if cities=="León"
(25 real changes made)
. replace state = "CZE" if cities=="Liberec"
(25 real changes made)
. replace state = "LV" if cities=="Liepaja"
(25 real changes made)
. replace state = "FR" if cities=="Lille"
(25 real changes made)
. replace state = "IRE" if cities=="Limerick"
(25 real changes made)
. replace state = "FR" if cities=="Limoges"
(25 real changes made)
. replace state = "UK" if cities=="Lincoln"
(25 real changes made)
. replace state = "SWE" if cities=="Linköping"
(25 real changes made)
. replace state = "AUT" if cities=="Linz"
(25 real changes made)
. replace state = "POR" if cities=="Lisboa"
(25 real changes made)
. replace state = "UK" if cities=="Liverpool"
(25 real changes made)
. replace state = "IT" if cities=="Livorno"
(25 real changes made)
. replace state = "BEL" if cities=="Liège"
(25 real changes made)
. replace state = "SLN" if cities=="Ljubljana"
(25 real changes made)
. replace state = "ESP" if cities=="Lleida"
(25 real changes made)
. replace state = "ESP" if cities=="Logroño"
(25 real changes made)
. replace state = "PL" if cities=="Lomza"
(25 real changes made)
. replace state = "UK" if cities=="London"
(25 real changes made)
. replace state = "FR" if cities=="Lorient"
(25 real changes made)
. replace state = "PL" if cities=="Lubin"
(25 real changes made)
. replace state = "PL" if cities=="Lublin"
(25 real changes made)
. replace state = "CH" if cities=="Lugano"
(25 real changes made)
. replace state = "LUX" if cities=="Luxembourg"
(25 real changes made)
. replace state = "CH" if cities=="Luzern"
(25 real changes made)
. replace state = "FR" if cities=="Lyon"
(25 real changes made)
. replace state = "PL" if cities=="Lódz"
(25 real changes made)
. replace state = "GER" if cities=="Lübeck"
(25 real changes made)
. replace state = "GER" if cities=="Lüneburg"
(25 real changes made)
. replace state = "NL" if cities=="Maastricht"
(25 real changes made)
. replace state = "ESP" if cities=="Madrid"
(25 real changes made)
. replace state = "GER" if cities=="Magdeburg"
(25 real changes made)
. replace state = "GER" if cities=="Mainz"
(25 real changes made)
. replace state = "TUR" if cities=="Malatya"
(25 real changes made)
. replace state = "SWE" if cities=="Malmö"
(25 real changes made)
. replace state = "UK" if cities=="Manchester"
(25 real changes made)
. replace state = "TUR" if cities=="Manisa"
   (25 real changes made)
. replace state = "GER" if cities=="Mannheim-Ludwigshafen"
   (25 real changes made)
. replace state = "ESP" if cities=="Marbella"
   (25 real changes made)
. replace state = "GER" if cities=="Marburg"
   (25 real changes made)
. replace state = "SLN" if cities=="Maribor"
   (25 real changes made)
. replace state = "FR" if cities=="Marseille"
   (25 real changes made)
. replace state = "FR" if cities=="Martigues"
   (25 real changes made)
. replace state = "IT" if cities=="Massa"
   (25 real changes made)
. replace state = "IT" if cities=="Matera"
   (25 real changes made)
. replace state = "FR" if cities=="Melun"
   (25 real changes made)
. replace state = "IT" if cities=="Messina"
   (25 real changes made)
. replace state = "FR" if cities=="Metz"
   (25 real changes made)
. replace state = "NL" if cities=="Middelburg"
   (25 real changes made)
. replace state = "UK" if cities=="Middlesbrough"
   (25 real changes made)
. replace state = "IT" if cities=="Milano"
   (25 real changes made)
. replace state = "HUN" if cities=="Miskolc"
   (25 real changes made)
. replace state = "IT" if cities=="Modena"
   (25 real changes made)
. replace state = "BEL" if cities=="Mons"
   (25 real changes made)
. replace state = "FR" if cities=="Montbéliard"
   (25 real changes made)
. replace state = "FR" if cities=="Montpellier"
   (25 real changes made)
. replace state = "CZE" if cities=="Most"
   (25 real changes made)
. replace state = "UK" if cities=="Mulhouse"
   (25 real changes made)
. replace state = "ESP" if cities=="Murcia"
   (25 real changes made)
. replace state = "ESP" if cities=="Málaga"
   (25 real changes made)
. replace state = "GER" if cities=="Mönchengladbach"
   (25 real changes made)
. replace state = "GER" if cities=="München"
   (25 real changes made)
. replace state = "GER" if cities=="Münster"
   (25 real changes made)
. replace state = "BEL" if cities=="Namur"
   (25 real changes made)
. replace state = "FR" if cities=="Nancy"
   (25 real changes made)
. replace state = "FR" if cities=="Nantes"
   (25 real changes made)
. replace state = "IT" if cities=="Napoli"
   (25 real changes made)
. replace state = "GER" if cities=="Neubrandenburg"
   (25 real changes made)
. replace state = "GER" if cities=="Neumünster"
   (25 real changes made)
. replace state = "TUR" if cities=="Nevsehir"
   (25 real changes made)
. replace state = "UK" if cities=="Newcastle upon Tyne"
   (25 real changes made)
. replace state = "UK" if cities=="Newport"
   (25 real changes made)
. replace state = "FR" if cities=="Nice"
   (25 real changes made)
. replace state = "NL" if cities=="Nijmegen"
   (25 real changes made)
. replace state = "FR" if cities=="Niort"
   (25 real changes made)
. replace state = "SLK" if cities=="Nitra"
   (25 real changes made)
. replace state = "UK" if cities=="Norwich"
   (25 real changes made)
. replace state = "UK" if cities=="Nottingham"
   (25 real changes made)
. replace state = "IT" if cities=="Novara"
   (25 real changes made)
. replace state = "PL" if cities=="Nowy Sacz"
   (25 real changes made)
. replace state = "HUN" if cities=="Nyíregyháza"
   (25 real changes made)
. replace state = "FR" if cities=="Nîmes"
   (25 real changes made)
. replace state = "GER" if cities=="Nürnberg"
   (25 real changes made)
. replace state = "DEN" if cities=="Odense"
   (25 real changes made)
. replace state = "GER" if cities=="Offenburg"
   (25 real changes made)
. replace state = "GER" if cities=="Oldenburg (Oldenburg)"
   (25 real changes made)
. replace state = "CZE" if cities=="Olomouc"
   (25 real changes made)
. replace state = "PL" if cities=="Olsztyn"
   (25 real changes made)
. replace state = "BEL" if cities=="Oostende"
   (25 real changes made)
. replace state = "PL" if cities=="Opole"
   (25 real changes made)
. replace state = "ROU" if cities=="Oradea"
   (25 real changes made)
. replace state = "FR" if cities=="Orléans"
   (25 real changes made)
. replace state = "CRO" if cities=="Osijek"
   (25 real changes made)
. replace state = "NOR" if cities=="Oslo"
   (25 real changes made)
. replace state = "GER" if cities=="Osnabrück"
   (25 real changes made)
. replace state = "CZE" if cities=="Ostrava"
   (25 real changes made)
. replace state = "PL" if cities=="Ostrów Wielkopolski"
   (25 real changes made)
. replace state = "FIN" if cities=="Oulu"
   (25 real changes made)
. replace state = "ESP" if cities=="Ourense"
   (25 real changes made)
. replace state = "ESP" if cities=="Oviedo"
   (25 real changes made)
. replace state = "PL" if cities=="Pabianice"
   (25 real changes made)
. replace state = "GER" if cities=="Paderborn"
   (25 real changes made)
. replace state = "IT" if cities=="Padova"
   (25 real changes made)
. replace state = "IT" if cities=="Palermo"
   (25 real changes made)
. replace state = "ESP" if cities=="Palma de Mallorca"
   (25 real changes made)
. replace state = "ESP" if cities=="Pamplona/Iruña"
   (25 real changes made)
. replace state = "LIT" if cities=="Panevezys"
   (25 real changes made)
. replace state = "CZE" if cities=="Pardubice"
   (25 real changes made)
. replace state = "FR" if cities=="Paris"
   (25 real changes made)
. replace state = "IT" if cities=="Parma"
   (25 real changes made)
. replace state = "GER" if cities=="Passau"
   (25 real changes made)
. replace state = "GRE" if cities=="Patra"
   (25 real changes made)
. replace state = "FR" if cities=="Pau"
   (25 real changes made)
. replace state = "IT" if cities=="Pavia"
   (25 real changes made)
. replace state = "BUL" if cities=="Pazardzhik"
   (25 real changes made)
. replace state = "FR" if cities=="Perpignan"
   (25 real changes made)
. replace state = "IT" if cities=="Perugia"
   (25 real changes made)
. replace state = "IT" if cities=="Pesaro"
   (25 real changes made)
. replace state = "IT" if cities=="Pescara"
   (25 real changes made)
. replace state = "GER" if cities=="Pforzheim"
   (25 real changes made)
. replace state = "IT" if cities=="Piacenza"
   (25 real changes made)
. replace state = "ROU" if cities=="Piatra Neamt"
   (25 real changes made)
. replace state = "PL" if cities=="Pila"
   (25 real changes made)
. replace state = "PL" if cities=="Piotrków Trybunalski"
   (25 real changes made)
. replace state = "IT" if cities=="Pisa"
   (25 real changes made)
. replace state = "ROU" if cities=="Pitesti"
   (25 real changes made)
. replace state = "GER" if cities=="Plauen"
   (25 real changes made)
replace state = "BUL" if cities == "Pleven"
(25 real changes made)
replace state = "PL" if cities == "Plock"
(25 real changes made)
replace state = "GER" if cities == "Plauen"
(0 real changes made)
replace state = "ROU" if cities == "Ploiesti"
(25 real changes made)
replace state = "BUL" if cities == "Plovdiv"
(25 real changes made)
replace state = "BUL" if cities == "Plovdiv_c"
(25 real changes made)
replace state = "CZE" if cities == "Plzen"
(25 real changes made)
replace state = "FR" if cities == "Poitiers"
(25 real changes made)
replace state = "POR" if cities == "Ponta Delgada"
(25 real changes made)
replace state = "IT" if cities == "Pordenone"
(25 real changes made)
replace state = "POR" if cities == "Porto"
(25 real changes made)
replace state = "UK" if cities == "Portsmouth"
(25 real changes made)
replace state = "IT" if cities == "Potenza"
(25 real changes made)
replace state = "PL" if cities == "Poznan"
(25 real changes made)
replace state = "CZE" if cities == "Praha"
(25 real changes made)
replace state = "IT" if cities == "Prato"
(25 real changes made)
replace state = "SLK" if cities == "Presov"
(25 real changes made)
replace state = "UK" if cities == "Preston"
(25 real changes made)
replace state = "PL" if cities == "Przemysl"
(25 real changes made)
replace state = "HUN" if cities == "Pécs"
(25 real changes made)
replace state = "POR" if cities == "Póvoa de Varzim"
(25 real changes made)
replace state = "FR" if cities == "Quimper"
(25 real changes made)
replace state = "PL" if cities == "Radom"
(25 real changes made)
. replace state = "ROU" if cities=="Ramnicu Valcea"
   (25 real changes made)
. replace state = "IT" if cities=="Ravenna"
   (25 real changes made)
. replace state = "UK" if cities=="Reading"
   (25 real changes made)
. replace state = "GER" if cities=="Regensburg"
   (25 real changes made)
. replace state = "IT" if cities=="Reggio di Calabria"
   (25 real changes made)
. replace state = "IT" if cities=="Reggio nell'Emilia"
   (25 real changes made)
. replace state = "FR" if cities=="Reims"
   (25 real changes made)
. replace state = "GER" if cities=="Remscheid"
   (25 real changes made)
. replace state = "FR" if cities=="Rennes"
   (25 real changes made)
. replace state = "ESP" if cities=="Reus"
   (25 real changes made)
. replace state = "GER" if cities=="Reutlingen"
   (25 real changes made)
. replace state = "CRO" if cities=="Rijeka"
   (25 real changes made)
. replace state = "IT" if cities=="Rimini"
   (25 real changes made)
. replace state = "FR" if cities=="Roanne"
   (25 real changes made)
. replace state = "IT" if cities=="Roma"
   (25 real changes made)
. replace state = "ROU" if cities=="Roman"
   (25 real changes made)
. replace state = "NL" if cities=="Roosendaal"
   (25 real changes made)
. replace state = "GER" if cities=="Rosenheim"
   (25 real changes made)
. replace state = "GER" if cities=="Rostock"
   (25 real changes made)
. replace state = "NL" if cities=="Rotterdam"
   (25 real changes made)
. replace state = "FR" if cities=="Rouen"
   (25 real changes made)
. replace state = "GER" if cities=="Ruhrgebiet"
   (25 real changes made)
. replace state = "BUL" if cities=="Ruse"
   (25 real changes made)
. replace state = "PL" if cities=="Rybnik"
(25 real changes made)
. replace state = "PL" if cities=="Rzeszów"
(25 real changes made)
. replace state = "GER" if cities=="Saarbrücken"
(25 real changes made)
. replace state = "FR" if cities=="Saint Denis"
(25 real changes made)
. replace state = "FR" if cities=="Saint-Brieuc"
(25 real changes made)
. replace state = "FR" if cities=="Saint-Etienne"
(25 real changes made)
. replace state = "FR" if cities=="Saint-Nazaire"
(25 real changes made)
. replace state = "FR" if cities=="Saint-Quentin"
(25 real changes made)
. replace state = "ESP" if cities=="Salamanca"
(25 real changes made)
. replace state = "IT" if cities=="Salerno"
(25 real changes made)
. replace state = "AUT" if cities=="Salzburg"
(25 real changes made)
. replace state = "TUR" if cities=="Samsun"
(25 real changes made)
. replace state = "IT" if cities=="Sanremo"
(25 real changes made)
. replace state = "ESP" if cities=="Santa Cruz de Tenerife"
(25 real changes made)
. replace state = "ESP" if cities=="Santander"
(25 real changes made)
. replace state = "ESP" if cities=="Santiago de Compostela"
(25 real changes made)
. replace state = "IT" if cities=="Sassari"
(25 real changes made)
. replace state = "ROU" if cities=="Satu Mare"
(25 real changes made)
. replace state = "IT" if cities=="Savona"
(25 real changes made)
. replace state = "GER" if cities=="Schweinfurt"
(25 real changes made)
. replace state = "GER" if cities=="Schwerin"
(25 real changes made)
. replace state = "POR" if cities=="Setúbal"
(25 real changes made)
. replace state = "ESP" if cities=="Sevilla"
(25 real changes made)
. replace state = "UK" if cities=="Sheffield"
(25 real changes made)
. replace state = "BUL" if cities=="Shumen"
(25 real changes made)
. replace state = "ROU" if cities=="Sibiu"
(25 real changes made)
. replace state = "PL" if cities=="Siedlce"
(25 real changes made)
