ECONOMICS & Sociology

Botrić, V. (2015), Relative Labour Market Outcomes of Immigrants in Croatia, *Economics and Sociology*, Vol. 8, No 3, pp. 197-214. **DOI: 10.14254/2071-789X.2015/8-3/15**

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Received: July, 2015
1st Revision: August, 2015
Accepted: September, 2015

DOI: 10.14254/2071-789X.2015/8-3/15

RELATIVE LABOUR MARKET OUTCOMES OF IMMIGRANTS IN CROATIA

ABSTRACT. The paper investigates the relative labour market outcomes of immigrant versus native population in Croatia. The immigrant population is broadly defined as foreign born and two outcomes – employment and unemployment – have been considered. The individual Labour Force Survey data without identifier has been used to produce estimates for the period 2006-2012. The results in Croatia are similar to those in other countries, where it has been frequently found that immigrants have lower employment and higher unemployment rates than native population. The results do not indicate that a recent crisis has affected immigrant population relatively more than native population, since no clear trends in widening of the estimated gaps have been identified.

JEL Classification: J15, J61 ***Keywords***: immigrants, unemployment, employment, Croatia.

Introduction

The main focus of the present paper is on the relative labour market outcomes of immigrant population in Croatia. When discussing migration flows, the focus in Croatia is predominately on the problem of emigration and in particular related to the recent adverse effects of the economic crisis on the local labour market. Consequently, increased negative net migration flows have recently been detected in the official statistical data, although concerns that unofficial emigration is even larger have been raised. Since Croatia joined European Union, questions of potential emigration of Croatian citizens to other member states became increasingly interesting (Vidovic and Mara, 2015). Within this situation, the first impression might be that the pressing need is related to the analysis of the emigration, rather than immigration determinants in Croatia. However, recent migration flows towards all European Union economies, and possible large numbers of immigrants on the Croatian territory, will call for active immigration policy, including the possibility to integrate immigrants on the Croatian labour market. To the best knowledge of the author, this is the first attempt to quantitatively analyse relative position of immigrants on the labour market in Croatia.

Croatia is faced with relative unfavourable trends on the labour market, with many population subgroups facing risk of poverty (Government of Croatia, 2014). At the same time, similar to other European Union countries, Croatia is facing demographic aging and potential skills shortages that could adversely affect potential economic growth. Such considerations have been actively discussed in European Union countries, where frequent empirical analysis

on the labour market outcomes of immigrant population has resulted in vast literature volumes.

Theoretical concepts related to the immigrants' outcomes on the labour markets are connected with over-assimilation and under-assimilation hypothesis, referring to different subgroups of immigrants according to their personal characteristics (Chiswick, 1978; Borjas, 1985). Recent empirical results claim that the immigrants usually belong to the vulnerable sub-groups on the host country labour markets (Bevelander and Irastorza, 2014; Jean *et al.*, 2010; de la Rica, Glitz and Ortega, 2013; Peracchi and Depalo, 2006). Kahanec and Zaiceva (2008) point to the fact that this is relatively widely researched topic in the European Union countries, but indicate that there might be large differences between old and new member states. In the event of immigrants' successful integration, studies indicate that they will positively contribute to net economic and fiscal position of the host country (Algan *et al.*, 2009). Croatia, as the newest EU member state has not been previously included in these empirical estimations. Therefore, we have no prior knowledge on the subject, beyond assuming that the situation in Croatia is similar to other new member countries.

In the empirical analysis of the relative labour market outcomes of immigrant versus native population, the most straightforward approach is to include the immigrant status as the explanatory variable in the labour market outcome regression (Kahanec and Zaiceva, 2008; Botrić, 2009). Peracchi and Depalo (2006) analyse labour market outcomes in eight old EU members for the cohort of immigrants that migrated before the mid1990s based on European Community Household Panel data. For each labour market outcome they consider models for the pooled data (when immigration is a dummy variable) and separate models for immigrants and natives. They find significant differences between the two population subgroups, especially for the immigrants coming from non EU-15 countries. Interesting fact is that the predictors of each status in each subgroup are similar. They also find that the differences diminish as the length of stay in the country increases, thus emphasising the effect of assimilation hypothesis. Dustmann and Frattini (2011) estimate unconditional (without additional covariates) and conditional (including usual labour market outcome determinants covariates) immigrant-native differences in employment probabilities in European countries and reach similar conclusions. Some authors argue that relative outcomes of immigrants change with different stages of business cycle (Dustmann, Glitz and Vogel, 2010). Recent evidence shows that effects of the latest crisis might be different than previous experiences (de la Rica and Polonyankina, 2013).

This type of analysis only enables discussion whether the fact that person is immigrant has effect on the probability of their employability. In order to assess the gap between the native and immigrant population, the need to compare persons with similar characteristics that are important for employability has long been established in the relevant literature (Van Ours and Veenman, 1999). The immigrant-native gap decomposition studies are more focused on detecting the factors behind wage gap (Hunt, 2012; Nicodemo and Ramos, 2011). Studies that investigate the differences in labour market outcomes are abundant (recently, for example, Corluy and Verbist, 2014; Langevin *et al.*, 2013). It is important to notice that countries with large share of immigrant population also develop studies on the labour market outcomes of second generation immigrants, since they have continuing interest on the analysis of immigration effect on their local labour markets.

