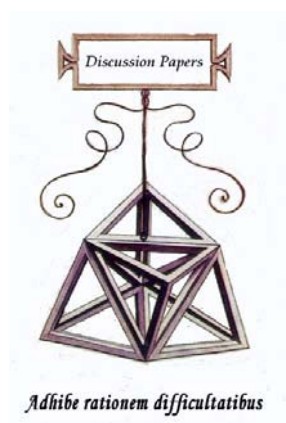

Discussion Papers

Collana di E-papers del Dipartimento di Economia e Management – University of Pisa



Angela Parenti Cristina Tealdi

*Does the abolition of border controls boost
cross-border commuting? Evidence from
Switzerland*

*Discussion Paper n. 213
2017*

Indirizzo degli Autori:

Angela Parenti

Institute of Advanced Studies (IMT), Piazza S. Ponziano 6, 55100 LUCCA – Italy

Email: angela.parenti@imtlucca.it

Cristina Tealdi

Heriot-Watt University, Edinburgh Campus, EDINBURGH EH14 4AS – United Kingdom

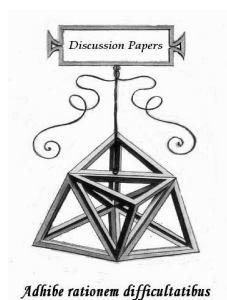
Email: c.tealdi@hw.ac.uk

© *Angela Parenti and Cristina Tealdi*

La presente pubblicazione ottempera agli obblighi previsti dall'art. 1 del decreto legislativo luogotenenziale 31 agosto 1945, n. 660.

Please cite as it follows

Angela Parenti and Cristina Tealdi (2015), “*Does the abolition of border controls boost cross-border commuting? Evidence from Switzerland?*”, Discussion Papers del Dipartimento di Economia e Management – University of Pisa, n. 213 (<http://www.ec.unipi.it/ricerca/discussion-papers.html>)



Angela Parenti - Cristina Tealdi

Does the abolition of border controls boost cross-border commuting? Evidence from Switzerland

Abstract

In this paper we study the effects of Switzerland implementing the Schengen agreement in December 2008 on labour mobility. As vehicles are allowed to cross borders without stopping and residents in border areas are granted freedom to cross borders away from fixed checkpoints, we expect cross-border commuting to Switzerland to be higher after Switzerland joined the Schengen area. Using data from the European Labour Force Survey (ELFS), we estimate a Difference-in-Differences model and find that the individual probability to cross-border commute to Switzerland has increased from a minimum of 3.2 percentage points to a maximum of 7 percentage points, according to different model specifications. Our result is particularly important due the timely and meaningful policy implications.

Classificazione JEL: D04, J61, R10, R23

Keywords: Schengen Agreement, Labour Mobility, Commuting Costs, Policy Implementation

Contents

I. Introduction	3
II. Institutional background	6
II.A. The Schengen agreement	6
II.B. The case of Switzerland	8
III. Data and descriptive statistics	9
IV. Identification and empirical strategy	12
IV.A. Treated and control groups	12
IV.B. Empirical specification	14
V. Results	16
V.A. Freedom of movement or removal of border checks?	18
V.B. Robustness checks	19
V.B.i. Commuting to a bordering region	20
V.B.ii. Further evidence of the impact of the crisis	20
V.B.iii. Language barriers	21
VI. Conclusions and policy implications	21

I. Introduction

The free movement of goods, services, capital and people is the pillar of the European Union (EU) Single Market and can be considered one of the greatest achievements of the EU. By proposing the gradual abolition of border checks at the signatories' common borders and the harmonisation of visa policies, the Schengen Agreement is one of the most important measures adopted to promote internal mobility. The two arrangements are strictly related: the Schengen agreement represents an important complement to the Single Market, as it provides a tangible way to make the "four freedoms" set out in the Treaties a reality. The implementation of the Schengen agreement, together with the "four freedoms", provides a greater individual freedom and allows for a more efficient allocation of resources within the EU. By warranting the right for people to travel, study and work in another Member State, the free movement of EU citizens is believed to promote economic growth, and by allowing employers to recruit from a larger pool, it has a positive impact on labour market efficiency (European Commission, 2016b). Indeed, the Schengen area operates very much like a single state for international travel purposes with external border controls for travellers entering and exiting the area, and common visas, but with no internal border controls. The implementation of the Schengen agreement is particularly relevant for cross-border commuters. By allowing vehicles to cross borders without stopping and residents in border areas freedom to cross borders away from fixed checkpoints, the treaty made the cross-country inter-regional travels to work journey shorter and easier. According to a recent study (Centre for Future Studies, 2006), "Taking advantage of the removal of mobility and labour market barriers between European countries, EU citizens are increasingly living in one EU country, working in another, shuttling back and forth between the two".

Despite the benefits of Schengen being evident, the Schengen area is currently facing major challenges. The combination of an increasing number of asylum-seekers, growing migratory pressure, security concerns and a rather weak economic recovery has put the Schengen area under stress, and called into question its functioning. In particular, the significant increase in asylum seekers in several countries of the European Union has created a lot of tension. In response to the considerable influx of refugees into the EU in the past two years, and then across internal EU borders, a number of Member States have re-introduced temporary internal border controls at certain crossings. Even on a temporary basis, these border controls are already disrupting the flow of goods and services within the Single Market, with economic costs for business and citizens (Ademmer et al., 2015). Parallel to a clear, temporary, limited suspension of the Schengen Agreement, some parties have also discussed the possibility to permanently re-introduce border controls within the European Union, and therefore in practice to terminate the Schengen Agreement (Bertelsmann Foundation, 2016).

A number of studies (France Strategie, 2013, 2016; EPRS, 2016) have tried

to quantify the potential cost of the re-establishment of border controls within the Schengen area. They identify three major implications: first, border controls itself within the Schengen area have direct and immediate costs; second, by introducing significant obstacles to intra-European trade and barriers to free movement of people, goods and services, they undermine the general progress of the past 20 years; and third, they weaken the police and judicial cooperation on terrorism and organised crime. All this could result in an estimated loss of more than €100 billions for the EU economy. It is believed that after the impact on cross-border transport of goods, the second most important impact would be on commuting workers (France Strategie, 2016). There are currently 1.7 millions workers in the EU who cross a border every day to go to work and who would see their quality of life significantly affected. According to the European Commission, border controls would cost commuters, as well as other travelers, between €1.3 billions and €5.2 billions in terms of time lost (European Commission, 2016a). In addition, increased commuting time would reduce cross-border job opportunities: for France, for instance, it could mean the loss of 5,000 to 10,000 cross-border workers, which could account for an economic loss of €150-300 millions annually. More generally, such a decision would lead to greater disparities in regional job markets and certainly more uneven economic development (Bertelsmann Foundation, 2016).

Our objective in this paper is to contribute to this literature by quantifying the effect of Switzerland joining the Schengen area in December 2008 on cross-border commuting. We choose Switzerland for several reasons. First, Switzerland is one of the countries which implemented the Schengen agreement after the freedom of movement was already granted to all EU-15 and NAFTA citizens. Therefore, this setup allows us to disentangle the effect of the two policies and test whether the implementation of Schengen had an additional effect in promoting labour mobility with respect to the freedom of movement. Second, Switzerland is a country located in the centre of Europe, which shares borders with many European countries. The trend of individuals who commute towards Switzerland has been consistently increasing in the last ten years (Figure 1), making Switzerland one of the most chosen destinations for many of the commuters from the EU (European Commission, 2011). Due to data limitations, we confine our study to workers commuting from Italy and France, who together represent more than 75% of the total commuting population to Switzerland (Figure 1).

We quantify the effects of the abolition of Switzerland's regional borders on commuting by means of a Difference-in-Differences model. We envision commuters to react positively to lower barriers to cross-border traveling and therefore we expect to observe an increase in the cross-border commuting flows. After controlling for several individual and job characteristics and a number of regional features, in line with our expectations we find that the entrance of Switzerland in the Schengen area had a positive and significant effect on the individual probability to commute for work across borders. In particular, we find that the probability

of cross-border commuting is approximately 3.5% higher after the implementation of Schengen. This result is shown to be consistent to several alternative specifications and to a number of additional robustness tests. We also show that the effect is even stronger when we restrict our analysis to cross-border workers who commute towards a region which is geographically contiguous to the region of residence: for this category of workers the increase in the probability of cross-border commuting is approximately 6.8%.

This paper is closely related to the studies which evaluate whether country borders still represent an obstacle to the EU labour market integration. In a recent paper, Bloomfield et al. (2015) examine whether international regulatory harmonization increases cross-border labour migration. To study this question, they analyse EU initiatives that harmonized accounting and auditing standards. They find that due to this harmonization plan, international labour migration in the accounting profession has increased significantly compared to other professions. Niebuhr and Stiller (2004) provide evidence of a measurable spatial segmentation of labour markets between EU-15 countries along national borders. They show that on average, border regions in the EU are characterised by a lower degree of labour market integration with neighbouring regions than non-border areas due to significant border impediments that hamper equilibrating forces between labour markets on both sides of national frontiers. Bartz and Fuchs-Schündeln (2012) study the causes of the low labour market integration in Europe by testing whether the abolition of the border controls through the Schengen agreement and the introduction of the Euro currency have led to an improvement in cross-border integration. Their empirical investigation shows that neither of the two events had an effect in improving labour market integration, while language barriers seem to be the main impediment. The paper by Persyn and Torfs (2015) quantifies the effect of regional borders on commuting in Belgium. After controlling for differences in local economic conditions and multi-lateral resistance, the authors conclude that regional borders are a strong barrier to commuters and impose strong spatial imperfection in the labour market.

This paper also fits into the literature that with a Difference-in-Differences estimation strategy evaluates the effects of newly implemented policy interventions on cross-border commuting. In a recent paper, Dustmann et al. (2016) analyse the short-run impact of the opening of Germany's border to Czech cross-border workers in 1991. They find that the large inflow of these workers in municipalities close to the border had a negative effect on employment of natives and a moderate, negative effect on wages. By far, the paper that resembles the most our work is the one by Beerli and Peri (2016),¹ who investigate the labour market effects of implementing the free movement of labour in Switzerland, by looking specifically

¹Complementary to this study, the work by Bigotta et al. (2013) explores the short-term employment effects of the policy which implemented the free movement of labour for cross-border commuters in Switzerland. They find contrasting negative short-run effects on total employment and positive effects on average wages of native workers.

at the category of cross-border commuters. They use the same methodological approach to test for the gradual implementation of the policy which granted free movement of labour to cross-border commuters on labour supply in bordering regions. They analyse three phases of the implementation: a pre-phase before 1999, a first phase between 1999 and 2004 and a second phase between 2004 and 2010. They find no significant effect of the treatment in the first two periods and a strong positive effect on labour supply in phase two.² However, by considering in phase two a period of time between 2004 and 2010 they capture not only the implementation of the free movement of labour for cross-border commuters in border regions (in 2004) and of the full liberalization for all EU-15 and NAFTA workers in the whole country (in 2007), but also the implementation of the Schengen agreement (in December 2008). Therefore, it is not clear which are the specific drivers behind the observed increased flow of cross-border commuters to Switzerland. Using a different experimental design and alternative data sources, our paper complements their work by disentangling the effect of the implementation of the Schengen agreement from the implementation of the free movement of labour on the probability to cross-border commute. Combining our and their findings, we have a clear picture of which policies have been effective in increasing cross-border commuting to Switzerland. Specifically, the 2004 reform that implemented the freedom of movement in border regions for cross-border commuters had a positive and significant impact. As the great majority of cross-border commuters work in contiguous regions with respect to the region of residency, the 2007 reform which extended the freedom of movement to all Swiss regions and to all EU (and NAFTA) workers did not have a significant impact on the cross-border commuters flow. However, the implementation of the Schengen agreement, which allowed for the opening of the Swiss borders by removing border checks and strongly reducing the commuting time, significantly boosted the flow of cross-border commuters to Switzerland.