. replace state = "GER" if cities=="Siegen"
(25 real changes made)
. replace state = "TUR" if cities=="Siirt"
(25 real changes made)
. replace state = "IT" if cities=="Siracusa"
(25 real changes made)
. replace state = "NL" if cities=="Sittard-Geleen"
(25 real changes made)
. replace state = "ROU" if cities=="Slatina"
(25 real changes made)
. replace state = "CRO" if cities=="Slavonski Brod"
(25 real changes made)
. replace state = "BUL" if cities=="Sliven"
(25 real changes made)
. replace state = "PL" if cities=="Slupsk"
(25 real changes made)
. replace state = "BUL" if cities=="Sofia"
(25 real changes made)
. replace state = "GER" if cities=="Solingen"
(25 real changes made)
. replace state = "UK" if cities=="Southampton"
(25 real changes made)
. replace state = "CRO" if cities=="Split"
(25 real changes made)
. replace state = "CH" if cities=="St. Gallen"
(25 real changes made)
. replace state = "PL" if cities=="Stalowa Wola"
(25 real changes made)
. replace state = "BUL" if cities=="Stara Zagora"
(25 real changes made)
. replace state = "PL" if cities=="Stargard Szczecinski"
(25 real changes made)
. replace state = "NOR" if cities=="Stavanger"
(25 real changes made)
. replace state = "SWE" if cities=="Stockholm"
(25 real changes made)
. replace state = "UK" if cities=="Stoke-on-Trent"
(25 real changes made)
. replace state = "GER" if cities=="Stralsund"
(25 real changes made)
. replace state = "FR" if cities=="Strasbourg"
(25 real changes made)
. replace state = "GER" if cities=="Stuttgart"
(25 real changes made)
. replace state = "ROU" if cities=="Suceava"
(25 real changes made)
. replace state = "PL" if cities=="Suwalki"
(25 real changes made)
. replace state = "UK" if cities=="Swansea"
(25 real changes made)
. replace state = "PL" if cities=="Swidnica"
(25 real changes made)
. replace state = "PL" if cities=="Szczecin"
(25 real changes made)
. replace state = "HUN" if cities=="Szeged"
(25 real changes made)
. replace state = "HUN" if cities=="Szombathely"
(25 real changes made)
. replace state = "HUN" if cities=="Székesfehérvár"
(25 real changes made)
. replace state = "EST" if cities=="Tallinn"
(25 real changes made)
. replace state = "FIN" if cities=="Tampere"
(25 real changes made)
. replace state = "IT" if cities=="Taranto"
(25 real changes made)
. replace state = "FR" if cities=="Tarbes"
(25 real changes made)
. replace state = "PL" if cities=="Tarnów"
(25 real changes made)
. replace state = "ESP" if cities=="Tarragona"
(25 real changes made)
. replace state = "EST" if cities=="Tartu"
(25 real changes made)
. replace state = "PL" if cities=="Tczew"
(25 real changes made)
. replace state = "IT" if cities=="Terni"
(25 real changes made)
. replace state = "GRE" if cities=="Thessaloniki"
(25 real changes made)
. replace state = "NL" if cities=="Tilburg"
(25 real changes made)
. replace state = "ROU" if cities=="Timisoara"
(25 real changes made)
. replace state = "ESP" if cities=="Toledo"
(25 real changes made)
. replace state = "PL" if cities=="Tomaszów Mazowiecki"
(25 real changes made)
. replace state = "IT" if cities=="Torino"
(25 real changes made)
. replace state = "PL" if cities=="Torun"
(25 real changes made)
. replace state = "FR" if cities=="Toulon"
(25 real changes made)
. replace state = "FR" if cities=="Toulouse"
(25 real changes made)
. replace state = "FR" if cities=="Tours"
(25 real changes made)
. replace state = "TUR" if cities=="Trabzon"
(25 real changes made)
. replace state = "SLK" if cities=="Trnava"
(25 real changes made)
. replace state = "NOR" if cities=="Tromsø"
(25 real changes made)
. replace state = "NOR" if cities=="Trondheim"
(25 real changes made)
. replace state = "FR" if cities=="Troyes"
(25 real changes made)
. replace state = "ROU" if cities=="Tulcea"
(25 real changes made)
. replace state = "FIN" if cities=="Turku"
(25 real changes made)
. replace state = "ROU" if cities=="Târgoviste"
(25 real changes made)
. replace state = "ROU" if cities=="Târgu Jiu"
(25 real changes made)
. replace state = "ROU" if cities=="Târgu Mures"
(25 real changes made)
. replace state = "GER" if cities=="Tübingen"
(25 real changes made)
. replace state = "IT" if cities=="Udine"
(25 real changes made)
. replace state = "GER" if cities=="Ulm"
(25 real changes made)
. replace state = "SWE" if cities=="Umeå"
(25 real changes made)
. replace state = "SWE" if cities=="Uppsala"
(25 real changes made)
. replace state = "NL" if cities=="Utrecht"
(25 real changes made)
. replace state = "FR" if cities=="Valence"
(25 real changes made)
. replace state = "ESP" if cities=="Valencia"
(25 real changes made)
. replace state = "FR" if cities=="Valenciennes"
(25 real changes made)
. replace state = "ESP" if cities=="Valladolid"
(25 real changes made)
. replace state = "ML" if cities=="Valletta"
(25 real changes made)
. replace state = "TUR" if cities=="Van"
(25 real changes made)
. replace state = "FR" if cities=="Vannes"
(25 real changes made)
. replace state = "IT" if cities=="Varese"
(25 real changes made)
. replace state = "BUL" if cities=="Varna"
(25 real changes made)
. replace state = "BUL" if cities=="Veliko Tarnovo"
(25 real changes made)
. replace state = "IT" if cities=="Venezia"
(25 real changes made)
. replace state = "NL" if cities=="Venlo"
(25 real changes made)
. replace state = "IT" if cities=="Verona"
(25 real changes made)
. replace state = "POR" if cities=="Viana do Castelo"
(25 real changes made)
. replace state = "IT" if cities=="Viareggio"
(25 real changes made)
. replace state = "IT" if cities=="Vicenza"
(25 real changes made)
. replace state = "BUL" if cities=="Vidin"
(25 real changes made)
. replace state = "IT" if cities=="Vigevano"
(25 real changes made)
. replace state = "ESP" if cities=="Zaragoza"
(25 real changes made)
. replace state = "PL" if cities=="Zielona Góra"
(25 real changes made)
. replace state = "SLK" if cities=="Zilina"
(25 real changes made)
. replace state = "CZE" if cities=="Zlín"
(25 real changes made)
. replace state = "TUR" if cities=="Zonguldak"
(25 real changes made)
. replace state = "GER" if cities=="Zwickau"
(25 real changes made)
. replace state = "NL" if cities=="Zwolle"
(25 real changes made)
. replace state = "CH" if cities=="Zürich"
(25 real changes made)
. replace state = "NL" if cities=="s' Gravenhage"
(25 real changes made)
. replace state = "NL" if cities=="s-Hertogenbosch"
(25 real changes made)
. replace state = "SWE" if cities=="Örebro"
(25 real changes made)
. replace state = "CZE" if cities=="Ústí nad Labem"
(25 real changes made)
. **Dummy Variable: EU-Enlargement in whole**
. gen Eu=1
. replace Eu=0 if (cities=="Helsinki" | cities=="Turku" | cities=="Tampere" | cities=="Wien" | cities=="Graz" | cities=="Linz" | cities=="Stockholm" | cities=="Göteborg" | cities=="Malmö" | cities=="Innsbruck" | cities=="Klagenfurt" | cities=="Salzburg" | cities=="Jyväskylä" | cities=="Kuopio" | cities=="Lahti" | cities=="Oulu" | cities=="Jönköping" | cities=="Linköping" | cities=="Umeå" | cities=="Uppsala" | cities=="Örebro") & year <=1994
(105 real changes made)
. replace Eu=0 if (cities=="Tallinn" | cities=="Tartu" | cities=="Daugavpils" | cities=="Jelgava" | cities=="Kaunas" | cities=="Vilnius" | cities=="Panevezys" | cities=="Liepaja" | cities=="Valetta" | cities=="Białystok" | cities=="Bielsko-Biała" | cities=="Bydgoszcz" | cities=="Chełm" | cities=="Częstochowa" | cities=="Elblag" | cities=="Elk" | cities=="Gdańsk" | cities=="Głogów" | cities=="Gniezno" | cities=="Gorzów Wielkopolski" | cities=="Grudziadz" | cities=="Inowroclaw" | cities=="Jastrzebie-Zdrój" | cities=="Jelenia Góra" | cities=="Kalisz" | cities=="Katowice" | cities=="Kielce" | cities=="Konin" | cities=="Koszalin" | cities=="Kraków" | cities=="Legnica" | cities=="Leszno" | cities=="Lomza" | cities=="Lubin" | cities=="Lublin"
> cities="Lódz" | cities="Nowy Sacz" | cities="Olsztyn" | cities="Opole" | cities="Ostrowiec Swietokrzyski" | ///
> cities="Ostrów Wielkopolski" | cities="Pabianice" | cities="Pila" | cities="Piotrków Trybunalski" | cities="Plock" | ///
> cities="Poznan" | cities="Przemysl" | cities="Radom" | cities="Rybnik" | cities="Rzeszów" | cities="Siedlce" | ///
> cities="Stalowa Wola" | cities="Stargard Szczecinski" | cities="Suwalki" | cities="Swidnica" | cities="Szczecin" | ///
> cities="Tarnów" | cities="Tczew" | cities="Tomaszów Mazowiecki" | cities="Torun" | cities="Walbrzych" | ///
> cities="Warszawa" | cities="Wloclawek" | cities="Worclaw" | cities="Zamosc" | cities="Zielona Góra" | cities="Slupsk" | ///
> cities="Ceske Budejovice" | cities="Chomutov" | cities="Hradec Králové" | cities="Jihlava" | cities="Karlov Vary" | ///
> cities="Liberec" | cities="Most" | cities="Olomouc" | cities="Ostrava" | cities="Pardubice" | cities="Plzen" | ///
> cities="Praha" | cities="Zlin" | cities="Banská Bystrica" | cities="Bratislava" | cities="Nitra" | cities="Presov" | ///
> cities="Trencin" | cities="Trnava" | cities="Zilina" | cities="Ljubljana" | cities="Kosice" | cities="Maribor" | ///
> cities="Alba Iulia" | cities="Bistrita" | cities="Budapest" | cities="Debrecen" | cities="Györ" | cities="Kecskemét" | ///
> cities="Miskolc" | cities="Nyiregyhaza" | cities="Pécs" | cities="Szeged" | cities="Szombathely" | ///
> cities="Székesfehérvár" | cities="Lefkosia" ) & year <= 2003
(1,386 real changes made)
. replace Eu=0 if (cities="Sofia" | cities="Plovdiv" | cities="Varna" | cities="Blagoevgard" | cities="Burgas" | cities="Haskovo" | cities="Pazardzhik" | cities="Pleven" | cities="Plovdiv_c" | cities="Ruse" | cities="Shumen" | cities="Sliven" | cities="Stara Zagora" | cities="Veliko Tarnovo" | cities="Vidin" | cities="Vratsa" | cities="Yambol" | cities="Arad" | cities="Bacau" | cities="Baia Mare" | cities="Botosani" | cities="Braila" | cities="Brasov" | cities="Buza" | cities="Bârlad" | cities="Calarasi" | cities="Constanța" | cities="Craiova" | cities="Drobeta-Turnu Severin" | cities="Focsani" | cities="Galati" | cities="Giurgiu" | cities="Iasi" | cities="Oradea" | cities="Piatra Neamt" | cities="Pitești" | cities="Ploiești" | cities="Râmnicu Valcea" | cities="Roman" | cities="Satu Mare" | cities="Sibiu" | cities="Slatina" | cities="Suceava" | cities="Tulcea" | cities="Târgoviste" | cities="Târgu Jiu" | cities="Târgu Mureș" | cities="București" | cities="Cluj-Napoca" | cities="Timisoara") & year <= 2006
(833 real changes made)
. replace Eu=0 if (cities="Osijek" | cities="Rijeka" | cities="Slavonski Brod" | cities="Split" | cities="Grad Zagreb") & year <= 2013
(120 real changes made)
. replace Eu=0 if (cities="Basel" | cities="Basel transnational LUZ" | cities="Bern" | cities="Biel/Bienne" | cities="Genève" | ///
. * Dummy Variable: every Enlargement Round:
  . gen eu=1
  . replace eu=2 if (cities=='Helsinki' | cities=='Turku' | cities=='Tampere' | cities=='Wien' |
                     cities=='Graz' | ///
                    cities=='Linz' | cities=='Stockholm' | cities=='Göteborg' | cities=='Malmö' | cities=='Innsbruck' |
                     cities=='Klagenfurt' | ///
                    cities=='Salzburg' | cities=='Jyväskylä' | cities=='Kuopio' | cities=='Lahti' | cities=='Oulu' | ///
                    cities=='Jönköping' | cities=='Linköping' | cities=='Umeå' | cities=='Uppsala' | cities=='Örebro')
                    & year <=1994
                    (105 real changes made)
  . replace eu=3 if (cities=='Tallinn' | cities=='Tartu' | cities=='Daugavpils' | cities=='Jelgava' | ///
                    cities=='Kaunas' | cities=='Vilnius' | cities=='Panevezys' | cities=='Liepaja' | cities=='Valetta' |
                    cities=='Bialystok' | ///
                    cities=='Bielsko-Biała' | cities=='Bydgoszcz' | cities=='Chełm' | cities=='Częstochowa' |
                    cities=='Elblag' | cities=='Elk' | ///
                    cities=='Gdańsk' | cities=='Głogów' | cities=='Gniezno' | cities=='Gorzów Wielkopolski' |
                    cities=='Grudziądz' | cities=='Inowrocław' | ///
                    cities=='Jastrzębie-Zdrój' | cities=='Jelenia Góra' | cities=='Kalisz' | cities=='Katowice' |
                    cities=='Kielce' | cities=='Końskie' | ///
                    cities=='Koszalin' | cities=='Kraków' | cities=='Legnica' | cities=='Leszno' | cities=='Lomża' |
                    cities=='Lubin' | cities=='Lublin' | ///
                    cities=='Łódź' | cities=='Nowy Sacz' | cities=='Olsztyn' | cities=='Opole' | cities=='Ostrówiec Świętokrzyski' | ///
                    cities=='Ostrów Wielkopolski' | cities=='Pabianice' | cities=='Pila' | cities=='Piotrków Trybunalski' | cities=='Płock' | ///
                    cities=='Poznań' | cities=='Przemysł' | cities=='Radom' | cities=='Rybnik' | cities=='Rzeszów' |
                    cities=='Siedlce' | ///
                    cities=='Stalowa Wola' | cities=='Starzeczki' | cities=='Suwałki' | cities=='Świdnica' | cities=='Szczecin' | ///
                    cities=='Tarnów' | cities=='Tczew' | cities=='Tomaszów Mazowiecki' | cities=='Toruń' |
                    cities=='Walbrzych' | ///
cities="Warszawa" | cities="Włocławek" | cities="Wrocław" | cities="Zamosc" | cities="Zielona Góra" | cities="Ślupsk" | cities="Czeské Budejovice" | cities="Chomutov" | cities="Hradec Králové" | cities="Jihlava" | cities="Karlovy Vary" | cities="Liberec" | cities="Most" | cities="Olomouc" | cities="Ostrava" | cities="Pardubice" | cities="Plzen" | cities="Praha" | cities="Zlín" | cities="Banská Bystrica" | cities="Bratislava" | cities="Nitra" | cities="Presov" | cities="Trencín" | cities="Trnava" | cities="Zilina" | cities="Ljubljana" | cities="Kosice" | cities="Maribor" | cities="Alba Iulia" | cities="Bistrita" | cities="Budapest" | cities="Debrecen" | cities="Győr" | cities="Kecskemét" | cities="Miskolc" | cities="Nyiregyhaza" | cities="Pecs" | cities="Szeged" | cities="Szombathely" | cities="Székesfehérvár" | cities="Lefkosia") & year <= 2003 (1,386 real changes made)