Previous studies on labour market outcomes of immigrants in Croatia are relatively scarce. The main contribution of the present paper is that it uses relatively rich data source for the analysis – namely, Labour Force Survey – which is the main data source for the analysis of labour market outcomes of overall population in most countries. Another contribution is related to the presented empirical analysis. Two approaches have been used to estimate the gap in employment and unemployment of immigrant versus native population in Croatia. The

first concept used comes from the economic policy evaluation literature, where we estimate the average treatment effect of the treated (ATT) with the assumption that the outcome is unemployment or employment (depending on the specification) and the treatment variable is the immigrant status. This unorthodox approach is supplemented with more commonly applied Fairlie (1999) decomposition strategy. Since there are no previous estimates on the existence of labour market outcome gap between immigrant and native population in Croatia, including estimates of the potential factors contributing to the existence of the gap, the two approaches have been used to provide the robustness check.

The analysis has been performed for the period 2006-2012. The intention was to analyse the possibility that the effects of the economic crisis have adversely affected the immigrant population in comparison to native population. This would also allow the discussion on possible changes through one segment of the business cycle in Croatia, namely recession.

The structure of the paper is following. Next section discusses the data source and empirical strategy in more details. Section 2 presents the results of the estimation. Section 3 provides discussion, while the last section brings conclusions.

1. Data and empirical strategy

We use the Labour Force Survey (LFS) data, which is the most detailed source available for analysing the labour market outcomes in a country. The Survey is regularly conducted by the Croatian Central Bureau of Statistics (CBS) since 1996 and according to the methodology sample is designed to produce estimates of labour market indicators on the national level. CBS provided individual data without personal identifiers (disabling the possibility to track the same person through time). It has to be noticed that throughout the analysed period some methodological changes have been introduced in the Survey. Whenever these had the possibility to affect the results, they are clearly explained to define which specific variables have been used in the analysis.

The sample utilised for LFS typically underestimates the share of foreign workers (Eurostat, 2011). Dustmann and Frattini (2011) clarify that the definition of immigrants might vary across specific countries. They specify two opposing cases. The first refers to Anglo-Saxon countries which consider immigrants as those born outside their country of residence. The other concept is related to citizenship, when people could be born in the country of residence, but are not entitled to the citizenship according to the relevant legislation. For the analytical purposes, we follow the Anglo-Saxon definition, which has interesting consequences. One is related to the fact that Croatia used to be a part of former Yugoslavia, within which labour mobility was not restricted. The other is related to recent war-induced migrations. Both factors contribute to the fact that persons from former Yugoslavia contribute significantly to the immigrant population in Croatia. Recently Botrić (2015) provides several indicators for these two types of immigrant definitions based on Croatian LFS, when and if available, in the period 1998-2012.

The decision to analyse foreign-born and not foreign citizens, implies that the starting date for the analysis is year 2006, the year the question was included for the first time. Another important data consideration is that from the year 2007 LFS includes panel component. Due to the fact that the data has been available without personal identification, the panel component has not been utilised in the empirical analysis. In order to avoid multiplication of the same answers without proper identification, we have opted for reducing the overall sample and taking into considerations only the first appearance of each panel (Drinkwater and Robinson, 2011).

The main focus of the paper is on the labour market outcomes, so the overall sample is restricted to persons in the working age – between 15 and 65 years. We analyse two different outcomes – employment and unemployment, which gives us two different outcome variables in the empirical analysis. The definition of unemployment and employment follows the LFS definition, which relies on ILO methodology.

To identify the gap in the outcome variables, two empirical strategies have been followed – Fairlie (1999) decomposition and average treatment of the treated estimation.

Fairlie decomposition is an extension of the widely used Blinder-Oaxaca decompositions for the cases when the outcome variable is binary. Fairlie (1999) describes the method to identify and decompose the overall gap between the two subgroups into the contribution of each specific factor considered to be relevant for the existing gap. Due to space consideration we do not present the whole methodology in details, but rather discuss only those segments that are relevant for the understanding of the results presented below.

The methodology relies on defining characteristics which are important for the specific outcome. The natural source for the existing gap between the labour market outcomes of the immigrant relative to native population can be attributed to the personal characteristics relevant for employability. For example, differences in educational attainment could be considered as positive predictor for employment and negative for unemployment. The significance of specific factors for the labour market outcome can be estimated by the logit or probit model. Theoretically, decomposition method proposed by Fairlie holds exactly in case of logit model, but empirically very closely also for the probit model (Fairlie, 2005). We have used probit throughout the paper (probit estimates available from the author upon request), in order to ensure benefit from the properties of ATT estimates presented below and comparability with previous analysis of labour market outcomes determinants in Croatia (Botrić, 2009).