The rest of the paper is organized as follows. In the next section, we describe in detail the institutional background. Section 3 presents the data, while Section 4 discusses the empirical strategy. We show the main results in Section 5. Section 6 concludes the paper.

II. Institutional background

II.A. The Schengen agreement

A core part of the original Treaty of Rome was the free movement of people. Since the European Economic Community (EEC) was established, nationals of

²They also find that the presence of cross-border workers in Switzerland increased employment with no significant effect on their skill composition. This inflow had a positive effect on the wages of highly educated Swiss workers and no significant effect on the wages of other workers.

EEC member states could freely travel from one member state to another by showing their passports or national identity cards. However, systematic identity controls were still in place at the border between most member states, since the complete abolition of border controls within the Community was not supported unanimously by the members. In 1985 five of the ten member states - Belgium, France, Luxembourg, the Netherlands, and West Germany - signed an agreement on the gradual abolition of common border controls. The agreement was signed near the town of Schengen, Luxembourg, where the territories of France, Germany and Luxembourg meet.³

The Schengen Agreement was signed independently of the European Union, for two main reasons: first, there was no consensus among EU member states over whether or not the EU had the jurisdiction to abolish border controls, and second, due to the impatience of the countries in favour. The Agreement provided for the harmonization of visa policies, allowing residents in border areas the freedom to cross borders away from fixed checkpoints, the replacement of passport checks with visual surveillance of vehicles at reduced speed, and vehicle checks that allowed vehicles to cross borders without stopping.

In 1990, the Agreement was complemented by the Schengen Convention which proposed the abolition of internal border controls and a common visa policy. This Convention was at the basis of the Schengen area since it called for the complete abolition of border controls between Schengen member states, common rules on visas, and police and judicial cooperation. The Schengen Agreement and its implementing Convention were enacted in 1995 only for some signatories, but just over two years later during the Amsterdam Intergovernmental Conference, all European Union member states (except the United Kingdom and Ireland) had signed the Agreement. During those negotiations, which led to the Amsterdam Treaty, the incorporation of the Schengen *acquis*⁴ into the main body of European Union law was agreed along with opt-outs for Ireland and the United Kingdom, which were to remain outside of the Schengen area.

In December 1996 two non-EU member states, Norway and Iceland, signed an association agreement with the signatories of the Schengen Agreement to become

³Three of the signatories, Belgium, Luxembourg and the Netherlands, had already abolished common border controls as part of the Benelux Economic Union.

⁴Since the Schengen Agreement is part of the *acquis communautaire*, it has, for EU members, lost the status of a treaty, which could only be amended according to its terms. Instead, amendments are made according to the legislative procedure of the EU under EU treaties. Ratification by the former agreement signatory states is not required for altering or repealing some or all of the former Schengen *acquis*. Legal acts setting out the conditions for entry into the Schengen area are now made by majority vote in the EU's legislative bodies. New EU member states do not sign the Schengen Agreement as such, instead being bound to implement the Schengen rules as part of the pre-existing body of EU law, which every new entrant is required to accept. This situation means that non-EU Schengen member states have few formally binding options to influence the shaping and evolution of Schengen rules; their options are effectively reduced to agreeing or withdrawing from the agreement. However, consultations with affected countries are conducted prior to the adoption of particular new legislation.

part of the Schengen area. While this agreement never came into force, both countries did become part of the Schengen area after concluding similar agreements with the EU. In December 2008, Switzerland finalised its official entry to the Schengen area with the acceptance of an association agreement by popular referendum in 2005. Liechtenstein joined the Schengen area in 2011. De facto, the Schengen area also includes three European micro-states, i.e., Monaco, San Marino and the Vatican City that maintain open or semi-open borders with other Schengen member countries. The remaining four EU member states, i.e., Bulgaria, Croatia, Cyprus and Romania are obliged to join the Schengen area shortly.

Currently the Schengen area consists of 26 European countries covering a population of over 400 million people and an area of 4,312,099 square kilometres. Due to the ongoing migration crisis, a number of countries (Austria, Belgium, Denmark, France, Germany, Norway, and Sweden) have recently re-introduced controls on some or all of their borders with other Schengen states. Moreover, following the November 2015 Paris attacks and subsequent attacks in France, France declared a state of emergency including measures to control borders with other Schengen countries.

II.B. The case of Switzerland

In 1999 the European Union and Switzerland signed the Agreement on the Free Movement of Persons (AFMP). The AFMP had the objective of lifting the restrictions on EU citizens wishing to live or work in Switzerland. The right of free movement was complemented by the mutual recognition of professional qualifications, by the right to buy property, and by the coordination of social insurance systems. The liberalization was officially approved by a national referendum in 2000 and came into force for citizens of the "old" EU member states (EU-15) as well as for citizens of EFTA member states in 2002. This agreement represented an important step towards the free movement of workers in Switzerland, which came officially into place for the EU-15 citizens in 2007. The AFMP gradually removed all prior legal restrictions on hiring and employing of resident immigrants and cross-border commuters. However, the transition process towards full mobility differed for the two categories of workers (Ruffner and Siegenthaler, 2016). Before 1999, Swiss firms were only allowed to hire cross-border commuters if the "priority requirement" was satisfied, that is if no equally qualified resident worker could be found for a given job. In addition, cross-border commuters could only work in the border regions of Switzerland. The other type of immigrant workers were subject instead to annual national quotas set by the federal government on top satisfying the "priority requirement". Between 1999 and 2004, gradually cross-border commuters were allowed to commute to work weekly (instead of daily), their permits were no longer bound to a particular job and were valid for 5 years (instead of one year) and applicants for a new cross-border commuters permit were no longer required to have resided in the adjacent

border region of the neighbouring country for the previous six months. In 2004, the second phase of the reform was implemented and the labour market of border regions municipalities became fully open to cross-border commuters, even though they were not allowed to work in non border regions. Finally, on June 1, 2007, all regions adopted full liberalization for cross-border commuters as well as for resident immigrants from the EU and citizens of EFTA member states.

Meanwhile in 2005, by means of a national referendum Swiss citizens were asked to express their opinion about Switzerland signing the Schengen agreement. Swiss voters agreed, by a 55% majority, to join the Schengen area. It was on 27 November 2008, that the interior and justice ministers of European Union in Brussels announced Switzerland's accession to the Schengen passport-free zone from 12 December 2008. The land border checkpoints would have remained in place only for goods movements, but no controls could be ran on people. However, in practice, people entering the country, if they originated from a Schengen nation, had their passports checked until 29 March 2009 (Swiss Federal Department of Finance, 2016).

III. Data and descriptive statistics

In order to perform our analysis, we use data from the European Labour Force Survey (ELFS). The ELFS is conducted in the 28 Member States of the European Union plus Iceland, Norway and Switzerland since 1983 and in each year it is representative of the specific country population. The surveys are conducted by the national statistical institutes and are centrally processed by Eurostat, which releases harmonised data at European level. The survey provides demographic and socio-economic information at individual level, with specific focus on employment and job characteristics. Most importantly for the present study, by offering information on the place of residence (current and one year before) and the workplace, it is possible to reconstruct measures of mobility. In this paper commuting is defined based on place of residence at the time of the interview and working place at the time of the interview being located in two different NUTS2 regions. The NUTS (Nomenclature of Units for Territorial Statistics) is a geo-code standard for referencing the subdivisions of countries for statistical purposes. The standard is developed and regulated by the European Union, and thus only covers the member states of the EU plus Norway and Switzerland in detail. For each country, a hierarchy of three NUTS levels is established by Eurostat; the subdivisions in some levels do not necessarily correspond to administrative divisions within the country. We have information at NUTS2 level for Italy and France, which corresponds to the first-level administrative division of the country (regions); for Germany and Austria only information at NUTS1 level (macro-regions) is available. This is one of the reasons why we focus our analysis on France and Italy, which nevertheless provide the highest numbers of cross-border commuters to Switzerland. According to the Federal Statistical Office,

in 2013 among the 270,000 Europeans who commuted across the border to work in Switzerland, more than 75% travelled from France and Italy.⁵ An additional reason to exclude Austria and Germany is to avoid confounding effects as they also share the border with Slovakia, Hungary and Czech Republic which joined the Schengen area during the period of our analysis (in December 2007). For the same reason, we exclude the Italian region Friuli Venezia Giulia, as it shares the border with Slovenia, which joined the Schengen area in December 2007.

We complement this dataset with Eurostat, Cambridge Econometrics and OECD data at regional level. Specifically, we use data on unemployment and youth unemployment to construct measures of unemployment variations at regional level for the years 2005-2015 for specific sub-categories of individuals. Specifically, we compute per each region the percentage point changes in unemployment as the difference between the unemployment rate at time t and at time $t - 1$. Moreover, we use data on the share of employment by sector at regional level to capture the way the structure of regional economies has changed over time during different phases of the business cycle. In addition, we also take into consideration the quality of the infrastructures by including the length of roads (in kilometers) connecting two regions. To facilitate the interpretation of the coefficients, all these regional variables are constructed per each region as the ratio between the average value among regions within national borders and the average value among regions across the border.⁶

Finally, to account for the language barrier, which in the literature has been mentioned as a rather important deterrent to mobility in Europe, we also control for language differences. Specifically, in order to understand whether language borders between two languages which share the same roots are more permeable than borders between distinct languages, we take into consideration a measure of closeness of languages, using data from the lexicostatical analysis of Dyen et al. (1992). They compute the percentage of words that are cognate⁷ between

⁵The latest data from the Federal Statistical Office also show that the Lake Geneva region is the most popular part of the country for people who live abroad to commute for work in Switzerland. Some 34.8% of cross-border workers earn a living in the Lake Geneva region, 23.4% in North West Switzerland and 21.5% in canton Ticino. Although the Lake Geneva region had a higher number of cross-border workers in absolute numbers (99,900), adding up to 10.7% of the workforce in the area, in Ticino 26.2% of its labour force consists of foreigners who commute.

⁶Given that the probability of commuting is expected to decrease with the geographical distance between the region of origin and the region of destination, the average values are constructed as weighted averages with weights proportional to the inverse of the (squared) great circle distance between regional centroids. When we limit our sample to commuters for which the region of residency and the region of work are geographically contiguous, the averages are calculated using equal weights for all regions and excluding the regions which are not geographically contiguous.

⁷The translations of a word in two languages are “cognate” if within both languages they have an unbroken history of descent from a common ancestral form. If there are more than two translations for a word (as there often are), the highest degree of cognation judged between any

two languages, "the lexicostatistical percentage", and use it as a measure of the closeness of the two languages.

We focus on the period 2005-2015, during which the survey data collection has not changed neither over time nor across countries. Hence, we are able to avoid any issue of data comparability. Among all individuals living in France or Italy, we keep observations of individuals who live in regions, which share the border either with Switzerland or with a country belonging to the Schengen area.⁸ In addition, we focus our analysis on all individuals who commute for work between regions to keep our sample as homogeneous as possible. Our sample includes 83,432 individuals who commute for working reasons either internally or across borders.

Looking at our sample, we observe an increasing trend of individuals who commute cross-border. Specifically, as shown in Figure 2a, the total number of cross-border commuters went up from less than 2,000 individuals before 2009 to more than 3,000 individuals in the years after 2010. Moreover, when we confine our analysis looking at workers who commute towards Switzerland we observe a rather similar trend. These numbers are in line with the statistics provided by the Swiss Federal Statistics Office, which show that since 2009 the number of people crossing the border for work has risen remarkably leading up to the end of 2014 by 29.6%. They are concentrated in the energy and manufacturing as well as in the distribution, transportation and communication sectors (Figure 2b).