. replace eu=4 if (cities="Plovdiv" | cities="Varna" | cities="Blagoevgrad" | cities="Burgas" | cities="Haskovo" | cities="Pazardzhik" | cities="pleven" | cities="Plovdiv_c" | cities="Ruse" | cities="Shumen" | cities="Sliven" | cities="Stara Zagora" | cities="Veliko Tarnovo" | cities="Vidin" | cities="Vratsa" | cities="Yambol" | cities="Arad" | cities="Bacau" | cities="Baia Mare" | cities="Botosani" | cities="Braila" | cities="Brasov" | cities="Buzau" | cities="Calarasi" | cities="Constanta" | cities="Craiova" | cities="Drobeta-Turnu Severin" | cities="Focsani" | cities="Galati" | cities="Giurgiu" | cities="Iasi" | cities="Oradea" | cities="Piatra Neamt" | cities="Pitesti" | cities="Ploiesti" | cities="Ramnicu Valcea" | cities="Roman" | cities="Satu Mare" | cities="Sibiu" | cities="Slatina" | cities="Suceava" | cities="Tulcea" | cities="Târgoviște" | cities="Târgu Jiu" | cities="Târgu Mureș" | cities="Bucuresti" | cities="Cluj-Napoca" | cities="Timisoara") & year <= 2006 (833 real changes made)