The ATT matching procedure has the benefit to impose balancing property in the propensity score matching procedure. Since the share of foreign-born and natives is frequently uneven in population, in Fairlie procedure we have used the variables that have satisfied the balancing property in propensity score matching, where in probit estimation immigrant status is dependent variable. This has initially left us with the set of variables that are balanced for immigrants and natives. We have specified probit models for employment and unemployment status in Fairlie procedure with initially considering all possible covariates that have been used in matching procedure. Due to the sample characteristics, unavailability of answers to specific questions and potential multicolinearity of the variables, the final number of explanatory variables in the estimation is smaller. These estimates are used to assume that holding the distribution of one subgroup constant (in our case native population), we can estimate the counterfactual outcome variable (employment or unemployment probability/share in the population).

In addition to detecting the gap between the two population subgroups, the Fairlie procedure can estimate the contribution of the analysed covariates to the existing gap. The contribution of each covariate is equal to the change in the average predicted probability from replacing one distribution with another (natives with immigrants), while holding all other variables constant. In cases when this is evaluated on the pooled sample, the total contribution of analysed covariates equals sum of the individual contributions.

In order to provide robustness check, we have also followed the propensity score matching and estimating average treatment of the treated. We perform propensity matching where treatment variable has the value one if a person is immigrant. The independent variables considered in the propensity score procedure are those typically found to be significant predictors for the status of employment or unemployment on the labour market (age, sex, education, occupation, etc.). The list of independent variables includes is following:

- **Age**. The idea that persons can expect different outcomes on the labour market related to their age has been increasingly discussed in particular related to the effects of the global economic crisis. Unemployment of the young (Cahuc *et al.*, 2013; Cinalli and Giugni, 2013; Eichorst *et al.*, 2013b) and the employability of the older population subgroups (Eichorst *et al.*, 2013b) have also become important policy questions. In order to capture the expected different outcomes of young and older population groups, 3 binary variables have been considered – for persons younger than 24, for persons aged 25-49 and for persons older than 50. In probit estimates used for propensity scores we cannot include all the dummy variables at the same time, so the initial estimation always left-out the largest sub-population group.
- **Sex** is the traditional labour market variable. Differences in labour market participation related to gender, age, race or residence are well documented in empirical studies (Azmat *et al.*, 2006), as well as in theory (Hyclak, Johnes and Thornton, 2005). We include a dummy variable, which equals one if a person is male.
- **Marital status**. Couple formation can be considered as a kind of insurance against poverty, and it has been found in the literature that unemployment spells delay couple formation (Ekert-Jaffe and Solaz, 2001). LFS considers several categories of marital status, which have been summarized into 3 dummy variables. Individuals either married or cohabitating are classified as married. Individuals divorced, widowed or separated are classified as divorced (see Peracchi and Depalo, 2006). The third category is singles, which is left out from specifications to avoid multicolinearity.
- **Living area**. Evidence from other countries suggests that urban areas, in particular capital cities, are having more vibrant labour markets (OECD, 2003; Thapa, 2004). Some areas might also be immigration hubs, due to their ability to either create jobs or absorb additional population more easily. LFS distinguishes four types of settlement, out of which we create one dummy variable which equals one if it was classified by LFS as urban or semi-urban.
- **Education**. To measure the educational attainment, dummy variables indicating level of education have been included in specification. Categories of level of education in LFS refer to the categories defined by the International Standard Classification of Education. It has to be noted that the classification is not comparable throughout the period. Since 2010, the classification has 14 defined levels instead of previously established 11. However, the inspection of data reveals that persons with highest classifications are relatively rare both in native and immigrant population (less than 1 percent in each subgroup). Since we are using these variables only for matching purposes and not for explanatory reasons, we did not include additional explanatory variables in initial probit estimates for more recent periods – they would have been probably excluded in final estimation due to balancing property. The estimates when they are included in the Fairlie procedure reveal that in most cases these high levels of education are not significant. In order to avoid multicolinearity, education level 4 is considered as reference in each specification.
- **Occupation**. Based on the available data from the LFS, occupation in the analysis is defined as the occupation of the main job listed by the employed person and as the occupation in previous job listed by the unemployed person. The unemployed persons without previous job are classified as first-time job seekers. These variables might potentially be the most significant factors behind the individual's risk of unemployment. Following occupation-dummies have been included in the specifications in addition to one "no occupation": 1 – Armed forces occupations; 2 – Managers; 3 – Professionals; 4 – Technicians and associate professionals; 5 – Clerical support workers; 6 – Service and sales workers; 7 – Skilled agricultural, forestry and

fishery workers; 8 – Craft and related trades workers; 9 – Plant and machine operators, and assemblers; 10 – Elementary occupation. In order to avoid possible multicolinearity, occupation level 4 is excluded from specifications.