The literature on commuting shows evidence of self-selection of workers that are willing to commute, especially long-distance.⁹ Therefore, to keep our sample of observations as homogeneous as possible, we focus our study on cross-regional commuters, either internal or cross-border. We take advantage of the rich set of variables provided by the labour force survey at individual, household and job levels. Among the set of individual characteristics, we control for age, sex, education, marital status, head of household and the size of the household. In addition, we control for several job characteristics such as the full-time work schedule, the permanency of the job, tenure, sector of employment, firm size, type of occupation (high skilled and low-skilled white and blue collars) and the

of the translations is used.

⁸The list of regions includes: for Italy, ITC1, ITC2, ITC3, ITC4, ITH1, ITH3; for France, FR21, FR22, FR30, FR41, FR42, FR43, FR61, FR62, FR71, FR81, FR82.

⁹A large number of country studies finds that commuters within a country are more highly skilled than non-commuters (Parenti and Tealdi, 2017; Eliasson et al., 2003; van Ommeren et al., 1999; Rouwendal, 1999). Overall, commuters are significantly more often male than female, with the largest gender differences existing for internal commuters (Huber, 2011). Gottholmseder and Theurl (2007) finds that individuals with children who live with other cross-border commuters are less likely to become cross-border commuters themselves, while the probability to become a cross-border worker for women is much lower compared to men. Specifically for the case of Switzerland, the majority of commuters is employed on a permanent job in the manufacturing industry, even though the share of workers in the tertiary sector is currently growing (European Commission, 2009c).

employment status one year before.

In our sample (Table 1), more than 65% of workers are men and married. In more than 55% of cases the individuals are head of household, in a family of three components. More than 40% of the individuals belong to the 35 to 49 age group and have a secondary level of education. Almost 90% work full-time and have a permanent contract, and almost 50% are hired as high-skilled white-collars in a large firm with more than 50 employees either in the energy and manufacturing sector or in the distribution, transportation and communication sector. The great majority of workers was employed one year before.

IV. Identification and empirical strategy

IV.A. Treated and control groups

To perform our analysis, we identify a treated group, which has been directly affected by Switzerland joining the Schengen area and a control group, for which the implementation of the Schengen agreement in Switzerland has been irrelevant. According to our strategy, the treated group includes inter-regional commuters who live in the regions of Italy and France which share the border with Switzerland, as shown in Figure 3.¹⁰ The control group is made by inter-regional commuters who live in regions, which share the border with a Schengen country, but not with Switzerland.¹¹ Any impact of Switzerland entering the Schengen area should therefore have an impact on the first group, while leaving the second group unaffected.

The key assumption for any Difference-in-Differences strategy is that the outcome in treated and control groups would follow the same time trend in the absence of the treatment. This means that the average change in the control group represents the counter-factual change in the treated group if there were no treatment. Although there is no formal procedure to test the validity of this assumption, we provide some encouraging evidence in support of it. We report in Figure 4 both the absolute number of cross-border commuters in treated and control regions and the percentage of cross-border commuters on the total number of commuters in treated and control regions. Remarkably, we observe that in the years before the entrance of Switzerland in Schengen (December 2008), even though the absolute number and the percentage of cross-border commuters were higher in treated regions, the trend was similar across the two groups, reassuring us on the validity of the Difference-in-Differences identifying assumption.

A potential factor which may have boosted the flow of cross-border commuters to Switzerland is the great recession which began with the subprime mortgage

¹⁰The treated group includes the following regions: FR42, FR43, FR71, ITC1, ITC2, ITC4, ITH1.

¹¹The control group includes the following regions: FR21, FR22, FR30, FR41, FR61, FR62, FR81, FR82, ITC3, ITH3.

market crisis in the USA in 2007 and was followed by a global economic downturn, which had its greatest repercussions on the European economies in 2009 (European Commission, 2009a). As the change in economic conditions may have affected individual mobility decisions, we provide supportive empirical evidence to rule out the hypothesis that the crisis played a major role in determining the observed increase in cross-border commuting to Switzerland.

The economic and financial crisis which asymmetrically hit European countries would have had a major impact on cross-border commuting if we would observe a different trend in unemployment in treated and control regions before or at the same time as the implementation of Schengen. We focus on unemployment since previous studies (Scott et al., 2008; Reinhart and Rogoff, 2009) have shown that financial crises have a much stronger impact on unemployment than other economic recessions. Moreover, as the sensitivity to business cycle is found to be twice as high for young workers below the age of 24 than for older workers (Brian and Patrick, 2010, Jimeno and Rodríguez-Palenzuela, 2003), we document also the trend of youth unemployment. Young workers are in fact the ones who are affected the most by the crisis and its impact on youth unemployment usually persists for a longer time, even after recovery (Parodi et al., 2012).

We compare the trend of the total unemployment rate (Figure 5a) and the youth unemployment rate (Figure 5b) in treated and control regions. We observe that both indicators are higher in control regions compared to treated regions, as reported also in the descriptive statistics (Table 1). However, during the entire period of observation, both rates of unemployment show trends which are parallel for the two groups, confirming our hypothesis that the patterns of unemployment in treated and control regions are similar. As additional evidence, we also compute the percentage point changes in the total unemployment rate and the youth unemployment rate in treated and control regions, as the annual change in these two indicators might have had a stronger impact on the individual commuting decision. Results are reported in Figures 5c and 5d. We notice that during the entire period of observation, both indicators show similar values and trends in treated and control regions, ruling out the hypothesis that the crisis had a major impact on our results. The evidence provided above is in line with the findings of the European Commission (2009a), which shows that the 2009 economic downturn did not systematically hit poorer or richer countries, but had a strong asymmetric impact across European regions (Dijkstra et al., 2015, Groot et al., 2011 and Davies, 2011). In particular, Davies (2011) shows that the features of the most resilient¹² regions in Italy and France are rather different. While in Italy the least resilient regions were the ones with higher GDP per capita and lower unemployment rates, in France regions with lower GDP and not high unemployment were the least resilient. Moreover, regions with high employment

¹²Resilience is defined both as the capacity of a regional economy to withstand change or to retain its core functions despite external upheaval and as the ability of a region to remain on or return to a long run developmental path in the face of an external shock.

shares in construction had poor resilience in France, but the strongest resilience in Italy. Since in our sample both the treated and control groups include a mix of Italian and French regions, it is not surprising to observe no systematic trend in unemployment.¹³

In addition, there is plenty of evidence in the literature (Verick, 2009; Groot et al., 2011; European Commission, 2009b), which documents that the great recession has affected specific sectors, such as construction, manufacturing, real estate and financial services, while other sectors such as non-market services, agriculture and mining have instead experienced little or no contraction at all. The large variations of employment across sectors and regions confirm the asymmetric character of the crisis. However, when we look at trends of employment across sectors by country (Figure 6), we notice that the Spanish economy is the one which has been affected the most, while other countries of interest for the present studies, such as Switzerland, France and Italy do not show significant drops in employment in the year of the crisis. Moreover, when we plot the employment by sector in treated and control regions Figure 7, we observe similar trends across the two groups, ruling out the hypothesis that the asymmetric nature of the crisis had a major impact on our results.

This evidence reassures us that the crisis is not a major factor behind the increased flow of cross-border commuting to Switzerland and the effect that we are estimating is ascribable to the implementation of the Schengen agreement. Nevertheless, we will control for unemployment differentials and regional employment by sector when estimating our model.

IV.B. Empirical specification

Our objective in this paper is to estimate the effect of Switzerland entering the Schengen area on the individual probability to commute cross-border at regional level. As described in Section II., the official date of entry of Switzerland in the Schengen area is December 2008, however people travelling from a Schengen country to Switzerland had their passports checked when crossing the border until the end of March 2009 (Swiss Federal Department of Finance, 2016). Moreover, since it is plausible to think that people take time to adjust to a new situation (Lucas and Prescott, 1974), particularly when the decision involves several steps such as quitting the current job, looking for another job in a foreign country, and getting a new job, we consider 2010 as the year of the treatment.

The enlargement of the Schengen area to Switzerland represents an exogenous event which we exploit within a Difference-in-Differences framework. The key

¹³In the specific case of the Swiss-Italian border regions, Baruffini (2011) shows that the trend in unemployment in Ticino (CH07) has been not so different from the trends in unemployment in Northern Italian regions until the third quarter of 2008; moreover, after the first quarter of 2009, the unemployment rates in the Italian regions of Piedmont (ITH1) and Lombardy (ITH4) show a decline, while the unemployment rate in Ticino (CH07) has remained stable.

aspect of this setting is that by identifying the treated group as those commuters who reside in regions sharing the border with Switzerland, the control group, which includes those commuters who reside in regions sharing the border with a Schengen country, but not Switzerland, is never observed to be exposed to the treatment. As a consequence, the possibility that a misclassification affects our sample split is ruled out.

We pool together data before and after the entrance of Switzerland in the Schengen area¹⁴ and we estimate the following equation:

$$P(\text{CB-Commuting} = 1|X)_{i,r,t} = \alpha + \beta \text{Treatment}_{i,r} + \gamma \text{Treated}_t + \delta \text{Treatment}_{i,r} \times \text{Treated}_t + \lambda X_{i,r,t} + \epsilon_{i,r,t} \quad (1)$$

where i identifies the individual, r the region of residence and t the time. We estimate Equation 1 using as outcome the probability to cross-border commute, which takes value one if the individual commutes towards a foreign country (cross-border) and value zero if the individual commutes across regions within national borders. *Treatment* is a dummy variable equal to zero for the years before Switzerland joined the Schengen area (2005-2009) and equal to one for the years after (2010-2015). *Treated* is the dummy variable which identifies the treated group, and takes value one for those individuals who reside in a treated region, i.e., a region sharing the border with Switzerland, and value zero for those individuals living in a control region, i.e., a region sharing the border with a country in the Schengen area. The matrix $X_{i,r,t}$ includes a set of individual and job characteristics which may affect the individual probability to cross-border commute. It also includes regional fixed effects and regional time-varying characteristics to capture region-specific economic trend which may affect the dependent variable. $\epsilon_{i,r,t}$ is the individual iid error term.

We run this equation by using ordinary least squares, so the estimated coefficients are readily interpretable as marginal effects. The coefficient β measures the difference in the probability of cross-border commuting after Switzerland joined the Schengen area for both groups. The coefficient γ measures the difference in the probability of cross-border commuting between treated and control groups. The parameter of interest is δ that captures the differential effect of the entrance of Switzerland in the Schengen area on the individual probability to commute cross-border between treated and control groups. A positive δ reflects a higher probability of cross-border commuting from Italy and France to work in Switzerland due to its entrance in the Schengen area, after having controlled for individual and job characteristics (i.e., individual-specific propensity to cross-border commute) as well as regional differential in macro-economic variables.

¹⁴For reasons of confidentiality the identification code of the individual/household is not released. Hence, it is not possible to follow the individuals over time and only 11 cross-sections of data from 2005 to 2015 are considered.

Conversely, a value of δ equal to zero indicates that the entrance of Switzerland into the Schengen area did not have any significant effect on the probability to commute cross-border.

Since we include in our model individual variables as well as variables aggregated at regional level, both constant and time-varying, the failure to account for the presence of common group errors can lead to estimated standard errors that are seriously downward biased (Moulton, 1990). We therefore compute region-year clustered standard errors.