. replace eu=5 if (cities="Osijek" | cities="Rijeka" | cities="Slavonski Brod" | cities="Split" | cities="Bârlad" | cities="Calarasi" | cities="Constanta" | cities="Craiova" | cities="Drobeta-Turnu Severin" | cities="Focsani" | cities="Galati" | cities="Giurgiu" | cities="Iasi" | cities="Oradea" | cities="Piatra Neamt" | cities="Pitesti" | cities="Ploiesti" | cities="Ramnicu Valcea" | cities="Roman" | cities="Satu Mare" | cities="Sibiu" | cities="Slatina" | cities="Suceava" | cities="Tulcea" | cities="Târgoviște" | cities="Târgu Jiu" | cities="Târgu Mureș" | cities="Bucuresti" | cities="Cluj-Napoca" | cities="Timisoara") & year <= 2013 (120 real changes made)

. replace eu=0 if (cities="Basel" | cities="Basel transnational LUZ" | cities="Bern" | cities="Biel/Bienne" | cities="Geneve" | cities="Genève transnationale LUZ" | cities="Lausanne" | cities="Lugano" | cities="Luzern" | cities="Genêve" | cities="Winterthur" | cities="Bergen" | cities="Kristiansand" | cities="København" | cities="Oslo" | cities="Stavanger" | cities="Trondheim" | cities="Adana" | cities="Ankara" | cities="Antalya" | cities="Balikesir" | cities="Bursa" | cities="Antalya" | cities="Denizli" | cities="Diyarbakir" | cities="Edirna" | cities="Erzurum" | cities="Gaziantep" | cities="Hatay" | cities="Istanbul" | cities="Izmir" | cities="Kars" | cities="Kastamonu" | cities="Kayseri" | cities="Kocaeli" | cities="Konya" | cities="Kastamonu" | cities="Kayseri" | cities="Kocaeli" | cities="Konya" | cities="Kastamonu" | cities="Kayseri" | cities="Kocaeli" | cities="Konya" |
> cities="Malatya" | cities="Manisa" | cities="Nevsehir" | cities="Samsun" | cities="Siirt" |
cities="Trabzon" | cities="Van" | //>
cities="Zonguldak"

(1,025 real changes made)

. save "C:\Users\Fabian\Desktop\master\stata\all_cities.dta", replace

. ** explanatory variables**

.         *1. Education/Human capital
. use "C:\Users\Fabian\Desktop\master\stata\edu.dta", clear
. reshape long x, i(cities) j(year)


Data                               wide -> long
-----------------------------------
Number of obs.                      597 -> 14925
Number of variables                  26 ->       3
j variable (25 values)              ->     year
xij variables:
     x1990 x1991 ... x2014 ->  x

. *only the highest education data was used -> ISCED level 5 and above
. egen city=group(cities)
. encode cities, gen (co)
. encode x, gen (edu)
. drop x

. save "C:\Users\Fabian\Desktop\master\stata\edu_panel.dta", replace

. *2. Unemployment
. use "C:\Users\Fabian\Desktop\master\stata\unemp.dta", clear
. save "C:\Users\Fabian\Desktop\master\stata\unemp_panel.dta", replace

. *3. Foreign EU citizens
. use "C:\Users\Fabian\Desktop\master\stata\eu_f.dta", clear
. save "C:\Users\Fabian\Desktop\master\stata\eu_panel.dta", replace

. **Merge of these variables to one big data set**
. use "C:\Users\Fabian\Desktop\master\stata\all_cities.dta", clear
. sort co year

. save "C:\Users\Fabian\Desktop\master\stata\pop1_m.dta", replace

. use "C:\Users\Fabian\Desktop\master\stata\edu_p.dta", replace

. use "C:\Users\Fabian\Desktop\master\stata\unemp_panel.dta", clear
. sort co year
. save "C:\Users\Fabian\Desktop\master\stata\unemp_p.dta", replace
file C:\Users\Fabian\Desktop\master\stata\unemp_p.dta saved
. use "C:\Users\Fabian\Desktop\master\stata\eu_panel.dta", clear
. sort co year
. save "C:\Users\Fabian\Desktop\master\stata\eu_p.dta", replace
file C:\Users\Fabian\Desktop\master\stata\eu_p.dta saved
. merge co year using C:\Users\Fabian\Desktop\master\stata\pop1_m.dta ///
> C:\Users\Fabian\Desktop\master\stata\edu_p.dta ///
> C:\Users\Fabian\Desktop\master\stata\unemp_p.dta ///
> C:\Users\Fabian\Desktop\master\stata\eu_p.dta
(note: you are using old merge syntax; see [D] merge for new syntax)
(label co already defined)
(label co already defined)
(label co already defined)
(label feu already defined)
(label co already defined)
.drop _merge
.drop _merge1
.drop _merge2
.drop _merge3
.drop _merge4
. save "C:\Users\Fabian\Desktop\master\stata\panel_reg.dta", replace
file C:\Users\Fabian\Desktop\master\stata\panel_reg.dta saved
. use "C:\Users\Fabian\Desktop\master\stata\panel_reg.dta", clear
. encode edu, gen(H)
. encode unemp, gen(U)
. encode feu, gen(frg)
. xtset city year
    panel variable:  city (strongly balanced)
    time variable:  year, 1990 to 2014
delta:  1 unit
. xtreg dpop i.year i.Eu H U frg, fe r
Fixed-effects (within) regression               Number of obs     =     15,233
Group variable: city                            Number of groups  =        635
R-sq:                                           Obs per group:
within = 0.0727                                    min =         19
between = 0.0028                                  avg =       24.0
overall = 0.0697                                  max =         24
F(27,634)         =      27.48                     corr(u_i, Xb)  =  -0.1079                        P
(Std. Err. adjusted for 635 clusters in city)    rob > F          =     0.0000

------------------------------------------------------------------
|               Robust             dpop |      Coef.   Std
|                          |       Err.      t    P>|t|    [95% Conf. Interval]
------------------------------------------------------------------
        year |
| Year | Coef. | Std. Err. | t    | P>|t|  | 95% Conf. Interval |
|------|-------|-----------|------|------|------------------|
| 1992 | .0367245 | .0260517 | 1.41 | 0.159 | -.0144335 to .0878825 |
| 1993 | .0941683 | .0251678 | 3.74 | 0.000 | .044746 to .1435907 |
| 1994 | .0358186 | .0175736 | 2.04 | 0.042 | .0013091 to .0703282 |
| 1995 | .0137273 | .0153978 | 0.89 | 0.373 | .0165096 to .0439641 |
| 1996 | -.0546934 | .0228555 | 2.39 | 0.017 | .0995751 to .1435907 |
| 1997 | .1263515 | .0248585 | 5.08 | 0.000 | .0775366 to .1751663 |
| 1998 | .0366262 | .0177032 | 2.07 | 0.039 | .0018622 to .0713902 |
| 1999 | .0302096 | .0187774 | 1.61 | 0.108 | .0066639 to .070832 |
| 2000 | -.0701087 | .0328366 | 2.14 | 0.033 | .1345903 to .1128319 |
| 2001 | -.0630286 | .0293334 | 2.15 | 0.032 | .120631 to .1286579 |
| 2002 | .2101733 | .0395169 | 5.32 | 0.000 | .1325734 to .2877732 |
| 2003 | .0704666 | .0215741 | 3.27 | 0.001 | .0281014 to .1128319 |
| 2004 | -.2662348 | .0481389 | 5.07 | 0.000 | .3327348 to .3387913 |
| 2005 | .1565249 | .0304518 | 5.14 | 0.000 | .0967262 to .2163236 |
| 2006 | .0306543 | .0215893 | 1.42 | 0.156 | -.0117409 to .0730495 |
| 2007 | .0243278 | .0226585 | 1.09 | 0.275 | -.0193959 to .0680514 |
| 2008 | .0198997 | .0275091 | 0.73 | 0.467 | .050467 to .109919 |
| 2009 | .0278881 | .0408374 | 0.73 | 0.467 | -.050467 to .109919 |
| 2010 | .1500168 | .0305296 | 4.91 | 0.000 | .0900654 to .209682 |
| 2011 | .2712422 | .0349387 | 7.89 | 0.000 | .2036931 to .3387913 |
| 2012 | .2788818 | .0328346 | 8.49 | 0.000 | .214404 to .3433596 |
| 2013 | .2788818 | .0328346 | 8.49 | 0.000 | .214404 to .3433596 |
| 2014 | .2788818 | .0328346 | 8.49 | 0.000 | .214404 to .3433596 |