In addition to personal characteristics, outcomes on the labour market are also determined by the specific labour market demand. Having in mind the dataset used in the paper, this would call for inclusion of industry-specific characteristics in the analysis. In case of Fairlie procedure this is not appropriate, since the industry dummy (controlling for either employment or previous employment of the person) perfectly predicts the dependent variable. In ATT procedure, this can be technically achieved, but not advisable since the dummy variable is highly correlated with the outcome (results of the estimates available from the author upon request).

It has to be emphasized that the list of variables analysed in this paper is not exhaustive for the explanation of the immigrant-native labour market outcome gap. Other possible explanations, which are more intangible (such as network effects, recognition of the qualifications, language barriers, etc.) also play important role. Reservation wage is also frequently emphasized when considering labour participation motives, but unfortunately not available in the data for all the years. Inclusion of other variables in the empirical analysis – such as unemployment benefits or methods used in active job search – although relevant for capturing motivation of the unemployed, are at the same time perfect predictors for the unemployment status and cannot be included in the empirical methodology of the present paper.

For the matched sample, we calculate the ATT, which provides the information on the difference between the shares/probabilities of each category in the matched sample. The overall sample contains employed, unemployed and inactive – thus the employment status is not complementary to the unemployment. The reason for including the inactive in the sample is specifically related to the analysed period which contains the recent economic crisis and its widespread effects on Croatian labour market. During the crisis it is more likely that the unemployed will decide not to actively search employment, due to the discouraged worker effect emphasized by the low labour demand.

In case of employment, we identify the share of employed immigrants and the share of employed domestic population with the same characteristics. If the difference between two shares of employment is significant (that is, if the ATT is significant) and negative, than the immigrant population with the same characteristics is likely to face adverse conditions.

The analysis has been performed for each year in the period 2006-2012. The initial estimates always included the full list of uncorrelated independent variables, which was consequently reduced to the list satisfying the balancing property. Each estimate was restricted to the common support area. The above procedure has thus been repeated for each year, with probit estimates slightly differing for each year. The ATTs were estimated with Epanechnikov kernel, followed by diagnostics tests to analyse the quality of the match (details available from the author upon request). Mantel-Haenszel bounds tests have been performed, and the results tables in the paper report corresponding gamma value. The values correspond to the threshold when gamma becomes insignificant, according to the appropriate bound – if the estimated ATT is significantly positive, than the upper bound is relevant.

2. Results

The methodology described above has enabled us to detect the gap between the immigrant and native population in both analysed labour market outcomes. The analysis has revealed that the immigrant population is less likely to be employed and more likely to be unemployed than the statistically identified comparable native population. Thus the results

have confirmed that throughout the analysed period the immigrant population is in more vulnerable position than the native population.

We first present the results of Fairlie procedure estimates. The decomposition technique used involves one-to-one matching of cases between two groups. Since we have two uneven-sized groups, 1000 replications have been performed. The following table contains the results of the estimation of the employment gap between the immigrant and native population in Croatia.

Table 1. Share of employed immigrants and natives, identified gap and the total contribution of the potential explanatory reasons for the gap, 2006-2012

Year	Immigrants	Natives	Difference	Total contribution (%)
2006	0,48	0,55	-0,07	-0,004 (5,55)
2007	0,52	0,56	-0,04	0,005 (- 11,84)
2008	0,53	0,57	-0,04	-0,000 (0,70)
2009	0,54	0,56	-0,02	0,007 (-32,17)
2010	0,49	0,54	-0,05	0,026 (-54,67)
2011	0,47	0,51	-0,04	0,024 (-55,99)
2012	0,43	0,50	-0,07	0,041 (-59,34)

Notes: the percentages of total contribution of all covariates to the gap calculated based on unrounded data.
Source: author's estimates.

The data in *Table 1* for each analysed year presents the employment share/probability of the immigrant and native population. It can be noticed that the shares of employment are falling, for both population subgroups, which can be attributed to the crisis. The analysis did not reveal trend in widening of the gap, which would imply that the immigrant population has faced additionally worse prospects than the native population.

The last column in the Table presents the total contributions of the analysed covariates to the existing gap. The estimation strategy enables us to detect the contribution of each covariate to the gap by estimating the change in the average predicted probability from replacing the immigrant distribution with the native distribution of that variable while holding the distribution of other covariates constant. The estimated contributions of each variable are presented in *Table A1* in the *Appendix*. The contribution of the analysed covariates to the existing gap is negative. These results imply that controlling for immigrant status differences actually widens the gap when coefficients for native population are used. The covariates analysed – although relevant as labour market predictors – do not seem to contribute to the narrowing of the existing gap, which consequently might be even larger. These results do seem to imply that if the immigrant population more similar to the native, the employment gap would have been even larger.

The results in *Table A1* in the *Appendix* also reveal that the largest positive contribution to explaining the employment gap is related to marital status of the individuals, which is significant and positive in all the analysed periods. Other variables do not seem to show consistency throughout analysed period, either in the significance or the size of the coefficients. It might be related to the crisis effect, when the underlying patterns of the existing gap are changing, even though the gap itself is not profoundly different.