V. Results

Results of our estimations are reported in Table 2. In the first column, we report the baseline specification, where we control for country fixed effects. We find no significant effect associated with our variable of interest. In the second column, we replace country fixed effects with regional fixed effects and we observe that our coefficient of interest is positive and significant. Specifically, in line with the evidence of Figure 4, we find that the probability to commute cross-border to Switzerland is approximately 3.6% higher for individuals who reside in regions which share the border with Switzerland, after the country joined the Schengen area. It is interesting to notice that by introducing regional fixed effects we are able to explain a much bigger share of the variation of our dependent variable, as shown by the much higher R-squared (17% compared to 39%).

In order to control for time-variant region-specific characteristics, we include in our specification unemployment differentials (either total or youth) as well as an index of the quality of the road infrastructure. Results are shown in columns 3 and 4 of Table 2. The coefficient of interest is still positive and significant across all specifications, and maintains the same magnitude. Moreover, we observe that while the total unemployment differential is not significantly different from zero, the youth unemployment differential, when interacted with the 15-24 age group dummy, as expected, has a positive and significant effect on the probability to cross-border commute. That is, the higher the average rate of youth unemployment in the regions within the same country relative to the regions in a foreign country, the higher the likelihood for young individuals to commute across the border. Hence, younger individuals seem to be the category of workers who is more responsive to unemployment differentials across regions.

The variable which captures the quality of the infrastructure is expected to be negative as the better the road network in the national neighboring regions compared to the foreign neighboring regions, the lower the probability to commute cross-border. The coefficient turns out to have the expected sign, but it is not significantly different from zero. In column 5 of Table 2, we control for the regional employment share by sector and we interact these variables with the corresponding individual sector dummy variables. By including these controls, we aim at capturing the changes in the share of regional employment across sectors

due to the business cycle. Specifically, we want to capture the asymmetric impact of the great recession on European regions across economic sectors. As expected, we find that the regional employment shares in agriculture, construction, manufacturing, mining and energy and finance have a negative and significant effect on cross-border commuting, that is, whenever the share of employment in that specific sector is higher in national regions compared to foreign regions, cross-border commuting to foreign regions is lower. Nevertheless, the coefficient of interest is still positive and significantly different from zero.

Finally, in our last specification, we also control for the language barrier by including a measure of the closeness of language across regions. The variable turns out to be negative and significant, while leaving the coefficient of interest almost unaffected. The negative sign is driven by the fact that inter-regional commuting within the same country is always associated with the highest value of the closeness of language (100), while cross-border commuting is on average associated with a lower value. A robustness test related to language differences is carried out in Section V.B.iii..

The robustness of our estimations across all specifications reassures us about the goodness of the model specification and the validity of our results.

In terms of individual characteristics, surprisingly we find that female workers are more likely to commute across border rather than internally, as well as head of households. Being married or single does not affect the decision to commute cross-border, even though the household size has a negative impact. This result is in line with the findings of Gottholmseder and Theurl (2007), who claim that the presence of children increases the opportunity costs of being away from home since individuals might prefer to spend more time together with the children. We also find that young workers in the cohorts 25-34 and 35-49 are more likely to commute to a Schengen country compared to older workers. Gottholmseder and Theurl (2007) show that the age distribution for cross-border workers has a significant peak at about 40 years. They explain this evidence as individuals first finish education in their country of residence and become cross-border commuters afterwards. When they get older, they stop commuting cross-border due to the increased necessity to utilize health care services and the preference to consume them in the home country. Interestingly, tertiary educated workers commute less across borders compared to primary and secondary educated individuals, in line with the descriptive statistics of cross-border commuters to Switzerland as provided by Beerli and Peri (2016).

In terms of job characteristics, full-time workers commute less cross-border than part-time workers. We explain this result as part-time workers are more likely to be female and young, all characteristics associated with higher probability to commute cross-border. We also find that the longer the tenure within the job, the lower the probability to commute cross-border. In fact, workers with longer job tenure are less mobile as they are less likely to change jobs due to the accumulated sector-specific and firm-specific human capital. The reduced job

mobility is also explained by their proximity to retirement, which makes a job change rather costly (van Ham et al., 2001). Surprisingly, permanent employees commute more across the border than temporary employees. In terms of occupation, blue collars are the ones who are more likely to commute to a foreign country, particularly if high-skilled, in line with the descriptive statistics of Beerli and Peri (2016). Employees of small firms (between 11 and 19 employees) or very large firms (more than 50 employees) commute more cross-border compared to employees of medium-size firms (20-50 employees) or very small firms (below 11 employees). This can be explained by the fact that larger firms are able to recruit from a larger territory and may afford to subsidize more commuting compared to smaller firms (Paci et al., 2007). Finally, we find that those individuals who were already employed one year before have higher chances to commute cross-border, in support of our hypothesis that being unemployed as a result of the crisis did not increase the probability of becoming a cross-border commuter.

Finally, to understand whether there is a chance that the increase in the cross-border commuting flow was contemporaneous to the entrance of Switzerland in the Schengen area, we estimate the same regression as described in Equation 1 by considering the year 2009 as the year of the treatment. Results are reported in Table 3. We observe that in most specifications the coefficient of interest is positive and significant, however the results are much weaker compared to our main specification and the magnitude of the coefficients is definitely smaller (approximately 2.5%). These findings confirm our hypothesis that individuals react with some delay to new events, specifically when the process involves a job reallocation (Lucas and Prescott, 1974).

V.A. Freedom of movement or removal of border checks?

Our main result about the positive and significant impact of the implementation of the Schengen agreement on cross-border commuting to Switzerland is in line with the findings of Beerli and Peri (2016). They indeed show that after 2004, year in which the freedom of movement for cross-border commuters to Swiss border regions was implemented, and specifically in the period 2004-2010, cross-border commuting has significantly increased. However, as they are pulling together many years of observations, they are not able to disentangle the effect of the 2004 reform, from the effect of the 2007 reform, which extended the freedom of movement to all EU-15 and NAFTA workers and to all Swiss regions, from the effect of the Schengen implementation. As we show that in 2009 the effect of Schengen was rather small and the main impact started from 2010, the positive result of Beerli and Peri (2016) may be partially due to Schengen and partially due to previous policies. With data availability from 2005,¹⁵ we can test

¹⁵ELFS data before 2005 are available, but since the rotation scheme used to collect the data has changed between 2004 and 2005 for a large number of countries, data are not fully comparable across time.

whether the 2007 reform had an impact on cross-border commuting to Switzerland. Hence, we re-estimate Equation 1 using 2007 as the treatment year. This test has a double purpose: first, it is going to reveal whether the extension of the freedom of work to the whole country and to all EU citizens had an impact on the decision of workers to commute cross-border. In addition, it serves also as a placebo test, to rule out the presence of heterogeneous trends between treatment and control regions before the date of the implementation of the Schengen agreement. Results are shown in Table 5. Across all our specifications, we observe no significant effect of our coefficient of interest on cross-border commuting.

As the implementation of the 2007 reform may have been internalized by workers with some delay, we also run the regression using a false implementation date in 2008, which is one year after the implementation of the freedom of movement and one year earlier than the implementation of the Schengen agreement. Table 6 shows that across all specifications the variable of interest is never significantly different from zero.

These results rule out the presence of different trends between treatment and control regions, confirming our hypothesis of the implementation of Schengen being an independent random event. In addition, when we combine these findings with the findings of Beerli and Peri (2016), we have a clear picture of the policies which were effective in increasing the flow of commuters across the border. Both the reform implemented in 2004, which introduced full freedom of work for cross-border commuters in border regions, and the border openings due to the Schengen implementation increased the flow of cross-border commuters to Switzerland, by creating incentives and reducing the costs of commuting. However, as the great majority of cross-border commuters work in border regions, the extension of the freedom of movement to non-border regions and to all EU citizens in 2007 did not have a significant impact.

We interpret this result in support of our hypothesis that the free movement of labour and the opening of the borders are two complementary policies, that are effective particularly when they are used simultaneously. In fact, the opening of the borders promoted by the Schengen agreement represents the concrete implementation of the freedom of movements which are at the basis of the Single Market.

V.B. Robustness checks

In order to test for the robustness of our results, we carry out several tests. First, we utilize a stricter definition of cross-border commuting, and keep only the observations of those individuals who commute for work in a foreign bordering region (and not in any region of a bordering foreign country). Second, we provide additional evidence on the effect of the crisis in further boosting the flow of cross-border commuting to Switzerland. Finally, we perform an additional regression to dig further into the issue of the language as a potential barrier to cross-border

commuting.

V.B.i. Commuting to a bordering region

As there is evidence Beerli and Peri (2016) that the majority of cross-border commuting is towards contiguous regions, we consider a stricter definition of cross-border commuting. We exclude from our sample all those individuals who commute cross-border towards a region which does not share the border with the region of residence. Our sample is down to 52,693 individuals and results are reported in Table 4. We find that across all specifications our coefficient of interest is positive and significant. Moreover, the magnitude of the coefficient is stable and significantly higher compared to the coefficient estimated for the larger sample, which includes also commuters towards non-contiguous regions. Specifically, we find that the probability to commute cross-border to Switzerland is approximately 6.8% higher for individuals who reside in regions which share the border with Switzerland, after the country joined the Schengen area. In terms of regional features, the unemployment differentials (either total or youth) do not play any role in affecting the commuting decision, however, the quality of the infrastructure is always negative and significant, as expected. In line with our expectations, the variables associated to regional employment in mining, energy and manufacturing and construction are negative and significant. Finally, the closeness of languages is significantly different from zero and keeps the same negative sign.

V.B.ii. Further evidence of the impact of the crisis

We have already provided substantial evidence in favour of our argument that the positive effect we estimate on cross-border commuting is mainly due to the implementation of the Schengen agreement in Switzerland in December 2008 and not to the economic crisis which hit Europe in the period 2009-2010. To shed additional light on this issue and to disentangle the effect of the crisis from the effect of the abolition of border controls, we split our sample according to sectors which have been either severely affected or not affected by the crisis (Verick, 2009; Groot et al., 2011; European Commission, 2009b). The difference in the magnitude of the coefficients of interest estimated using the two sub-samples should therefore quantify the effect of the crisis. On the other hand, the coefficient estimated using the sub-sample of sectors not affected by the crisis should inform us on the net effect of the Schengen implementation purified by the effect of the crisis. The results of our regressions on the subsamples of sectors not affected and strongly hit by the crisis are reported in Tables 7 and 8, respectively. We observe that across all specifications and across the two sub-samples, the coefficient of interest is always positive and significant. When we compare the magnitude of the coefficients across the two sub-samples, the numbers are higher in the subsample of sectors hit by the crisis, as expected. Specifically, on average, the

effect on cross-border commuting estimated using the subsample of sectors hit by the crisis is approximately 6%, while for the subsample of sectors not affected by the crisis is approximately 3%. Hence, we can conclude that the abolition of the border checks by itself had the effect of increasing cross-border commuting by approximately 3 percentage points. The economic crisis had the effect of boosting the share of cross-border commuters by additional 3 percentage points. Nevertheless, it is natural to think that the absence of border checks represented an important incentive for individuals to turn into cross-border commuters as a consequence of the crisis and they would have not necessarily chosen to do so if the controls at the frontier were still in place.

V.B.iii. Language barriers

In the literature, often the low cross-border mobility rates within Europe are explained by the language barrier. In this paper, we study the cross-border commuting phenomenon to Switzerland, a country where several (official) languages are spoken and where in the cantons contiguous to other countries the same language of the foreign contiguous country is spoken. Nevertheless, we estimate an additional specification of our model, in which we include a dummy which takes the value one if the same language is spoken in the region of work and in the region of residency. Otherwise, it takes value zero. Our findings (Table 9) are consistent with our previous results, as our coefficient of interest is positive and significant. Specifically, we find that the probability to commute cross-border to Switzerland is approximately 3.1% higher for individuals who reside in regions which share the border with Switzerland, after the country joined the Schengen area.