**Note:** The table above shows the coefficients and standard errors for the years 1992 to 2014. The coefficients represent the impact of various factors on the dependent variable, with the standard errors indicating the variability of these estimates. The t-values and p-values are used to assess the statistical significance of the coefficients.
```
\begin{verbatim}
1.Eu      |  -0.052125  0.0153704  -3.39  0.001  -0.082253  -0.0219969
H         |   0.000371  0.000239    1.55  0.121   -9.75e-06  0.000839
U         |  -0.00332  0.001105   -3.00  0.003    -0.005486  -0.001154
frg       |   0.015211  0.001467   10.37  0.000    0.012336  0.018086
_cons     |  -1.64585  0.0338926  -4.86  0.000   -0.2310191  -0.0981509

 rho_ar    |  -1.6375407
sigma_u   |   0.0469616
sigma_e   |    0.5219873
 rho_fov   |    0.0080289 (fraction of variance because of u_i)

F test that all u_i=0: F(634,13959) = 0.21  Prob > F = 1.0000
modified Bhargava et al. Durbin-Watson = 2.322511
Baltagi-Wu LBI = 2.4314669
  quietly xtreg dpop i.year i.Eu H U frg, fe
  estimate store fix, title(Fixed)
  quietly xtreg dpop i.year i.Eu H U frg, re
  estimate store ran, title(Random)
  hausman fix ran

---- Coefficients ----
| (b)      (B)      (b-B)     sqrt(diag(V_b-V_B)) |
| fix      ran      Difference     S.E.     |

 year |
1992 |   0.0366331   0.0367225  -0.0000894   0.0053802
1993 |    0.094028   0.0944172  -0.0003893   0.0053823
1994 |    0.0356564   0.0360759  -0.0004194   0.0053838
1995 |    0.0135885   0.0129667   0.0006218   0.0054045
1996 |   -0.054463   -0.0559354    0.001507   0.0054081
1997 |    0.1262056   0.1255544   0.0006512   0.0054045
1998 |    0.0365043   0.0358109   0.0006935   0.0054033
1999 |    0.0300785   0.0293377   0.0007408   0.005404
2000 |   -0.0703188  -0.0730259    0.0027071   0.0054279
2001 |   -0.062857  -0.0666202   0.0037632   0.0054913
2002 |    0.2100426   0.2086086    0.001434   0.0054109
2003 |    0.0703254   0.0697082   0.0006171   0.0054047
2004 |   -0.266082  -0.274494   0.008412    0.006539
2005 |    0.1567905   0.1500323   0.0067582   0.0063574
2006 |    0.0309039   0.0237248   0.0071791   0.0063606
2007 |    0.0250076   0.0152161   0.0097916   0.0071016
2008 |    0.0207213   0.0100426   0.0106788   0.0072465
2009 |   -0.0696159  -0.0846497    0.0150338   0.0075364
2010 |   -0.2436688  -0.2653618    0.021693   0.008589
2011 |    0.030427   0.0009762   0.0294509   0.0105635
2012 |    0.1498954   0.127411   0.0224845   0.0084679
\end{verbatim}
```
<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>.2716607</td>
<td>.2469169</td>
<td>.0247439</td>
<td>.0081407</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>.2795868</td>
<td>.2663146</td>
<td>.0132722</td>
<td>.0072403</td>
<td></td>
</tr>
<tr>
<td>1.Eu</td>
<td>-.0362456</td>
<td>-.0047698</td>
<td>-.0314758</td>
<td>.0164179</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>-.0000978</td>
<td>-.0009097</td>
<td>-6.97e-06</td>
<td>.000011</td>
<td></td>
</tr>
<tr>
<td>U</td>
<td>-.0002637</td>
<td>-.003008</td>
<td>.000037</td>
<td>.0000379</td>
<td></td>
</tr>
<tr>
<td>frg</td>
<td>.0022035</td>
<td>.0019201</td>
<td>.0002834</td>
<td>.0000617</td>
<td></td>
</tr>
</tbody>
</table>

\[ b = \text{consistent under Ho and Ha; obtained from xtreg} \]
\[ B = \text{inconsistent under Ha, efficient under Ho; obtained from xtreg} \]

Test: Ho: difference in coefficients not systematic
\[
\chi^2(27) = (b - B)'[(V_b - V_B)^{-1}](b - B)
\]
\[
= 27.23
\]
\[
\text{Prob} > \chi^2 = 0.4515
\]

*if Prob > chi2 greater than 0.05 use fixed effects

**Panel Modell with all Enlargement rounds:

*Dummy variable consists of every round itself, So to see the effect on the different members.

use "C:\Users\Fabian\Desktop\master\stata\panel_reg.dta", clear

taxset city year
taxreg dpop i.year i.eu H U frg if eu>=1, fe r

Fixed-effects (within) regression  Number of obs = 14,249
Group variable: city  Number of groups = 594

R-sq:
within = 0.0741  min = 19
between = 0.0103  avg = 24.0
overall = 0.0703  max = 24

\[ F(30,593) = 24.12 \]
\[ \text{corr}(u_i, Xb) = -0.1174 \]
\[ \text{Prob} > F = 0.0000 \]

(Std. Err. adjusted for 594 clusters in city)

<table>
<thead>
<tr>
<th></th>
<th>Robust</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>dpop</td>
<td>Coef. Std. Err.</td>
<td>t</td>
<td>P&gt;</td>
<td>t</td>
</tr>
<tr>
<td>year</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>.0589068</td>
<td>.0262301</td>
<td>2.25</td>
<td>.025</td>
</tr>
<tr>
<td>1993</td>
<td>.1205397</td>
<td>.0251693</td>
<td>4.79</td>
<td>0.000</td>
</tr>
<tr>
<td>1994</td>
<td>.0582322</td>
<td>.0163449</td>
<td>3.56</td>
<td>0.000</td>
</tr>
<tr>
<td>1995</td>
<td>.032471</td>
<td>.0135953</td>
<td>2.39</td>
<td>0.017</td>
</tr>
<tr>
<td>1996</td>
<td>-.0400661</td>
<td>.0226654</td>
<td>-1.77</td>
<td>0.078</td>
</tr>
<tr>
<td>1997</td>
<td>.151124</td>
<td>.0246054</td>
<td>6.14</td>
<td>0.000</td>
</tr>
<tr>
<td>1998</td>
<td>.0568391</td>
<td>.0164276</td>
<td>3.46</td>
<td>0.001</td>
</tr>
<tr>
<td>1999</td>
<td>.0499898</td>
<td>.0178048</td>
<td>2.81</td>
<td>0.005</td>
</tr>
<tr>
<td>2000</td>
<td>.0164433</td>
<td>.0245755</td>
<td>0.67</td>
<td>0.504</td>
</tr>
<tr>
<td>2001</td>
<td>-.0563259</td>
<td>.0302563</td>
<td>-1.86</td>
<td>0.063</td>
</tr>
<tr>
<td>Year</td>
<td>EU</td>
<td>SE</td>
<td>z</td>
<td>p</td>
</tr>
<tr>
<td>------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>2002</td>
<td>.169552</td>
<td>.035957</td>
<td>4.72</td>
<td>.000</td>
</tr>
<tr>
<td>2003</td>
<td>.0931372</td>
<td>.0210121</td>
<td>4.43</td>
<td>.000</td>
</tr>
<tr>
<td>2004</td>
<td>- .1982383</td>
<td>.0300025</td>
<td>-6.61</td>
<td>.000</td>
</tr>
<tr>
<td>2005</td>
<td>.072309</td>
<td>.028557</td>
<td>-2.25</td>
<td>.025</td>
</tr>
<tr>
<td>2006</td>
<td>- .2703834</td>
<td>.0513571</td>
<td>-5.26</td>
<td>.000</td>
</tr>
<tr>
<td>2007</td>
<td>.0394285</td>
<td>.0218008</td>
<td>1.81</td>
<td>.071</td>
</tr>
<tr>
<td>2008</td>
<td>.0672309</td>
<td>.0266554</td>
<td>2.01</td>
<td>.045</td>
</tr>
<tr>
<td>2009</td>
<td>- .042712</td>
<td>.0278621</td>
<td>1.22</td>
<td>.225</td>
</tr>
<tr>
<td>2010</td>
<td>- .0394285</td>
<td>.0218008</td>
<td>1.81</td>
<td>.071</td>
</tr>
<tr>
<td>2011</td>
<td>- .0672309</td>
<td>.0266554</td>
<td>2.01</td>
<td>.045</td>
</tr>
<tr>
<td>2012</td>
<td>.0854298</td>
<td>.0354887</td>
<td>8.31</td>
<td>.000</td>
</tr>
<tr>
<td>2013</td>
<td>.2970105</td>
<td>.0332107</td>
<td>8.94</td>
<td>.000</td>
</tr>
</tbody>
</table>

**Difference-in-Difference:**

- **gen treatn = (eu>1)**
- **gen treat1 = (eu>1) & (eu<3)**
- **gen treat2 = (eu>2) & (eu<4)**
- **gen treat3 = (eu>3) & (eu<4)**
- **gen treat4 = (eu>4)**

**xtset city year**
- panel variable: city (strongly balanced)
- time variable: year, 1990 to 2014
- delta: 1 unit
- **xtreg dpop i.year treatn, fe r**

Fixed-effects (within) regression

- **Number of obs** = 15,240
- **Number of groups** = 635

R-sq:
- **within** = 0.0607
- **between** = 0.0226
- **overall** = 0.0601

<table>
<thead>
<tr>
<th>Obs per group:</th>
</tr>
</thead>
<tbody>
<tr>
<td>within = 0.0607</td>
</tr>
<tr>
<td>between = 0.0226</td>
</tr>
<tr>
<td>overall = 0.0601</td>
</tr>
</tbody>
</table>

F(24,634) = 32.89
\[ \text{corr}(u_i, X_b) = -0.0111 \quad \text{Prob} > F = 0.0000 \]

(Std. Err. adjusted for 635 clusters in city)