Similar analysis has been performed for unemployment and is presented in *Table 2*.

Table 2. Share of unemployed immigrants and natives, identified gap and the total contribution of the potential explanatory reasons for the gap, 2006-2012

Year	Immigrants	Natives	Difference	Total contribution (%)
2006	0,18	0,14	0,04	0,001 (3,15)
2007	0,16	0,13	0,03	-0,008 (-33,02)
2008	0,13	0,12	0,01	-0,005 (-43,20)
2009	0,14	0,12	0,02	-0,007 (-34,73)
2010	0,16	0,14	0,02	-0,003 (-11,92)
2011	0,19	0,15	0,04	0,002 (3,97)
2012	0,20	0,16	0,04	0,011 (25,98)

Notes: the percentages of total contribution of all covariates to the gap calculated based on unrounded data.
Source: author's estimates.

The data reveals that the unemployment probabilities/shares of the native and immigrant population are rising, in particular since the crises started in 2008. When it comes to the contributions of the analysed covariates to the existing gap, it does not seem that there is consistency in their overall effect – whether they contribute to the reduction or widening of the gap. Inspection of the individual covariates' contribution (*Table A2* in the *Appendix*) reveals that the strongest positive effect is related to the "noOcc" variable which is related to the first-time job seekers. This probably comes from the fact that native population has larger share of first-time job seekers, and if the distributions were more similar this would narrow the gap. However, it does not seem very likely that large groups of immigrant flows without any prior work experience will be recorded in Croatia, since it is not perceived as a prosperous country for job-seekers in the recent years.

We turn next to the results of propensity score ATT estimation. The results for the employment are presented in *Table 3*, while those for unemployment are presented in *Table 4*.

Table 3. Estimates of immigrant vs. native employment gap with ATT propensity score matching

Year	Treated/ immigrants	Controls	ATT (standard error)	Gamma (- bound)
2006	0,49	0,58	-0,09* (0,01)	1,25 (0,97)
2007	0,52	0,56	-0,03* (0,01)	1,1 (1,05)
2008	0,53	0,58	-0,05* (0,01)	1,1 (1,20)
2009	0,54	0,58	-0,04* (0,01)	1,05 (0,68)
2010	0,49	0,54	-0,05* (0,01)	1,15 (1,01)
2011	0,47	0,50	-0,03* (0,01)	1,15 (0,54)
2012	0,44	0,51	-0,07* (0,01)	1,25 (0,94)

Notes: *denotes significance at the level smaller than 10 percent.
Source: author's estimates.

The estimates reveal that the share of employed immigrants in the overall sample of immigrants is lower than the share of employed in the overall sample of domestic population with the same identifiable characteristics. The estimates also reveal that the employment shares in the respective populations are decreasing, which can be attributed to the effects of the crisis. Thus, although the numbers themselves are somewhat different than the ones produced by the Fairlie decomposition, it seems that they corroborate the similar story.

The benefit of this additional procedure is that it reveals that the estimated gap is significant throughout the period, implying that immigrants have relatively more difficult access to the Croatian labour market. Another contribution comes from the relatively low

gamma-values, which implies that the covariates chosen for the analysis are appropriate and there are no unobservable factors that could be associated with bias in our estimates of the gap.

Table 4. Estimates of immigrant vs. native unemployment gap with ATT propensity score matching

Year	Treated/ immigrants	Controls	ATT (standard error)	Gamma (+ bound)
2006	0,18	0,13	0,05* (0,01)	1,3 (0,58)
2007	0,16	0,13	0,03* (0,01)	1,15 (0,29)
2008	0,13	0,12	0,01 (0,01)	1,05 (0,64)
2009	0,14	0,11	0,03* (0,01)	1,1 (1,24)
2010	0,16	0,12	0,04* (0,01)	1,1 (1,21)
2011	0,19	0,15	0,04* (0,01)	1,25 (0,93)
2012	0,20	0,15	0,05* (0,01)	1,25 (0,93)

Notes: * denotes significance at the level smaller than 10 percent.
Source: author's estimates.

Following the same methodology, the estimated shares of the unemployed immigrants in the overall immigrant population is lower than the share of unemployment of the statistically comparable domestic population. The difference between the two is, with the exception of the year 2008, statistically significant confirming previous results that immigrants face adverse conditions on Croatian labour market. Although it seems that each population subgroup has been affected by the crisis (revealed by the rising shares of unemployment in each subgroup), it does not seem that crisis has affected the immigrant more than domestic population.

Similar data have been produced by the Fairlie procedure, thus confirming that the gap between native and immigrant population related to unemployment outcome in Croatia exists. Again, relatively low values of gamma imply that the choice of covariates seems plausible and that there are no unobservables that would significantly influence the estimated gap.

3. Discussion

The results have confirmed that, based on two empirical strategies, we were able to detect the existence of employment and unemployment gap between the native and immigrant population in Croatia. This gap exists in most countries, as documented by various empirical studies.