VI. Conclusions and policy implications

In this paper we study the effects of Switzerland implementing the Schengen agreement in December 2008 on cross-border commuting. By allowing residents in border areas freedom to cross borders away from fixed checkpoints, we expect the flow of cross-border commuters to be larger between countries belonging to the Schengen area. We use data from the European Labour Force Survey (ELFS) to estimate a Difference-in-Differences model in which the probability to cross-border commute is regressed on a number of individual, job and regional variables.

We find that the effect of Switzerland joining the Schengen area has a significant positive effect on cross-border commuting. Indeed, after the Schengen implementation, the individual probability to commute cross-border has increased by more than 3% for individuals who live in regions, which share the border with Switzerland. Several robustness checks confirm our findings. Interestingly, when we restrict our sample to those workers who commute for work in a region which is contiguous to the region of residency, we find that the effect is larger and

approximately equal to 7%.

Since the great recession hit asymmetrically European regions and affected specific sectors more than others, we disentangle the effect of the crisis from the effect of the abolition of border checks, by splitting the sample in two subsamples according to sectors. We confirm our finding that the implementation of the Schengen agreement (purified by the effect of the crisis) had the effect of increasing cross-border commuting to Switzerland by approximately 3%. In sectors strongly affected by the crisis, the effect is double and approximately equal to 6%. Nevertheless, we claim that the decision of workers to move their workplace to Switzerland as a consequence of the economic downturn was also due to the easiness of commuting cross-border without the need to stop at the frontier for border checks.

This result is very important for several reasons. First, it represents a meaningful contribution, as the effect of the implementation of Schengen has been so far neglected in the literature. Second, it provides evidence that labour mobility is an important equilibrating mechanism in the labour market, with the potential of reducing disparities in regional labour market outcomes, such as employment and unemployment (Blanchard and Katz, 1992; Decressin and Fatas, 1995). Therefore, inter-regional labour mobility can bring to an efficient spatial allocation of labour and consequently to welfare gains, particularly in areas with marked differences in regional labour market performance, as it is the case of Europe. Third, when combined with the recent findings of Beerli and Peri (2016), it sheds some light on the cross-border commuting phenomenon for the case of Switzerland. In line with the results of Beerli and Peri (2016), it provides evidence that the vast majority of cross-border commuters work in regions which are contiguous to the region of residence and therefore policies which directly affect cross-border labour mobility to border regions are the most effective in increasing cross-border commuting. Specifically, it supports the hypothesis that both the implementation of the free movement of labour for cross-border workers in border regions, implemented in Switzerland in 2004, and the opening of the borders through the implementation of Schengen were effective policies to increase cross-border commuting. Hence, it confirms the idea that the free movement of labour and the border openings are two fundamental arrangements, which are particularly effective when implemented together. In fact, they are perfect complements as the concepts of "free movements" outlined in the EU Treaties find a practical implementation in the border openings. Finally, this result is relevant for the noteworthy associated policy implications.

First, commuting appears to be more responsive than migration to cross-regional differences in labour market indicators (Erbenova, 1995). This is because a significant and stable positive relation emerges at individual level between being inactive or unemployed in one country or region and commuting in the following. Thus, commuting appears to have a higher potential as a means of facilitating transitions out of joblessness. Policy actions which aim at encouraging commuting

have therefore the potential to effectively address the issue of regional disparities, especially in European countries, where such disparities are rather large.

Second, there is evidence in the literature that the effect of labour mobility on the wages of native workers is on average close to zero (Peri, 2014). Even when considering workers with different skills levels, often it is found a positive effect on the wages of natives with different skills level through the complementarity channel, and no or small negative effects on the wages of natives with the same skills level (Dustmann et al., 2013; Manacorda et al., 2012; Ottaviano and Peri, 2012). Specifically for the case of Switzerland, Beerli and Peri (2016) show that the increase in cross-border commuters had a significant positive impact on wages of highly educated natives, potentially due to skills complementarities, and a positive effect on employment and hours worked by less educated natives, potentially due to the expansion of local firms. Hence, contrary to popular beliefs, from a policy perspective, measures to increase commuting could potentially improve job opportunities for commuters, while increasing the wage level of natives.

As part of our research agenda we plan to extend this study to other countries to learn more about the response of labour mobility to European policies.

References

- Ademmer, E., T. Barsbai, M. Lucke, and T. Stohr (2015). *30 Years of Schengen: Internal Blessing, External Curse?* Kiel Institute for the World Economy.
- Bartz, K. and N. Fuchs-Schündeln (2012). The role of borders, languages, and currencies as obstacles to labor market integration. *European Economic Review* 56(6), 1148–1163.
- Baruffini, M. (2011). Cross-border commuting in the Swiss-Italian region; labour market effects of progressive integration. *Measuring Geographical Mobility in Regional Labour Market Monitoring: State of the Art and Perspectives*, Munich: Rainer Hampp.
- Beerli, A. and G. Peri (2016). The labor market effects of opening the border: Evidence from Switzerland. *Mimeo*.
- Bertelsmann Foundation (2016). *Departure from the Schengen Agreement*.
- Bigotta, M., G. Oscar, and F. B. Losa (2013). Free movement of people: joy or sorrow? Post-Print halshs-01182924, HAL.
- Blanchard, O. and L. Katz (1992). Regional evolutions. *Brookings Papers on Economic Activity* 1992(1), 1–75.

- Bloomfield, M. J., U. Brüggemann, H. B. Christensen, and C. Leuz (2015). The effect of regulatory harmonization on cross-border labor migration: Evidence from the accounting profession. *NBER Working Paper No. 20888*.
- Brian, K. and L. Patrick (2010). *OECD Insights From Crisis to Recovery The Causes, Course and Consequences of the Great Recession: The Causes, Course and Consequences of the Great Recession*. OECD Publishing.
- Centre for Future Studies (2006). *Social Demographics in 2016*. Kent University Press.
- Davies, S. (2011). Regional resilience in the 2008-2010 downturn: Comparative evidence from European countries. *Cambridge Journal of Regions, Economy and Society*, rsr019.
- Decressin, J. and A. Fatas (1995). Regional labor market dynamics in Europe. *European Economic Review* 39(9), 1627–1655.
- Dijkstra, L., E. Garcilazo, and P. McCann (2015). The effects of the global financial crisis on European regions and cities. *Journal of Economic Geography* 15(5), 935–949.
- Dustmann, C., T. Frattini, and I. P. Preston (2013). The effect of immigration along the distribution of wages. *The Review of Economic Studies* 80(1), 145.
- Dustmann, C., U. Schönberg, and J. Stuhler (2016). Labor supply shocks, native wages, and the adjustment of local employment. *The Quarterly Journal of Economics*, qjw032.
- Dyen, I., J. Kruskal, and P. Black (1992). An Indoeuropean classification: a lexicostatical experiment. *Transactions of the American Philosophical Society* 82, 1–132.
- Eliasson, K., U. Lindgren, and W. Olle (2003). Geographical labour mobility: Migration or commuting? *Regional Studies* 37(8), 827–837.
- EPRS (2016). *The Cost of Non-Schengen: the Impact of Border Controls within Schengen on the Single Market*. European Parliamentary Research Service.
- Erbenova, M. (1995). Regional labour mobility, wages and unemployment in the Czech republic. *Prague Economic Papers* 6(1).
- European Commission (2009a). Economic crisis in Europe: Causes, consequences and responses. Technical report.
- European Commission (2009b). Economic crisis in europe: Causes, consequences and responses. Technical report.

- European Commission (2009c). Scientific report on the mobility of cross-border workers within the EU-27/EEA/EFTA countries. Technical report.
- European Commission (2011). *Mobility in Europe 2011*. European Commission.
- European Commission (2016a). *Back to Schengen - A Roadmap*.
- European Commission (2016b). *Schengen Area: Update and State of Play*.
- France Strategie (2013). *L'Evaluation Socioeconomique des Investissements Publics*.
- France Strategie (2016). *The Economic Cost of Rolling Back Schengen*.
- Gottholmseder, G. and E. Theurl (2007). Determinants of cross-border commuting: Do cross-border commuters within the household matter? *Journal of Borderlands Studies* 22(2), 97–112.
- Groot, S. P., J. L. Möhlmann, J. Garretsen, and H. L. de Groot (2011). The crisis sensitivity of European countries and regions: Stylized facts and spatial heterogeneity. *Cambridge Journal of Regions, Economy and Society* 4(3), 437–456.
- Huber, P. (2011). The self-selection of commuters. Technical report, University of Salzburg.
- Jimeno, J. F. and D. Rodríguez-Palenzuela (2003). Youth unemployment in the OECD: Demographic shifts, labour market institutions and macroeconomic shocks. Technical report, European Network of Economic Policy Research Institute, Brussels.
- Lucas, R. E. and E. C. Prescott (1974). Equilibrium search and unemployment. *Journal of Economic Theory* 7(2), 188 – 209.
- Manacorda, M., A. Manning, and J. Wadsworth (2012). The impact of immigration on the structure of wages: Theory and evidence from Britain. *Journal of the European Economic Association* 10(1), 120–151.
- Moulton, B. R. (1990). An illustration of a pitfall in estimating the effects of aggregate variables on micro units. *The review of Economics and Statistics*, 334–338.
- Niebuhr, A. and S. Stiller (2004). Integration and labour markets in European border regions. *HWWA Discussion Paper No. 284*.
- Ottaviano, G. I. P. and G. Peri (2012). Rethinking the effect of immigration on wages. *Journal of the European Economic Association* 10(1), 152–197.

- Paci, P., M. Tiongson, Erwin R. and Walewski, J. Liwinski, and M. M. Stoilkova (2007). *Internal Labor Mobility in Central Europe and the Baltic Region*. World Bank Publications.
- Parenti, A. and C. Tealdi (2017). The role of job uncertainty in inter-regional commuting: the case of Italy. *Mimeo*.
- Parodi, G., F. Pastore, M. Tanveer Choudhry, E. Marelli, and M. Signorelli (2012). Youth unemployment rate and impact of financial crises. *International journal of manpower* 33(1), 76–95.
- Peri, G. (2014). Do immigrant workers depress the wages of native workers? *IZA World of Labor* 42.
- Persyn, D. and W. Torfs (2015). A gravity equation for commuting with an application to estimating regional border effects in Belgium. *Journal of Economic Geography*, 1–21.
- Reinhart, C. M. and K. S. Rogoff (2009). The aftermath of financial crises. *The American Economic Review* 99(2), 466.
- Rouwendal, J. (1999). Spatial job search and commuting distances. *Regional Science and Urban Economics* 29(4), 491 – 517.
- Ruffner, J. and M. Siegenthaler (2016). From labor to cash flow? The impact of abolishing all immigration restrictions for EU workers on Swiss firms. *KOF Working Papers, No. 424*.
- Scott, A., S. Barnett, M. De Broeck, A. Ivanova, D. Kim, M. Kumhof, D. Laxton, D. Leigh, S. J. Stehn, and S. Symansky (2008). World economic outlook: Financial stress, downturns, and recoveries. *International Monetary Fund*.
- Swiss Federal Department of Finance (2016). Welcome to "Schengen-land". Technical report, The Swiss Federal Council.
- van Ham, M., C. H. Mulder, and P. Hooimeijer (2001). Spatial flexibility in job mobility: macrolevel opportunities and microlevel restrictions. *Environment and Planning a* 33(5), 921–940.
- van Ommeren, J., P. Rietveld, and P. Nijkamp (1999). Job moving, residential moving, and commuting: A search perspective. *Journal of Urban Economics* 46(2), 230 – 253.
- Verick, S. (2009). Who is hit hardest during a financial crisis? the vulnerability of young men and women to unemployment in an economic downturn. *IZA Discussion Paper No. 4359*.