<table>
<thead>
<tr>
<th></th>
<th>Robust</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>dpop</td>
<td>Coef.</td>
<td>Std. Err.</td>
<td>t</td>
<td>P&gt;</td>
<td>t</td>
<td></td>
</tr>
<tr>
<td>year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>.0344214</td>
<td>.0264965</td>
<td>1.30</td>
<td>.0176101</td>
<td>.0864529</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>.0932311</td>
<td>.0253593</td>
<td>3.68</td>
<td>.0000000</td>
<td>.0434326</td>
<td>.1430295</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>.0346448</td>
<td>.0184021</td>
<td>1.92</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0699916</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>.0120444</td>
<td>.0158975</td>
<td>0.76</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0432625</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>-.0572481</td>
<td>.0231912</td>
<td>-2.47</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.1170724</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>.1244919</td>
<td>.0251297</td>
<td>4.95</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.1738394</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>.0350982</td>
<td>.0180299</td>
<td>1.95</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0705037</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>.0281054</td>
<td>.0190620</td>
<td>1.47</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0655342</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>-.0837481</td>
<td>.0382467</td>
<td>-2.48</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.0173256</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>-.0765548</td>
<td>.0300937</td>
<td>-2.55</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.0175859</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>.2044222</td>
<td>.0394313</td>
<td>5.18</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.281854</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>.0687480</td>
<td>.0219420</td>
<td>3.13</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.1118357</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>-.2738672</td>
<td>.0357213</td>
<td>-7.67</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.2037207</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>.1550318</td>
<td>.0295041</td>
<td>5.25</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.2129693</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>.0254461</td>
<td>.0209642</td>
<td>1.21</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0666138</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>.0155059</td>
<td>.0214077</td>
<td>0.72</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0575445</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>.0118805</td>
<td>.0264448</td>
<td>0.45</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0638106</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>-.0996968</td>
<td>.0276029</td>
<td>-3.61</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.0454926</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>-.3237553</td>
<td>.0418941</td>
<td>-7.73</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.2418744</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>-.0663015</td>
<td>.029627</td>
<td>-2.24</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.0081225</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>.0660540</td>
<td>.0238284</td>
<td>2.77</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.1128462</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>.1656709</td>
<td>.0297594</td>
<td>5.57</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.2241098</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>.2475195</td>
<td>.0323262</td>
<td>7.66</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.3109989</td>
<td></td>
</tr>
<tr>
<td>treatn</td>
<td>.0200821</td>
<td>.0194044</td>
<td>1.94</td>
<td>.0000000</td>
<td>.0000000</td>
<td>.0403955</td>
<td></td>
</tr>
<tr>
<td>_cons</td>
<td>-.0401872</td>
<td>.0182692</td>
<td>-2.20</td>
<td>.0000000</td>
<td>.0000000</td>
<td>-.0043117</td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{sigma}_u = 0.03869768 \\
\text{sigma}_e = 0.51984438 \\
\text{rho} = 0.00551091 \text{ (fraction of variance due to u_i)}
\]

*1. Erweiterung

\text{xtreg dpop i.year treatn1, fe r}

Fixed-effects (within) regression Number of obs = 15,240
Group variable: city Number of groups = 635
R-sq: within = 0.0608 between = 0.0244 overall = 0.0601

\[
\begin{align*}
\text{Obs per group:} & \\
\text{within} & = 24 & \text{min} & = 24 & \\
\text{between} & = 24.0 & \text{avg} & = 24.0 & \\
\text{overall} & = 24 & \text{max} & = 24 & \\
\text{F(25,634)} & = 31.76
\end{align*}
\]
### Model Output

**corr(u_i, Xb) = -0.0144  Prob > F = 0.0000**  
(Std. Err. adjusted for 635 clusters in city)

| Robust | dpop | Coef. | Std. Err. | t | P>|t| | [95% Conf. Interval] |
|--------|------|-------|-----------|---|-----|---------------------|
| year   |      |       |           |   |     |                     |
| 1992   |      | .0344214 | 0.0264974 | 1.30 | 0.194 | -.0176118   .0864546 |
| 1993   |      | .0932311 | 0.0253602 | 3.68 | 0.000 | .043431   1.430312 |
| 1994   |      | .0346448 | 0.0180006 | 1.92 | 0.055 | -.0176118   .0864546 |
| 1995   |      | .0108648 | 0.0158792 | 0.68 | 0.494 | -.0203174   .042047 |
| 1996   |      | -.0584277 | 0.0232499 | -2.51 | 0.012 | -.1040838   -.0127716 |
| 1997   |      | .1233123 | 0.0250568 | 4.92 | 0.000 | .0741079    .1725167 |
| 1998   |      | .0339186 | 0.0180192 | 1.88 | 0.060 | -.001466    .0693032 |
| 1999   |      | .0108648 | 0.0190525 | 1.41 | 0.158 | -.0104878   .0643393 |
| 2000   |      | .0584277 | 0.0232499 | 2.51 | 0.012 | -.1040838   -.0127716 |
| 2001   |      | .1233123 | 0.0250568 | 4.92 | 0.000 | .0741079    .1725167 |
| 2002   |      | .0339186 | 0.0180192 | 1.88 | 0.060 | -.001466    .0693032 |
| 2003   |      | .0108648 | 0.0190525 | 1.41 | 0.158 | -.0104878   .0643393 |
| 2004   |      | .0584277 | 0.0232499 | 2.51 | 0.012 | -.1040838   -.0127716 |
| 2005   |      | .1233123 | 0.0250568 | 4.92 | 0.000 | .0741079    .1725167 |
| 2006   |      | .0339186 | 0.0180192 | 1.88 | 0.060 | -.001466    .0693032 |
| 2007   |      | .0108648 | 0.0190525 | 1.41 | 0.158 | -.0104878   .0643393 |
| 2008   |      | .0584277 | 0.0232499 | 2.51 | 0.012 | -.1040838   -.0127716 |
| 2009   |      | .1233123 | 0.0250568 | 4.92 | 0.000 | .0741079    .1725167 |
| 2010   |      | .0339186 | 0.0180192 | 1.88 | 0.060 | -.001466    .0693032 |
| 2011   |      | .0108648 | 0.0190525 | 1.41 | 0.158 | -.0104878   .0643393 |
| 2012   |      | .0584277 | 0.0232499 | 2.51 | 0.012 | -.1040838   -.0127716 |
| 2013   |      | .1233123 | 0.0250568 | 4.92 | 0.000 | .0741079    .1725167 |
| 2014   |      | .0339186 | 0.0180192 | 1.88 | 0.060 | -.001466    .0693032 |

### Additional Analysis

- `sigma_u | .03899791`
- `sigma_e | .51985596`
- `rho | .00559602  (fraction of variance due to u_i)`

---

**. test _b[treatn] + [treat1]=0**

( 1) treatn + treat1 = 0

F( 1, 634) =  4.16
Prob > F =  0.0419

---

**.xtreg dpop i.year treatn treat2, fe r**

Fixed-effects (within) regression  
Number of obs = 15,240
Group variable: city    Number of groups =  635
R-sq:                      
    within = 0.0608    min =  24
    between = 0.0415   avg =  24.0
    overall = 0.0597   max =  24
F(25,634) = 31.67

corr(u_i, Xb) = -0.0284  Prob > F = 0.0000

(obs adjustments for 635 clusters in city)

|               Robust
| dpop | Coef. Std. Err. t P>|t|  [95% Conf. Interval]

<table>
<thead>
<tr>
<th>year</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>0.0344214</td>
<td>0.0264974</td>
<td>1.30</td>
<td>0.194</td>
<td>0.0176118</td>
</tr>
<tr>
<td>1993</td>
<td>0.0932311</td>
<td>0.0253602</td>
<td>3.68</td>
<td>0.000</td>
<td>0.043431</td>
</tr>
<tr>
<td>1994</td>
<td>0.0346448</td>
<td>0.0180006</td>
<td>1.92</td>
<td>0.055</td>
<td>-0.0007031</td>
</tr>
<tr>
<td>1995</td>
<td>0.0129089</td>
<td>0.0158822</td>
<td>0.81</td>
<td>0.417</td>
<td>-0.0182793</td>
</tr>
<tr>
<td>1996</td>
<td>-0.0563836</td>
<td>0.0231361</td>
<td>-2.44</td>
<td>0.015</td>
<td>-0.1018162</td>
</tr>
<tr>
<td>1997</td>
<td>0.1253564</td>
<td>0.0250478</td>
<td>5.00</td>
<td>0.000</td>
<td>0.0761698</td>
</tr>
<tr>
<td>1998</td>
<td>0.0359627</td>
<td>0.0179396</td>
<td>2.00</td>
<td>0.045</td>
<td>-0.0007031</td>
</tr>
<tr>
<td>1999</td>
<td>0.0289698</td>
<td>0.0197090</td>
<td>1.53</td>
<td>0.127</td>
<td>-0.0082836</td>
</tr>
<tr>
<td>2000</td>
<td>-0.0828838</td>
<td>0.0337844</td>
<td>-2.45</td>
<td>0.014</td>
<td>-0.1492266</td>
</tr>
<tr>
<td>2001</td>
<td>-0.0756903</td>
<td>0.0296040</td>
<td>-2.53</td>
<td>0.012</td>
<td>-0.1345239</td>
</tr>
<tr>
<td>2002</td>
<td>-0.2052873</td>
<td>0.0393959</td>
<td>5.21</td>
<td>0.000</td>
<td>-0.1279243</td>
</tr>
<tr>
<td>2003</td>
<td>0.0696125</td>
<td>0.0218177</td>
<td>3.19</td>
<td>0.001</td>
<td>0.0267688</td>
</tr>
<tr>
<td>2004</td>
<td>-0.275396</td>
<td>0.0359</td>
<td>-7.67</td>
<td>0.000</td>
<td>-0.3458933</td>
</tr>
<tr>
<td>2005</td>
<td>0.1535029</td>
<td>0.0294734</td>
<td>5.21</td>
<td>0.000</td>
<td>0.0956257</td>
</tr>
<tr>
<td>2006</td>
<td>0.0239173</td>
<td>0.0211439</td>
<td>1.13</td>
<td>0.258</td>
<td>-0.0176033</td>
</tr>
<tr>
<td>2007</td>
<td>0.0159942</td>
<td>0.0214124</td>
<td>0.75</td>
<td>0.455</td>
<td>-0.0260536</td>
</tr>
<tr>
<td>2008</td>
<td>0.0123688</td>
<td>0.0263761</td>
<td>0.47</td>
<td>0.639</td>
<td>-0.0394263</td>
</tr>
<tr>
<td>2009</td>
<td>-0.0992085</td>
<td>0.0275788</td>
<td>-3.60</td>
<td>0.000</td>
<td>-0.1533653</td>
</tr>
<tr>
<td>2010</td>
<td>-0.323267</td>
<td>0.0418768</td>
<td>-7.72</td>
<td>0.000</td>
<td>-0.405501</td>
</tr>
<tr>
<td>2011</td>
<td>-0.0658132</td>
<td>0.0295724</td>
<td>-2.23</td>
<td>0.026</td>
<td>-0.1238848</td>
</tr>
<tr>
<td>2012</td>
<td>0.0665423</td>
<td>0.0237911</td>
<td>2.80</td>
<td>0.005</td>
<td>0.0198235</td>
</tr>
<tr>
<td>2013</td>
<td>0.1661592</td>
<td>0.0297391</td>
<td>5.59</td>
<td>0.000</td>
<td>0.1077601</td>
</tr>
<tr>
<td>2014</td>
<td>0.2482136</td>
<td>0.0323244</td>
<td>7.68</td>
<td>0.000</td>
<td>0.1847379</td>
</tr>
<tr>
<td>treatn</td>
<td>0.0462223</td>
<td>0.018486</td>
<td>2.50</td>
<td>0.013</td>
<td>0.0099211</td>
</tr>
<tr>
<td>treat2</td>
<td>-0.0414911</td>
<td>0.0203994</td>
<td>-2.03</td>
<td>0.042</td>
<td>-0.0815497</td>
</tr>
<tr>
<td>_cons</td>
<td>-0.0408813</td>
<td>0.0181947</td>
<td>-2.25</td>
<td>0.025</td>
<td>-0.0766105</td>
</tr>
</tbody>
</table>

sigma_u | 0.04037692
sigma_e | 0.51983846
rho | 0.00599677 (fraction of variance due to u_i)