For example, important study by Dustmann and Frattini (2011) provides a useful general overview of employment gaps between immigrants and natives in 15 Western European countries based on the European LFS for the years 2007-2009. Their results have shown that after conditioning on age, education and the regional distribution (i.e. the usual determinants of labour market outcome differences similar to those used in this paper), immigrants in Central and Northern Europe face higher disadvantages relative to natives, with an employment gap of between 8 and 15 percentage points. In Ireland and the UK as well as the Southern European countries Italy, Spain and Portugal, the authors have established that these disadvantages are smaller.

Other studies have also found out that certain countries seem to integrate immigrants more easily into their labour markets. Clark and Drinkwater (2008) discovered that the employment rate of the immigrants from accession countries (A8) in the United Kingdom during the post-accession 2004-2007 period was not significantly different to that of the native born. Kangasniemi and Kauhanen (2013) analyse different period and wider set of new

member states. They report that NMS12 immigrants have lower probability of employment than natives in all other countries except the United Kingdom.

Empirical studies usually find that immigrants have higher risks of unemployment (de la Rica, Glitz and Ortega, 2013), although for some countries this was not pronounced (Amuedo-Dorantes and de la Rica, 2006). There are two important conclusions from these empirical studies for Croatia – the first is that in most analysed countries the gap exists. But, more important, relative disadvantage of immigrant population is different across analysed countries, which does imply that in some countries access to labour market is easier, directing the discussion to the possibilities to reduce the gap with policy measures.

Markaki (2014) recently analysed policy measures that could explain differences across immigrant-native gaps in European countries. The results suggest that gaps are large in countries with more immigrants, but also that the labour market regulations play important role. It seems that in countries with stricter regular contract regulations, immigrants are more likely to have temporary contracts, and if these are under strict regulations immigrants have higher risks of unemployment and underemployment. Markaki (2014) concludes that immigrants have different roles on the European labour markets than the native population, which is reflected by their outsider status.

Analysis in this paper does not entail the policy measures and we cannot contribute to this segment of the discussion in quantitative way. Yet, there are significant changes in the Croatian labour market during the recent years – reduction of the labour protection (measured by the EPL index), increases in the share of temporary contracts, increases in the shares of unpaid work – which are likely also to affect the immigrant and native population. Another limitation to the results presented in the paper is that actual outcome on the labour market is the result of the individual's ability and labour market demand. The results in the paper capture explicitly only one segment – individual's characteristics, while the demand side of the labour market is at best captured only through the economic activity dummy variables. However, the future research should also incorporate firm's characteristics and rely on the employer-employee datasets to incorporate both segments of the labour market.

We cannot claim that migrant population, when choosing their host country, takes into consideration results of empirical studies. However, it could be easily assumed that countries with relatively high unemployment rates and adverse conditions for immigrants might not be considered as desirable host countries attracting highly productive labour force. This has been shown by the recent migration flows on the Croatian territory, where Croatia has been considered only a transit and not desirable destination country. Thus, if Croatia is actively going to address the issue of possible skills shortages, policy makers should consider both acting to reduce the unemployment and increase employment probabilities of immigrant population, in order to quickly integrate them into domestic labour market. As Markaki (2014) restates the frequently emphasized argument, the successful integration of immigrants contributes to the host country by filling the labour market demand in the required segments, increasing domestic productivity and expanding the tax base, while avoiding putting the welfare state under additional burden by creating new vulnerable groups. This clearly sets the path for considering creation of positive prospects for future policy measures in Croatia as well.

Conclusions

The focus of the paper is on the investigation whether there is a gap in relative labour market outcomes of native versus immigrant population in Croatia. Similar studies in other European countries have shown that the gap usually exists, although the size of the gap varies across different countries. The immigrants usually face adverse prospects on the host

countries' labour markets and the question is whether similar can be found on Croatian labour market as well.

The two empirical strategies used in the paper have produced similar results, even though most of the immigrants in Croatia are coming from the neighbouring (former Yugoslavia) countries. The immigrant population in Croatia does not face full extent of barriers usually found in other countries (language, education system, cultural). Throughout the analysed period, which entails effects of recent global economic crises, relative labour market outcomes of immigrant versus native population in Croatia point to the difficulties the foreign born are facing on the local labour market. The immigrants have higher unemployment rates and lower employment rates than native population. There are, however, no indications that the crisis itself has contributed to the widening of the gap.

The results are important when considering possible future directions of the immigration policy in Croatia. Due to existing and possible labour (skills) shortages, policy makers should reconsider creating positive conditions for attracting immigrant population to be able to reduce the mismatch on the labour market. Although it seems that in the conditions of relatively high domestic unemployment such policy actions are unnecessary, the demographic aging of Croatian population combined with recent increased emigration, do imply that alternative scenarios should have been already designed.