	Treated		Control		All	
	mean	s.d.	mean	s.d.	mean	s.d.
Female	0.341	0.474	0.347	0.476	0.345	0.475
Single	0.366	0.482	0.399	0.490	0.384	0.486
Head of household	0.560	0.496	0.572	0.495	0.567	0.496
Household size	3.030	1.238	3.039	1.295	3.035	1.269
Age 16-24	0.071	0.256	0.082	0.275	0.077	0.267
Age 25-34	0.232	0.422	0.231	0.421	0.231	0.422
Age 35-49	0.447	0.497	0.448	0.497	0.447	0.497
Age 50-64	0.250	0.433	0.240	0.427	0.244	0.430
Primary education	0.238	0.426	0.216	0.411	0.226	0.418
Secondary education	0.466	0.499	0.446	0.497	0.455	0.498
Tertiary education	0.296	0.456	0.338	0.473	0.319	0.466
Full-time	0.874	0.332	0.875	0.331	0.874	0.332
Tenure	116.056	115.273	121.638	118.374	119.087	117.000
Permanent job	0.875	0.331	0.868	0.339	0.871	0.335
High-skilled white-collar	0.470	0.499	0.482	0.500	0.476	0.499
Low-skilled white-collar	0.199	0.400	0.206	0.405	0.203	0.402
High-skilled blue-collar	0.158	0.364	0.120	0.325	0.137	0.344
Low-skilled blue-collar	0.173	0.378	0.192	0.394	0.183	0.387
Firm size 1-10	0.173	0.378	0.169	0.375	0.171	0.376
Firm size 11-19	0.181	0.385	0.165	0.371	0.172	0.377
Firm size 20-49	0.146	0.353	0.143	0.350	0.144	0.352
Firm size ≥ 50	0.501	0.500	0.523	0.499	0.513	0.500
Employed 1y	0.926	0.262	0.916	0.277	0.920	0.271
Agriculture	0.008	0.091	0.010	0.100	0.009	0.096
Energy and Manufacturing	0.319	0.466	0.232	0.422	0.272	0.445
Construction	0.091	0.288	0.080	0.272	0.085	0.279
Distr., Transp. and Comm.	0.280	0.449	0.324	0.468	0.304	0.460
Finance	0.129	0.335	0.160	0.367	0.146	0.353
Non-market services	0.172	0.377	0.194	0.395	0.184	0.387
Unemployment diff	5.528	30.424	0.724	3.894	2.919	20.905
Youth unemployment diff	4.947	26.433	0.789	11.451	2.690	19.870
Road network (km)	1.417	0.440	1.805	0.520	1.627	0.522
Reg. empl. agric	1.418	0.285	1.922	0.416	1.692	0.441
Reg. empl. min-ener-manuf	1.539	0.935	1.381	0.663	1.453	0.802
Reg. empl. construction	1.489	0.381	1.912	0.738	1.719	0.637
Reg. empl. finance	1.714	0.514	2.292	1.175	2.028	0.977
Reg. empl. non-mrk serv	1.391	0.268	2.086	0.806	1.768	0.711
Closeness of languages	96.085	16.632	97.090	13.897	96.630	15.216
Observations	38134		45298		83432	

Table 1: Descriptive statistics

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2010	0.010 (0.070)	0.010 (0.006)	0.010 (0.006)	0.010 (0.006)	0.009 (0.006)	0.021*** (0.005)
Treated	0.285*** (0.061)	0.374*** (0.028)	0.379*** (0.031)	0.378*** (0.030)	0.378*** (0.026)	0.296*** (0.027)
Treated 2010	0.023 (0.078)	0.036** (0.015)	0.036** (0.015)	0.035** (0.014)	0.035** (0.015)	0.032** (0.014)
Female	0.024*** (0.007)	0.027*** (0.005)	0.027*** (0.005)	0.027*** (0.005)	0.023*** (0.006)	0.026*** (0.005)
Single	-0.028*** (0.007)	-0.007 (0.006)	-0.007 (0.006)	-0.007 (0.006)	-0.007 (0.006)	-0.007 (0.006)
Head of household	0.010 (0.009)	0.016*** (0.004)	0.016*** (0.004)	0.016*** (0.004)	0.016*** (0.004)	0.018*** (0.004)
Household size	-0.006** (0.003)	-0.004* (0.002)	-0.004* (0.002)	-0.004* (0.002)	-0.004* (0.002)	-0.004 (0.002)
Age 16-24	-0.007 (0.015)	0.0001 (0.012)	0.0001 (0.012)	-0.002 (0.012)	0.003 (0.012)	0.008 (0.011)
Age 25-34	0.034*** (0.011)	0.039*** (0.008)	0.039*** (0.008)	0.039*** (0.008)	0.039*** (0.008)	0.042*** (0.008)
Age 35-49	0.022*** (0.008)	0.022*** (0.006)	0.022*** (0.006)	0.022*** (0.006)	0.023*** (0.006)	0.023*** (0.006)
Secondary education	0.025*** (0.009)	-0.005 (0.007)	-0.005 (0.007)	-0.005 (0.007)	-0.007 (0.007)	-0.005 (0.006)
Tertiary education	0.010 (0.011)	-0.024*** (0.008)	-0.024*** (0.008)	-0.024*** (0.008)	-0.026*** (0.008)	-0.019** (0.008)
Full-time	-0.082*** (0.010)	-0.056*** (0.009)	-0.056*** (0.009)	-0.056*** (0.009)	-0.059*** (0.009)	-0.057*** (0.010)
Tenure	-0.0003*** (0.00004)	-0.0002*** (0.00004)	-0.0002*** (0.00004)	-0.0002*** (0.00004)	-0.0002*** (0.00004)	-0.0002*** (0.00004)
Permanent job	0.069*** (0.011)	0.060*** (0.009)	0.060*** (0.009)	0.060*** (0.009)	0.063*** (0.009)	0.063*** (0.009)
High-skilled withe-collar	-0.140*** (0.017)	-0.085*** (0.011)	-0.085*** (0.011)	-0.085*** (0.011)	-0.084*** (0.011)	-0.076*** (0.010)
Low-skilled withe-collar	-0.045*** (0.011)	-0.023** (0.009)	-0.023** (0.009)	-0.023** (0.009)	-0.023*** (0.009)	-0.018*** (0.009)
High-skilled blue-collar	0.065*** (0.012)	0.068*** (0.010)	0.068*** (0.010)	0.068*** (0.010)	0.072*** (0.010)	0.070*** (0.010)
Employed 1y	0.045*** (0.009)	0.047*** (0.009)	0.047*** (0.009)	0.047*** (0.009)	0.048*** (0.009)	0.048*** (0.009)
Unemployment diff			0.00002 (0.0001)			
Youth unemployment diff*Age 16-24				0.001*** (0.0003)		
Road network (km)			-0.042 (0.127)	-0.038 (0.128)		
Reg. empl. agric*Agriculture					-0.107* (0.057)	
Reg. empl. min-ener-manuf*Min-ener-manuf					-0.071*** (0.009)	
Reg. empl. construction*Construction					-0.054*** (0.016)	
Reg. empl. finance*Finance					-0.011* (0.006)	
Reg. empl. non-mrk serv*Non-mrk serv					-0.004 (0.006)	
Closeness of languages						-0.005*** (0.0004)
Country fixed effect	YES	NO	NO	NO	NO	NO
Regional fixed effect	NO	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Firm size	YES	YES	YES	YES	YES	YES
Observations	83,432	83,432	83,432	83,432	83,432	83,432
Adjusted R ²	0.170	0.387	0.387	0.387	0.390	0.410

Note: Region-year clustered standard errors. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 2: Large sample 2010

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2009	0.009 (0.007)	0.010*** (0.003)	0.010*** (0.004)	0.010*** (0.004)	0.010*** (0.003)	0.020*** (0.004)
Treated	0.289*** (0.006)	0.379*** (0.024)	0.386*** (0.030)	0.386*** (0.031)	0.384*** (0.022)	0.302*** (0.022)
Treated 2009	0.015 (0.012)	0.025* (0.014)	0.025* (0.014)	0.024* (0.013)	0.024* (0.013)	0.020 (0.013)
Female	0.024*** (0.005)	0.027*** (0.003)	0.027*** (0.003)	0.027*** (0.003)	0.028*** (0.003)	0.026*** (0.003)
Single	-0.028*** (0.006)	-0.007** (0.003)	-0.007** (0.003)	-0.007** (0.003)	-0.007** (0.003)	-0.006 (0.004)
Head of household	0.010* (0.006)	0.017*** (0.004)	0.016*** (0.004)	0.017*** (0.004)	0.017*** (0.004)	0.018*** (0.005)
Household size	-0.006*** (0.002)	-0.004** (0.002)	-0.004** (0.002)	-0.004** (0.002)	-0.004*** (0.002)	-0.004** (0.002)
Age 16-24	-0.008 (0.013)	-0.001 (0.011)	-0.001 (0.011)	-0.004 (0.010)	0.002 (0.011)	0.006 (0.011)
Age 25-34	0.033*** (0.008)	0.038*** (0.005)	0.038*** (0.005)	0.038*** (0.005)	0.039*** (0.005)	0.040*** (0.005)
Age 35-49	0.022*** (0.006)	0.022*** (0.005)	0.022*** (0.005)	0.022*** (0.005)	0.023*** (0.005)	0.022*** (0.006)
Secondary education	0.025*** (0.006)	-0.005 (0.005)	-0.005 (0.005)	-0.005 (0.005)	-0.007 (0.005)	-0.005 (0.005)
Tertiary education	0.011 (0.010)	-0.023*** (0.007)	-0.023*** (0.007)	-0.023*** (0.007)	-0.025*** (0.007)	-0.019*** (0.006)
Full time	-0.083*** (0.008)	-0.057*** (0.011)	-0.057*** (0.011)	-0.057*** (0.011)	-0.059*** (0.011)	-0.058*** (0.012)
Tenure	-0.0003*** (0.00003)	-0.0002*** (0.00002)	-0.0002*** (0.00002)	-0.0002*** (0.00002)	-0.0002*** (0.00002)	-0.0002*** (0.00002)
Permanent job	0.069*** (0.008)	0.060*** (0.007)	0.060*** (0.007)	0.060*** (0.007)	0.063*** (0.006)	0.063*** (0.007)
High-skilled white-collar	-0.140*** (0.008)	-0.084*** (0.005)	-0.084*** (0.005)	-0.085*** (0.005)	-0.084*** (0.005)	-0.075*** (0.005)
Low-skilled white-collar	-0.045*** (0.007)	-0.023*** (0.004)	-0.023*** (0.004)	-0.023*** (0.004)	-0.023*** (0.004)	-0.018*** (0.004)
High-skilled blue-collar	0.065*** (0.006)	0.068*** (0.007)	0.068*** (0.007)	0.068*** (0.007)	0.072*** (0.007)	0.070*** (0.007)
Employed 1y	0.045*** (0.009)	0.047*** (0.009)	0.047*** (0.009)	0.047*** (0.009)	0.047*** (0.009)	0.047*** (0.009)
Unemployment diff			0.00000 (0.00005)			
Youth unemployment*Age 16-24				0.001*** (0.0003)		
Road network (km)			-0.061 (0.101)	-0.056 (0.101)		
Reg. empl. agric*Agriculture					-0.108** (0.052)	
Reg. empl. min-ener-manuf*Min-ener-manuf					-0.071*** (0.004)	
Reg. empl. construction*Construction					-0.055*** (0.014)	
Reg. empl. finance*Finance					-0.011*** (0.003)	
Reg. empl. non-mrk serv*Non-mrk serv					-0.004 (0.006)	
Closeness of languages						-0.005*** (0.0002)
Country fixed effect	YES	NO	NO	NO	NO	NO
Regional fixed effect	NO	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Firm size	YES	YES	YES	YES	YES	YES
Observations	83,432	83,432	83,432	83,432	83,432	83,432
Adjusted R ²	0.169	0.386	0.386	0.386	0.389	0.409