. estimate store m3, title(2. Enlargement)
. test _b[treatn] + [treat2]=0
(1) treatn + treat2 = 0
F(1, 634) = 0.19
Prob > F = 0.6653

*.3.Erweiterung
.xtreg dpop i.year treatn treat3, fe r
Fixed-effects (within) regression
Number of obs = 15,240
Group variable: city Number of groups = 635
R-sq:
within = 0.0609 min = 24
between = 0.0286 avg = 24.0
overall = 0.0597 max = 24
F(25, 634) = 31.86
corr(u_i, Xb) = -0.0345 Prob > F = 0.0000
(Std. Err. adjusted for 635 clusters in city)

<p>| year   | Coef. | Std. Err. | t     | P&gt;|t|     | 95% Conf. Interval |
|--------|-------|-----------|-------|---------|-------------------|
| 1992   | .0344214 | .0264974 | 1.30  | 0.194  | -.0176118 - .0864546 |
| 1993   | .0932311 | .0253602 | 3.68  | 0.000  | .043431 - .1430312 |
| 1994   | .0346448 | .0180006 | 1.92  | 0.055  | -.0007031 - .0699928 |
| 1995   | .0115156 | .0159102 | 0.72  | 0.469  | -.0197275 - .0427587 |
| 1996   | -.0577769 | .0232265 | -2.49 | 0.013  | -.1033871 - .0121667 |
| 1997   | .1239631 | .0251661 | 4.93  | 0.000  | .074544 - .1733822 |
| 1998   | .0345694 | .0180767 | 1.91  | 0.056  | -.0009281 - .0700668 |
| 1999   | .0275765 | .019107 | 1.44  | 0.149  | -.009944 - .0650971 |
| 2000   | -.0842771 | .0338506 | -2.49 | 0.013  | -.1507499 - .0178044 |
| 2001   | -.0770836 | .030086 | -2.56 | 0.011  | -.1361638 - .0180034 |
| 2002   | .2038933 | .0394343 | 5.17  | 0.000  | .1264557 - .281331 |
| 2003   | .0682192 | .0220036 | 3.10  | 0.002  | .0250104 - .1114281 |
| 2004   | -.2768891 | .0360783 | -7.67 | 0.000  | -.3477365 - .2060416 |
| 2005   | .1520099 | .0294138 | 5.17  | 0.000  | .0942496 - .2097701 |
| 2006   | .0224242 | .0212521 | 1.06  | 0.292  | -.0193089 - .0641573 |
| 2007   | .0156157 | .021406 | 0.73  | 0.466  | -.0264195 - .057651 |
| 2008   | .0119903 | .0264269 | 0.45  | 0.650  | -.0399046 - .0638853 |
| 2009   | -.099587 | .0275991 | -3.61 | 0.000  | -.1537836 - .0453903 |
| 2010   | -.3236455 | .0418937 | -7.73 | 0.000  | -.4059126 - .2413783 |
| 2011   | -.0661916 | .029616 | -2.23 | 0.026  | -.124349 - .0080342 |
| 2012   | .0661638 | .0238177 | 2.78  | 0.006  | .0193927 - .1129348 |
| 2013   | .1657807 | .0297543 | 5.57  | 0.000  | .1073518 - .2242095 |
| 2014   | .2475034 | .0323332 | 7.65  | 0.000  | .1840103 - .3109965 |
| treatn | .0040913 | .009775 | 0.42  | 0.676  | -.0151039 - .0232866 |
| treat3 | .056575 | .0242081 | 2.34  | 0.020  | .0090372 - .1041127 |
| _cons  | -.0401711 | .0182558 | -2.20 | 0.028  | -.0760202 - .004322 |</p>
<table>
<thead>
<tr>
<th></th>
<th>sigma_u</th>
<th>sigma_e</th>
<th>rho</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.04078836</td>
<td>0.51982356</td>
<td>0.0061192 (fraction of variance due to u_i)</td>
</tr>
</tbody>
</table>

```
estimate store m4, title(3. Enlargement)
estest _b[treatn] + [treat3]=0
( 1) treatn + treat3 = 0
F(  1,   634) =  6.75
   Prob > F =  0.0096
.*4.Erweiterung
.xtreg dpop i.year treatn treat4, fe r
Fixed-effects (within) regression
Number of obs = 15,240
Group variable: city
Number of groups = 635
R-sq: within = 0.0608
     min =  24
between = 0.0278
    avg =  24.0
overall = 0.0589
   max =  24
F(25,634) = 31.64
corr(u_i, Xb) = -0.0617
   Prob > F =  0.0000
(Std. Err. adjusted for 635 clusters in city)

<p>|     | Coef. | Std. Err. |  t  | P&gt;|t| | [95% Conf. Interval] |
|-----|-------|-----------|-----|-----|----------------------|
| 1992 | .0344214 | .0264974 | 1.30 | 0.194 | -.0176118 | .0864546 |
| 1993 | .0932311 | .0253602 | 3.68 | 0.000 | .043431 | .1430312 |
| 1994 | .0346448 | .0180006 | 1.92 | 0.055 | -.0007031 | .0699928 |
| 1995 | .0120148 | .0158979 | 0.76 | 0.450 | -0.0192041 | .0432337 |
| 1996 | .0572777 | .0231918 | 2.47 | 0.014 | -.1028198 | .0711732 |
| 1997 | .1244623 | .0251309 | 4.95 | 0.000 | .0751125 | .1738122 |
| 1998 | .0350686 | .0180307 | 1.94 | 0.052 | -.0003384 | .0704756 |
| 1999 | .0280758 | .019061 | 1.47 | 0.141 | -.0093545 | .065506 |
| 2000 | .0837779 | .038257 | -2.48 | 0.014 | -.1502018 | -.017354 |
| 2001 | .0765844 | .0300297 | -2.55 | 0.011 | -.1355541 | -.0176146 |
| 2002 | .2043926 | .0394333 | 5.13 | 0.000 | .1269568 | .2818283 |
| 2003 | .0687184 | .021943 | 3.13 | 0.002 | .0256286 | .118083 |
| 2004 | .2740363 | .0357167 | -7.67 | 0.000 | -.3441736 | -.203899 |
| 2005 | .1548626 | .029513 | 5.25 | 0.000 | .0969076 | .2128176 |
| 2006 | .0252777 | .020967 | 1.21 | 0.228 | -.0158963 | .0664502 |
| 2007 | .0152677 | .0214106 | 0.71 | 0.476 | -.0267766 | .057312 |
| 2008 | .0116423 | .0264643 | 0.44 | 0.660 | -.0402906 | .0635753 |
| 2009 | -.099935 | .0276019 | -3.62 | 0.000 | -.1541372 | -.0457329 |
| 2010 | .329935 | .0419018 | -7.73 | 0.000 | -.4062766 | -.2417104 |
| 2011 | -.0665397 | .0296481 | -2.24 | 0.025 | -.12476 | -.0083194 |
| 2012 | .0658157 | .0238362 | 2.76 | 0.006 | .0190084 | .1126231 |</p>
<table>
<thead>
<tr>
<th>Year</th>
<th>treatn Mean</th>
<th>treatn Std. Error</th>
<th>treatn t</th>
<th>p-value</th>
<th>treat Mean</th>
<th>treat Std. Error</th>
<th>treat t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>0.1654327</td>
<td>0.0297899</td>
<td>5.55</td>
<td>0.000</td>
<td>0.1069338</td>
<td>0.2239315</td>
<td>0.1069338</td>
<td>0.2239315</td>
</tr>
<tr>
<td>2014</td>
<td>0.2485413</td>
<td>0.0324597</td>
<td>7.66</td>
<td>0.000</td>
<td>0.1847998</td>
<td>0.3122828</td>
<td>0.1847998</td>
<td>0.3122828</td>
</tr>
</tbody>
</table>

- **sigma_u**: 0.04310492
- **sigma_e**: 0.51985413
- **rho**: 0.00682834 (fraction of variance due to u_i)

---

### Regression Table:***

- **estout m1 m2 m3 m4 m5, cells(b(star fmt(6)) se(par fmt(2)))**
- **legend label collabels(none) varlabels(_cons Constant)**
- **stats (r2 N, fmt(3 0) label(R-squared Observations))**
- **style(tex)**

| Year | Model 1 & Model 2 & Model 3 & Model 4 & Model 5 |
|------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1991 | 0.000000 & 0.000000 & 0.000000 & 0.000000 & 0.000000 |
|      | (.) & (.) & (.) & (.) & (.) |
| 1992 | 0.036724 & 0.034421 & 0.034421 & 0.034421 & 0.034421 |
|      | (0.03) & (0.03) & (0.03) & (0.03) & (0.03) |
| 1993 | 0.094168*** & 0.093231*** & 0.093231*** & 0.093231*** & 0.093231*** |
|      | (0.03) & (0.03) & (0.03) & (0.03) & (0.03) |
| 1994 | 0.035819* & 0.034645 & 0.034645 & 0.034645 & 0.034645 |
|      | (0.02) & (0.02) & (0.02) & (0.02) & (0.02) |
| 1995 | 0.013727 & 0.010865 & 0.012909 & 0.011516 & 0.012015 |
|      | (0.02) & (0.02) & (0.02) & (0.02) & (0.02) |
| 1996 | -0.054693* & -0.058428* & -0.056384* & -0.057777* & -0.057278* |
|      | (0.02) & (0.02) & (0.02) & (0.02) & (0.02) |
| 1997 | 0.126351*** & 0.123312*** & 0.125356*** & 0.123963*** & 0.124462*** |
|      | (0.02) & (0.02) & (0.02) & (0.02) & (0.02) |
| 1998 | 0.036626* & 0.033919 & 0.035963* & 0.034569 & 0.035069 |
|      | (0.02) & (0.02) & (0.02) & (0.02) & (0.02) |
| 1999 | 0.030210 & 0.026926 & 0.028970 & 0.027577 & 0.028076 |
|      | (0.02) & (0.02) & (0.02) & (0.02) & (0.02) |
| 2000 | -0.070190* & -0.084928* & -0.082884* & -0.084277* & -0.083778* |
|      | (0.03) & (0.03) & (0.03) & (0.03) & (0.03) |
| 2001 | -0.063029* & -0.077734* & -0.075690* & -0.077084* & -0.076584* |

---

**estimate store m5, title(4. Enlargement)**

**test _b[treatn] + [treat4]=0**

( 1) treatn + treat4 = 0

F(  1,   634) =   29.07
Prob > F =    0.0000

***Regression Table:***
<table>
<thead>
<tr>
<th>Year</th>
<th>Eu=0</th>
<th>Eu=1</th>
<th>H</th>
<th>U</th>
<th>frg</th>
<th>treatn</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>0.210173*** &amp; 0.203243*** &amp; 0.205287*** &amp; 0.203893*** &amp; 0.204393***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>0.070467** &amp; 0.067568** &amp; 0.069613** &amp; 0.068219** &amp; 0.068718**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>-0.266235*** &amp; -0.274552*** &amp; -0.275396*** &amp; -0.276889*** &amp; -0.274036***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>0.156525*** &amp; 0.154347*** &amp; 0.153503*** &amp; 0.152010*** &amp; 0.154863***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>-0.266235*** &amp; -0.274552*** &amp; -0.275396*** &amp; -0.276889*** &amp; -0.274036***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>0.15017*** &amp; 0.065615** &amp; 0.066542** &amp; 0.066164** &amp; 0.065816**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>0.19900 &amp; 0.011441 &amp; 0.012369 &amp; 0.011990 &amp; 0.011642</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>-0.071231* &amp; -0.100136*** &amp; -0.099209*** &amp; -0.099587*** &amp; -0.099935***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>-0.244293*** &amp; -0.324195*** &amp; -0.323267*** &amp; -0.323645*** &amp; -0.323993***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>0.029726 &amp; -0.066741* &amp; -0.065813* &amp; -0.066192* &amp; -0.066540*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>0.15017*** &amp; 0.065615** &amp; 0.066542** &amp; 0.066164** &amp; 0.065816**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>0.271242*** &amp; 0.165232*** &amp; 0.166159*** &amp; 0.165781*** &amp; 0.165433***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>0.278882*** &amp; 0.247105*** &amp; 0.248214*** &amp; 0.247503*** &amp; 0.248541***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- ** and *** indicate significance levels.
treat1 & & -0.038846** & & & &  \\
& & (0.01) & & & &  \\
treat2 & & & -0.041491* & & & &  \\
& & & (0.02) & & & &  \\
treat3 & & & & 0.056575* & & & &  \\
& & & & (0.02) & & & &  \\
treat4 & & & & & 0.160915*** \\
& & & & & (0.03)  \\
Constant & & -0.141652* & & -0.039773* & & -0.040881* & & -0.040171* & & -0.041209*  \\
& & (0.06) & & (0.02) & & (0.02) & & (0.02) & & (0.02)  \\
R-squared & & 0.073 & & 0.061 & & 0.061 & & 0.061 & & 0.061  \\
Observations & & 15233 & & 15240 & & 15240 & & 15240 & & 15240  \\
* p<0.05, ** p<0.01, *** p<0.001

**Tables**

*1. Enlargements*

.tab year Eu

<table>
<thead>
<tr>
<th>year</th>
<th>Eu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>215</td>
</tr>
<tr>
<td>1991</td>
<td>215</td>
</tr>
<tr>
<td>1992</td>
<td>215</td>
</tr>
<tr>
<td>1993</td>
<td>215</td>
</tr>
<tr>
<td>1994</td>
<td>215</td>
</tr>
<tr>
<td>1995</td>
<td>194</td>
</tr>
<tr>
<td>1996</td>
<td>194</td>
</tr>
<tr>
<td>1997</td>
<td>194</td>
</tr>
<tr>
<td>1998</td>
<td>194</td>
</tr>
<tr>
<td>1999</td>
<td>194</td>
</tr>
<tr>
<td>2000</td>
<td>194</td>
</tr>
<tr>
<td>2001</td>
<td>194</td>
</tr>
<tr>
<td>2002</td>
<td>194</td>
</tr>
<tr>
<td>2003</td>
<td>194</td>
</tr>
<tr>
<td>2004</td>
<td>95</td>
</tr>
<tr>
<td>2005</td>
<td>95</td>
</tr>
<tr>
<td>2006</td>
<td>95</td>
</tr>
<tr>
<td>2007</td>
<td>46</td>
</tr>
<tr>
<td>2008</td>
<td>46</td>
</tr>
<tr>
<td>2009</td>
<td>46</td>
</tr>
<tr>
<td>2010</td>
<td>46</td>
</tr>
<tr>
<td>2011</td>
<td>46</td>
</tr>
<tr>
<td>2012</td>
<td>46</td>
</tr>
<tr>
<td>2013</td>
<td>46</td>
</tr>
<tr>
<td>2014</td>
<td>41</td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3,469</td>
</tr>
<tr>
<td>treatn</td>
<td>0</td>
</tr>
<tr>
<td>--------</td>
<td>---</td>
</tr>
<tr>
<td>0</td>
<td>1,025</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

Total | 13,431 | 2,444 | 15,875 |

<table>
<thead>
<tr>
<th>treat1</th>
<th>0</th>
<th>1</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
<td>1,025</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
<td>12,406</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>1,386</td>
<td>0</td>
<td>1,386</td>
</tr>
<tr>
<td>4</td>
<td>833</td>
<td>0</td>
<td>833</td>
</tr>
<tr>
<td>5</td>
<td>120</td>
<td>0</td>
<td>120</td>
</tr>
</tbody>
</table>

Total | 15,770 | 105 | 15,875 |

<table>
<thead>
<tr>
<th>treat2</th>
<th>0</th>
<th>1</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
<td>1,025</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
<td>12,406</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
<td>0</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>1,386</td>
<td>1,386</td>
</tr>
<tr>
<td>4</td>
<td>833</td>
<td>0</td>
<td>833</td>
</tr>
<tr>
<td>5</td>
<td>120</td>
<td>0</td>
<td>120</td>
</tr>
</tbody>
</table>

Total | 14,489 | 1,386 | 15,875 |

<table>
<thead>
<tr>
<th>treat3</th>
<th>0</th>
<th>1</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1,025</td>
<td>0</td>
<td>1,025</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
<td>0</td>
<td>12,406</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
<td>0</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>1,386</td>
<td>0</td>
<td>1,386</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>833</td>
<td>833</td>
</tr>
<tr>
<td></td>
<td>120</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
<td>---</td>
<td>------</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15,042</td>
<td>833</td>
<td>15,875</td>
</tr>
</tbody>
</table>