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Appendix

Table A1. Contributions to employment gap in Fairlie procedure, referent population native

Variables	Estimated coefficients *100						
	2006	2007	2008	2009	2010	2011	2012
Age 15-24	-0,27**	-0,01	-0,11	-0,36***	-0,32***	-0,35***	0,34**
Age 50-65	-0,01	0,00	0,00	0,05	0,20**	0,23*	-0,03
Urban	0,33***	0,19	0,20*	0,18**	0,26**	0,28	0,37**
Male	-0,02	0,03	0,16***	0,16***	-0,43***	0,24***	0,23**
Married	0,78***	1,41***	1,53***	1,82***	2,84***	1,67***	3,24***
Divorced	-0,33***	-0,39***	-0,53***	-0,44***	-0,48***	-0,58***	-0,54***
Edu3	0,25**				1,87***	1,77***	1,78***
Edu5	0,79***	0,12	0,97***	1,19***	0,72***	0,26	-0,42***
Edu6	0,02	0,74***	-0,66***	0,06	0,03	0,04	0,04
Edu7	0,54***	0,39***	0,49***	0,45***	-0,29***	-0,80***	-0,82***
Edu8	-0,84***	-0,11**	-0,77***	-0,91***	-0,22***	-0,15***	-0,05**
Edu9	-1,63***	-1,96***	-1,26***	-1,53***			
Edu10	0,07				-0,00	0,01	-0,00
Edu11					-1,51***	-0,18	-0,04

Notes: *** denotes significance at 1 percent, ** denotes significance at 5 percent, * denotes significance at 10 percent. Contributions represented with reference to domestic population, 1000 replications applied. Standard errors not presented due to small values, but available upon request.

Source: author's estimates based on LFS data.

Table A2. Contributions to unemployment in Fairlie procedure, referent population native

Variables	Estimated coefficients*100						
	2006	2007	2008	2009	2010	2011	2012
1	2	3	4	5	6	7	8
Age 15-24	0,01	-0,09	0,07	0,07	-0,09	0,16**	0,18*
Age 50-65	-2,56***	-2,88***	-2,10***	-1,87***	-2,67***	-3,33***	-4,35***
Urban	0,03	-0,18***	-0,10**	-0,09*	-0,07	-0,13*	-0,02
Male	0,01	0,00	0,00	-0,01	-0,06*	-0,06**	-0,04
Married	-1,71***	-1,02***	-1,04***	-1,25***	-1,72***	-1,65***	-1,48***
Divorced	-0,27***	-0,13***	-0,16***	-0,12***	-0,12***	-0,15***	-0,12***
Edu1	0,05*	0,04	0,10	-0,02	-0,06***	-0,14***	-0,12***
Edu2	0,02*	0,05	0,04	-0,02	-0,27***	-0,36***	-0,30***
Edu3	-0,11	-0,17**	-0,03	-0,02	-0,35***	-0,68***	-0,64***
Edu5	-0,27***	-0,50***	-0,29***	-0,13***	0,10*	0,16**	0,15**
Edu6	-0,45***	-0,26***	-0,29***	-0,17***	0,22***	0,34***	0,21***
Edu7	-0,04**	-0,02	-0,01	-0,00	-0,06***	-0,00	0,01
Edu8	-0,02*	0,03**	-0,01	0,03*	-0,01	-0,03	-0,04***
Edu9	-0,37***	-0,34***	-0,31***	-0,50***	-0,00	0,00	-0,01
Edu10	0,02	0,00	-0,01	-0,01	0,00	0,01	0,04*
Edu11	-0,00				-0,51***	-0,39***	-0,39***
Edu12					-0,02*	-0,02	-0,01
Edu13					-0,04***	-0,02	0,01
Occ1	-0,34***	-0,34***	-0,17***	-0,46***	-0,52***	-0,60***	-0,78***
Occ2	-0,07***	-0,10***	-0,09***	-0,08***	-0,06***	-0,12***	-0,19***
Occ3	0,35***	0,22***	0,21***	0,41***	0,61***	0,43***	0,43***
Occ5	0,03***	0,02**	0,01	0,03**	-0,04**	0,02	0,05***
Occ6	-0,02	0,02	-0,00	-0,08***	-0,02**	0,06***	-0,07***

1	2	3	4	5	6	7	8
Occ7	-0,13***	-0,00	-0,03***	-0,13***	-0,19***	-0,13***	-0,14***
Occ8	0,03**	-0,03**	-0,05***	-0,04***	-0,04***	-0,18***	-0,07***
Occ9	-0,02	-0,07**	-0,06***	-0,19***	-0,03**	-0,19***	-0,24***
Occ10	0,43***	0,19***	0,11***	0,12***	0,33***	0,21**	0,04
Occ11	0,00	0,00	0,00		-0,03**	-0,00	-0,00
NoOcc	5,54***	4,72***	3,75***	3,83***	5,48***	6,95***	9,04***

Notes: *** denotes significance at 1 percent, ** denotes significance at 5 percent, * denotes significance at 10 percent. Contributions represented with reference to domestic population, 1000 replications applied. Standard errors not presented due to small values, but available upon request.

Source: author's estimates based on LFS data.