Note: Region-year clustered standard errors. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 3: Large sample 2009

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2010	−0.005 (0.009)	−0.002 (0.006)	−0.001 (0.007)	0.001 (0.007)	−0.002 (0.006)	0.012** (0.005)
Treated	0.049** (0.024)	−0.028* (0.016)	0.129* (0.077)	0.132 (0.080)	−0.025 (0.017)	−0.030* (0.017)
Treated 2010	0.067* (0.038)	0.070** (0.030)	0.068** (0.029)	0.067** (0.030)	0.070** (0.030)	0.070** (0.032)
Unemployment diff			0.0002 (0.0001)			
Youth unemployment diff*Age 16-24				0.0001 (0.0001)		
Road network (km)			−0.246** (0.120)	−0.249** (0.124)		
Reg. empl. agric*Agriculture					−0.068 (0.048)	
Reg. empl. min-ener-manuf*Min-ener-manuf					−0.023*** (0.003)	
Reg. empl. construction*Construction					−0.009 (0.006)	
Reg. empl. finance*Finance					−0.007*** (0.002)	
Reg. empl. non-mrk serv*Non-mrk serv					0.005 (0.003)	
Closeness of languages						−0.004*** (0.0004)
Country fixed effect	YES	NO	NO	NO	NO	NO
Regional fixed effect	NO	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Firm size	YES	YES	YES	YES	YES	YES
Observations	52,693	52,693	52,693	52,693	52,693	52,693
Adjusted R ²	0.190	0.638	0.638	0.638	0.638	0.658

Note: Region-year clustered standard errors. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 4: Small sample 2010

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2007	0.004 (0.014)	0.007* (0.004)	0.004 (0.005)	0.004 (0.005)	0.007* (0.004)	0.016*** (0.005)
Treated	0.291*** (0.014)	0.387*** (0.029)	0.410*** (0.040)	0.410*** (0.040)	0.393*** (0.028)	0.314*** (0.028)
Treated 2007	0.011 (0.017)	0.010 (0.013)	0.010 (0.013)	0.009 (0.013)	0.008 (0.012)	0.003 (0.012)
Unemployment diff			−0.0001 (0.0001)			
Youth unemployment diff*Age 16-24				0.001*** (0.0003)		
Road network (km)			−0.206* (0.118)	−0.199* (0.115)		
Reg. empl. agric*Agriculture					−0.108** (0.052)	
Reg. empl. min-ener-manuf*Min-ener-manuf					−0.072*** (0.004)	
Reg. empl. construction*Construction					−0.056*** (0.014)	
Reg. empl. finance*Finance					−0.012*** (0.003)	
Reg. empl. non-mrk serv*Non-mrk serv					−0.005 (0.006)	
Closeness of languages						−0.005*** (0.0002)
Country fixed effect	YES	NO	NO	NO	NO	NO
Regional fixed effect	NO	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Individual characteristics	YES	YES	YES	YES	YES	YES
Job characteristics	YES	YES	YES	YES	YES	YES
Firm size	YES	YES	YES	YES	YES	YES
Observations	83,432	83,432	83,432	83,432	83,432	83,432
Adjusted R ²	0.169	0.386	0.386	0.386	0.389	0.409

Note: Region-year clustered standard errors. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 5: Large sample placebo 2007

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2008	0.009 (0.008)	0.009*** (0.003)	0.008** (0.004)	0.008** (0.004)	0.009*** (0.003)	0.018*** (0.004)
Treated	0.294*** (0.007)	0.385*** (0.027)	0.402*** (0.038)	0.402*** (0.038)	0.390*** (0.026)	0.309*** (0.026)
Treated 2008	0.009 (0.012)	0.015 (0.013)	0.013 (0.013)	0.012 (0.013)	0.013 (0.013)	0.009 (0.012)
Unemployment diff			−0.0001* (0.0001)			
Youth unemployment diff*Age 16-24				0.001*** (0.0003)		
Road network (km)			−0.154 (0.116)	−0.148 (0.114)		
Reg. empl. agric*Agriculture					−0.108** (0.052)	
Reg. empl. min-ener-manuf*Min-ener-manuf					−0.071*** (0.004)	
Reg. empl. construction*Construction					−0.055*** (0.014)	
Reg. empl. finance*Finance					−0.011*** (0.003)	
Reg. empl. non-mrk serv*Non-mrk serv					−0.004 (0.006)	
Closeness of languages						−0.005*** (0.0002)
Country fixed effect	YES	NO	NO	NO	NO	NO
Regional fixed effect	NO	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Individual characteristics	YES	YES	YES	YES	YES	YES
Job characteristics	YES	YES	YES	YES	YES	YES
Firm size	YES	YES	YES	YES	YES	YES
Observations	83,432	83,432	83,432	83,432	83,432	83,432

Note: Region-year clustered standard errors. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 6: Large sample placebo 2008

DOES THE ABOLITION OF BORDER CONTROLS BOOST CROSS-BORDER COMMUTING? 33

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2010	0.001 (0.010)	0.001 (0.007)	0.0004 (0.007)	0.0004 (0.007)	-0.004 (0.007)	0.008 (0.008)
Treated	0.271*** (0.008)	0.418*** (0.036)	0.422*** (0.040)	0.421*** (0.040)	0.441*** (0.034)	0.253*** (0.031)
Treated 2010	0.025** (0.013)	0.030** (0.013)	0.030** (0.014)	0.030** (0.013)	0.033** (0.013)	0.038*** (0.012)
Unemployment diff			0.00001 (0.0001)			
Youth unemployment diff*Age 16-24				0.001** (0.0004)		
Road network (km)			-0.036 (0.063)	-0.036 (0.063)		
Reg. empl. agric*Agriculture					-0.153*** (0.046)	
Reg. empl. min-ener-manuf*Min-ener-manuf					-0.029*** (0.011)	
Reg. empl. non-mrk serv*Non-mrk serv					-0.047*** (0.007)	
Closeness of languages						-0.007*** (0.0005)
Country fixed effect	YES	NO	NO	NO	NO	NO
Regional fixed effect	NO	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Individual characteristics	YES	YES	YES	YES	YES	YES
Job characteristics	YES	YES	YES	YES	YES	YES
Firm size	YES	YES	YES	YES	YES	YES
Observations	17,957	17,957	17,957	17,957	17,957	17,957
Adjusted R ²	0.195	0.361	0.361	0.361	0.362	0.397

Note: Region-year clustered standard errors. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 7: Restricted sample in 2010 with only workers in agriculture, mining, energy or non-market services sectors

	(1)	(2)	(3)	(4)	(5)	(6)
Year 2010	0.015 (0.010)	0.004 (0.006)	0.005 (0.006)	0.005 (0.006)	-0.001 (0.005)	0.019*** (0.006)
Treated 0.270***	0.310*** (0.005)	0.349*** (0.019)	0.349*** (0.033)	0.364*** (0.033)	0.280*** (0.020)	(0.019)
Treated 2010	0.036*** (0.014)	0.065*** (0.018)	0.060*** (0.018)	0.059*** (0.018)	0.063*** (0.017)	0.055*** (0.015)
Unemployment diff			0.00000 (0.00004)			
Youth unemployment diff*Age 16-24				0.002*** (0.0004)		
Road network (km)			-0.342* (0.183)	-0.329* (0.182)		
Reg. empl. min-ener-manuf*Min-ener-manuf					-0.106*** (0.008)	
Reg. empl. construction*Construction					-0.103*** (0.017)	
Reg. empl. finance*Finance					-0.052*** (0.009)	
Closeness of languages						-0.004*** (0.0001)
Country fixed effect	YES	NO	NO	NO	NO	NO
Regional fixed effect	NO	YES	YES	YES	YES	YES
Sector dummies	YES	YES	YES	YES	YES	YES
Individual characteristics	YES	YES	YES	YES	YES	YES
Job characteristics	YES	YES	YES	YES	YES	YES
Firm size	YES	YES	YES	YES	YES	YES
Observations	37,608	37,608	37,608	37,608	37,608	37,608
Adjusted R ²	0.186	0.411	0.411	0.411	0.416	0.429

Note: Region-year clustered standard errors. Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 8: Restricted sample in 2010 with only workers in manufacturing, construction or finance sectors

(1)	
Year 2010	0.022*** (0.004)
Treated	0.287*** (0.022)
Treated 2010	0.031** (0.013)
Dummy same languages	-0.428*** (0.013)
Country fixed effect	NO
Regional fixed effect	YES
Sector dummies	YES
Individual characteristics	YES
Job characteristics	YES
Firm size	YES
Observations	83,432
Adjusted R ²	0.421

Note: Region-year clustered standard errors.
Significance levels: *p<0.1; **p<0.05; ***p<0.01

Table 9: Large sample 2010 with dummy for same language

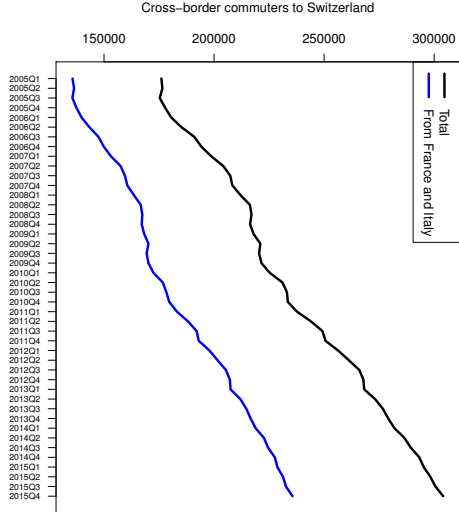


Figure 1: Total cross-border commuters to Switzerland. Source: Swiss Federal Statistical Office.

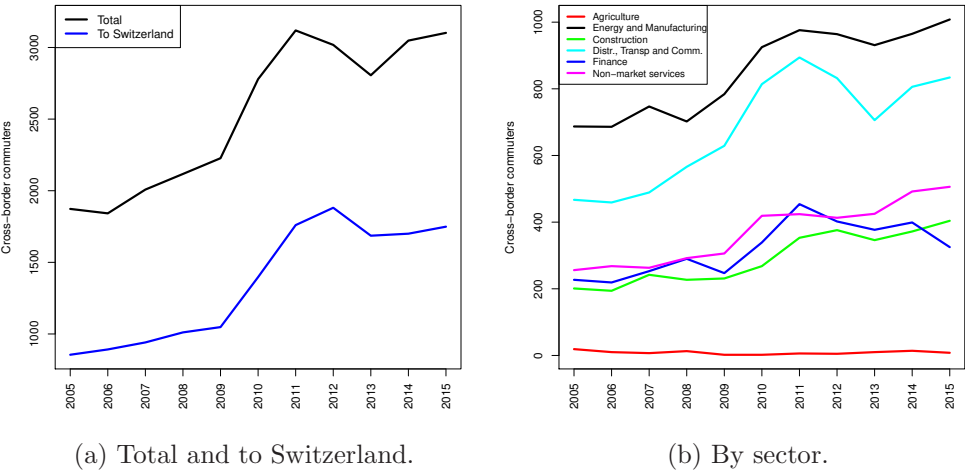


Figure 2: Cross-border commuters. Source: ELFS.