```
.tab eu treat4

|   | treat4
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>eu</td>
<td>0</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>0</td>
<td>1,025</td>
</tr>
<tr>
<td>1</td>
<td>12,406</td>
</tr>
<tr>
<td>2</td>
<td>105</td>
</tr>
<tr>
<td>3</td>
<td>1,386</td>
</tr>
<tr>
<td>4</td>
<td>833</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15,755</td>
</tr>
</tbody>
</table>
```

***Graphes for descriptive Analysis***

*Treated vs. Untreatet characteristics*

```
xset city year
panel variable: city (strongly balanced)
time variable: year, 1990 to 2014
delta: 1 unit
```

```
.xtreg dpop i.year i.eu H U frg, fe r
```

```
Fixed-effects (within) regression
Number of obs = 15,233
Group variable: city
Number of groups = 635
R-sq: within = 0.0727, min = 19
between = 0.0028, avg = 24.0
overall = 0.0697, max = 24
F(27,634) = 27.48
corr(u_i, Xb) = -0.1079
Prob > F = 0.0000
(Std. Err. adjusted for 635 clusters in city)
```

```
|   | Robust
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>dpop</td>
<td>Coef.</td>
</tr>
<tr>
<td>---</td>
<td>------</td>
</tr>
<tr>
<td>year</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>.0367245</td>
</tr>
<tr>
<td>1993</td>
<td>.0941683</td>
</tr>
<tr>
<td>1994</td>
<td>.0358186</td>
</tr>
<tr>
<td>1995</td>
<td>.0137273</td>
</tr>
<tr>
<td>1996</td>
<td>-.0546934</td>
</tr>
<tr>
<td>1997</td>
<td>.1263515</td>
</tr>
<tr>
<td>1998</td>
<td>.0366262</td>
</tr>
<tr>
<td>1999</td>
<td>.0302096</td>
</tr>
<tr>
<td>2000</td>
<td>-0.0701087</td>
</tr>
<tr>
<td>2001</td>
<td>-.0630286</td>
</tr>
<tr>
<td>Year</td>
<td>Treatment</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
</tr>
<tr>
<td>2002</td>
<td>.2101733</td>
</tr>
<tr>
<td>2003</td>
<td>.0704666</td>
</tr>
<tr>
<td>2004</td>
<td>-2.662348</td>
</tr>
<tr>
<td>2005</td>
<td>.1565249</td>
</tr>
<tr>
<td>2006</td>
<td>.0306543</td>
</tr>
<tr>
<td>2007</td>
<td>.0243278</td>
</tr>
<tr>
<td>2008</td>
<td>.0198997</td>
</tr>
<tr>
<td>2009</td>
<td>-1.2662348</td>
</tr>
<tr>
<td>2010</td>
<td>.1500168</td>
</tr>
<tr>
<td>2011</td>
<td>.029726</td>
</tr>
<tr>
<td>2012</td>
<td>.2712422</td>
</tr>
<tr>
<td>2013</td>
<td>.2788818</td>
</tr>
</tbody>
</table>

Sigma_u | .04650004
Sigma_e | .51610078
Rho | .00805242 (fraction of variance due to u_i)

```
gen tdpop=dpop if Eu==1
(3,889 missing values generated)
gen cdpop=dpop if Eu==0
(12,621 missing values generated)
scatter tdpop cdpop year, title("City Growth") ytitle(growth) xtitle(Year) ylab(8 [1]) ///
> legend( order(1 "Treatment" 2 "Control") region(lwidth(none) lcolor(none) lstyle(none)) ring(0) pos(7)) ///
> xsize(20) ysize(8) || lfit tdpop year
```

```
file C:\Users\Fabian\Desktop\master\stata\Graph_treatment.gph", replace
file C:\Users\Fabian\Dropbox\Masterarbeit\Latex\Screenshots\treat.png", as(png) replace
```
	(file C:\Users\Fabian\Dropbox\Masterarbeit\Latex\Screenshots\treat.png written in PNG format)
6 References