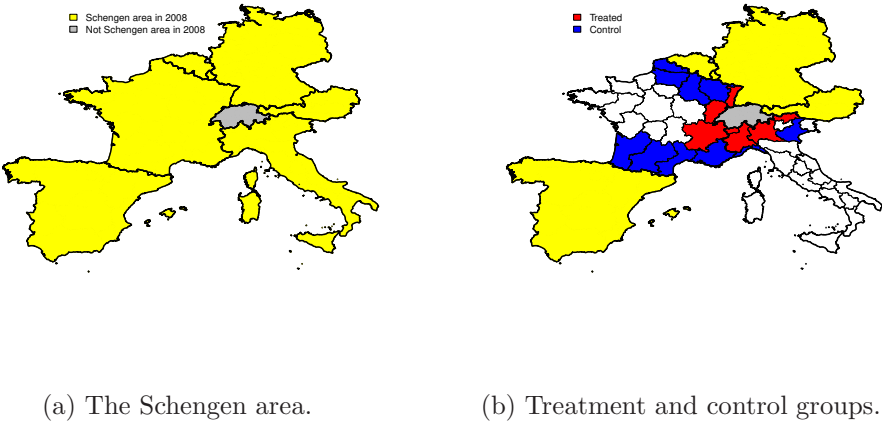


Figure 3: Countries in the Schengen area and treated and control groups.

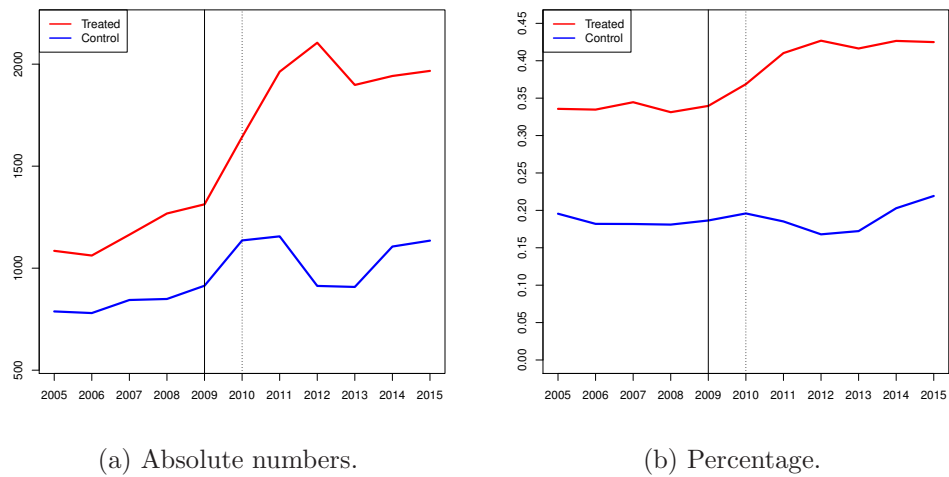
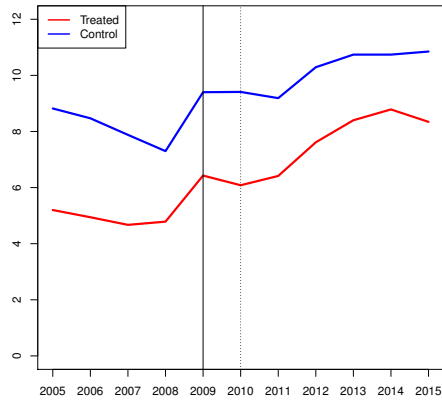
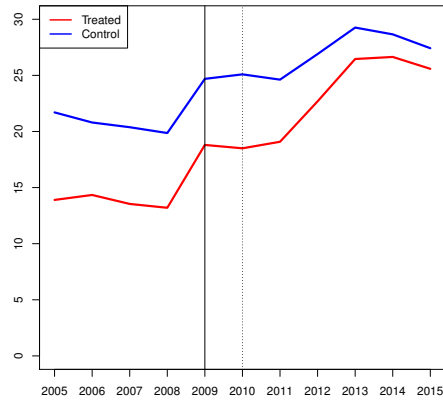


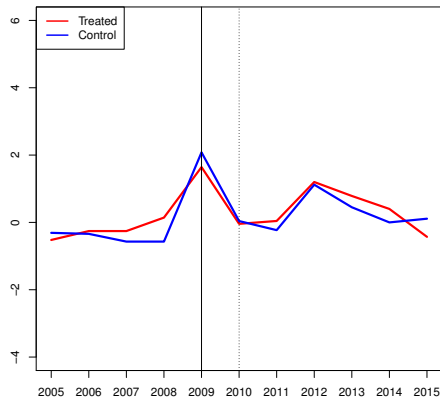
Figure 4: Cross-border commuters in treated and control regions.



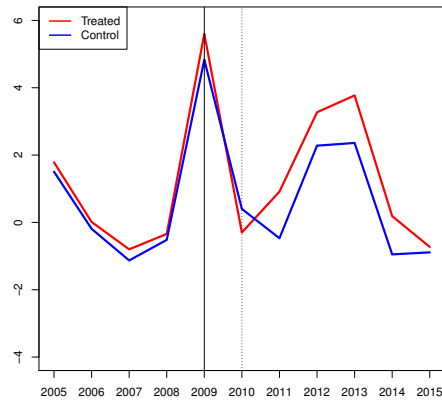
(a) Total unemployment rate



(b) Youth unemployment rate

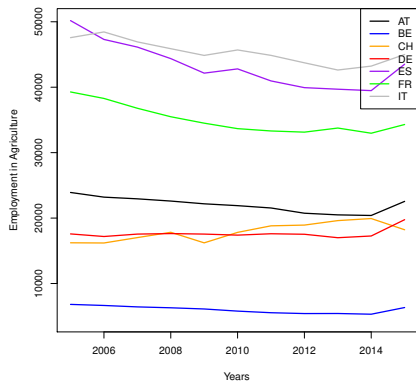


(c) Percentage point changes in total unemployment

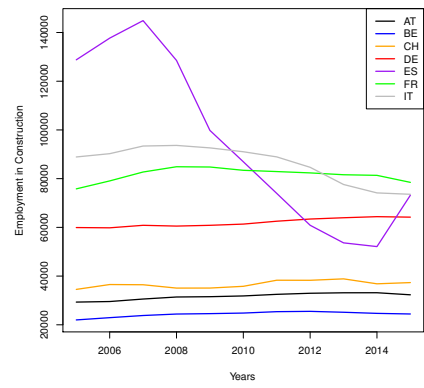


(d) Percentage point changes in youth unemployment

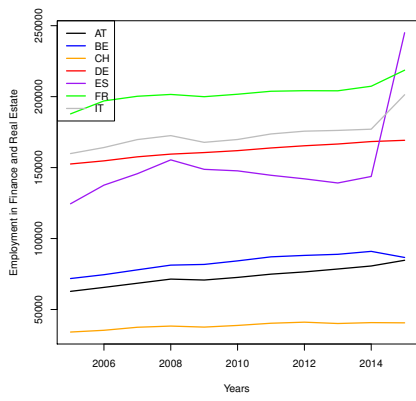
Figure 5: Unemployment trends in treated and control regions.



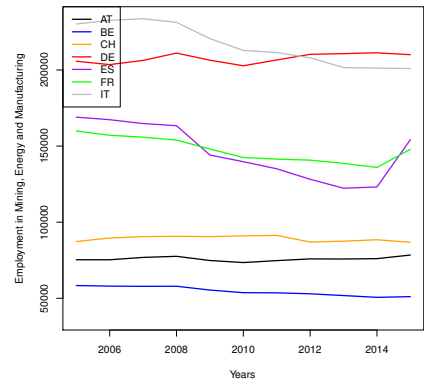
(a) Agriculture.



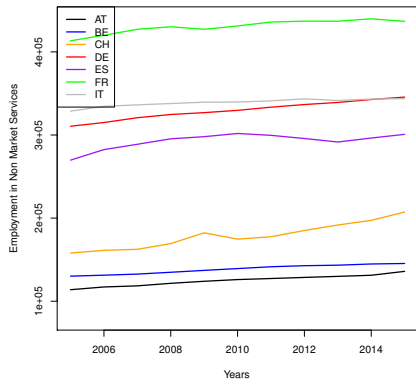
(b) Construction.



(c) Finance and Real Estate.

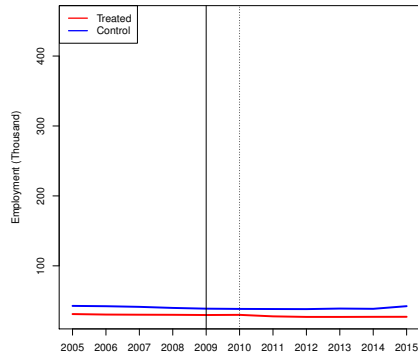


(d) Mining, Energy and Manufacturing.

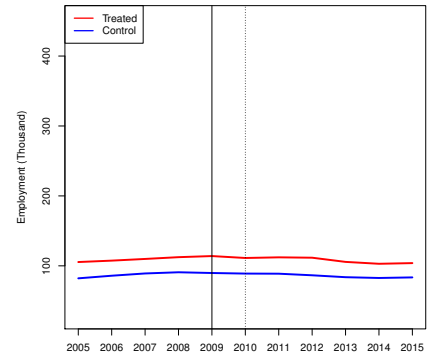


(e) Non-market services.

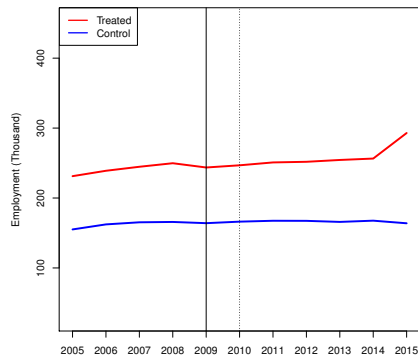
Figure 6: Employment by country and sector.



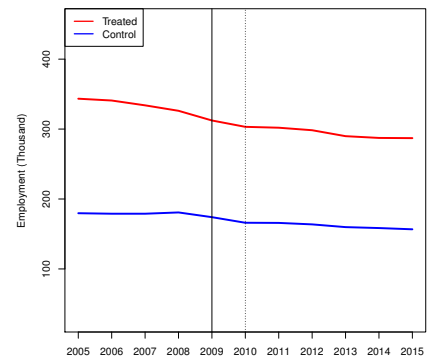
(a) Agriculture.



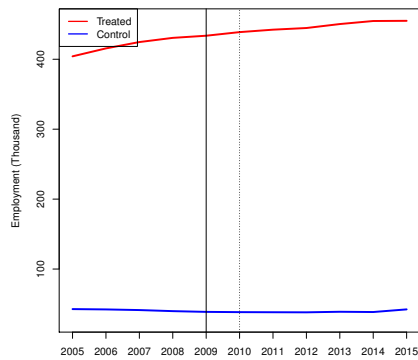
(b) Construction.



(c) Finance and Real Estate.



(d) Mining, Energy and Manufacturing.



(e) Non-market services.

Figure 7: Employment by sector in treated and control regions.

Discussion Papers

Collana del Dipartimento di Economia e Management, Università di Pisa

Comitato scientifico:

Luciano Fanti - *Coordinatore responsabile*

Area Economica

Giuseppe Conti
Luciano Fanti
Davide Fiaschi
Paolo Scapparone

Area Aziendale

Mariacristina Bonti
Giuseppe D'Onza
Alessandro Gandolfo
Elisa Giuliani
Enrico Gonnella

Area Matematica e Statistica

Sara Biagini
Laura Carosi
Nicola Salvati

Email della redazione: lfanti@ec.unipi.it