Table S1. Probit estimates in propensity score matching

Variables	Estimated coefficients (standard errors)						
	2006	2007	2008	2009	2010	2011	2012
1	2	3	4	5	6	7	8
Constant	-1,31***	-1,29***	-1,33***	-1,05***	-1,60***	-1,55***	-1,56***
	(0,03)	(0,06)	(0,04)	(0,05)	(0,03)	(0,06)	(0,06)
Age 15-24	-0,24***	-0,24***	-0,27***	-0,23***		-0,12**	-0,21***
	(0,04)	(0,05)	(0,04)	(0,05)		(0,06)	(0,06)
Age 50-65		-0,01					0,11***
		(0,03)					(0,03)
Urban		0,19***	0,18***	-0,19***	0,24***	0,26***	0,19***
		(0,03)	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)
Male		-0,01				-0,05	
		(0,03)				(0,03)	
Married	0,27***	0,23***	0,19***	0,21***	0,38***	0,30***	0,27***
	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)	(0,04)	(0,04)
Divorced	0,23***				0,26***	0,16**	0,07
	(0,05)				(0,05)	(0,07)	(0,07)
Edu1	0,65***	0,78***	0,95***	0,90***	0,99***	1,12***	0,91***
	(0,11)	(0,13)	(0,13)	(0,14)	(0,14)	(0,15)	(0,15)
Edu2	0,16	0,65***	0,67***	0,86***	0,48***	0,46***	0,37***
	(0,15)	(0,22)	(0,21)	(0,20)	(0,06)	(0,07)	(0,08)
Edu3		0,27***		0,34***			
		(0,06)		(0,06)			
Edu5	-0,06**	-0,09**			-0,11***	-0,12***	-0,11***
	(0,03)	(0,04)			(0,03)	(0,04)	(0,04)
Edu6		-0,12***	-0,13***		-0,12**	-0,28***	-0,19**
		(0,04)	(0,03)		(0,06)	(0,08)	(0,07)
Edu7	0,01		-0,11*	-0,05			-0,12*
	(0,05)		(0,06)	(0,06)			(0,07)
Edu8		-0,25***	-0,23***	-0,06	-0,15		0,04
		(0,07)	(0,06)	(0,06)	(0,19)		(0,16)
Edu9	-0,00	-0,30***				-0,12	0,07
	(0,06)	(0,09)				(0,50)	(0,39)
Edu10	0,21	-0,05	0,14	0,18	0,28	0,18	-0,35
	(0,18)	(0,19)	(0,19)	(0,20)	(0,35)	(0,28)	(0,33)
Edu11	0,21	-0,05	0,01	0,16	-0,18**	-0,08	-0,06
	(0,27)	(0,32)	(0,34)	(0,30)	(0,08)	(0,08)	(0,08)
Occ1		0,02	-0,19*	0,04	0,10	0,12	0,12
		(0,11)	(0,11)	(0,09)	(0,09)	(0,11)	(0,12)

1	2	3	4	5	6	7	8
Occ2		0,03		-0,02	0,01	0,05	0,09
		(0,08)		(0,07)	(0,07)	(0,09)	(0,09)
Occ3	-0,19**	0,09	-0,13**	-0,15**	-0,09	-0,05	-0,07
	(0,07)	(0,09)	(0,06)	(0,05)	(0,08)	(0,08)	(0,08)
Occ5	-0,18***	-0,23***	-0,23***	-0,23***	-0,08	-0,11*	-0,13**
	(0,04)	(0,05)	(0,05)	(0,05)	(0,05)	(0,06)	(0,06)
Occ6	0,03	-0,10**	-0,05		0,02	-0,04	0,04
	(0,03)	(0,05)	(0,04)		(0,04)	(0,05)	(0,05)
Occ7		-0,23***	-0,20***			-0,29***	-0,35***
		(0,06)	(0,06)			(0,07)	(0,08)
Occ8		-0,01	-0,04	0,00	0,01	0,12**	0,03
		(0,05)	(0,04)	(0,04)	(0,04)	(0,05)	(0,06)
Occ9		-0,07		0,05	-0,07		0,04
		(0,05)		(0,04)	(0,05)		(0,06)
Occ10		-0,02	0,05			0,25***	0,23***
		(0,05)	(0,05)			(0,05)	(0,06)
Occ11	-0,58	0,69		0,38	0,25		0,33
	(0,47)	(0,51)		(0,64)	(0,34)		(0,31)
NoOcc		-0,02				-0,03	
		(0,03)				(0,03)	
Diagnostics							
N	23431	16711	18027	17387	18190	14326	13944
LogL	-8386,65	-5673,29	-5977,69	-5798,76	-5944,72	-4453,82	-4338,87
PseudoR^2	0,02	0,03	0,03	0,03	0,03	0,04	0,04
LRchi^2	346,79***	313,01***	314,78***	298,49***	387,60***	408,39***	382,01***
LR_match	13,71	14,43	19,80	21,05	16,30	10,47	10,59

Notes: *** denotes significance at 1 percent, ** denotes significance at 5 percent, * denotes significance at 10 percent. LR_match denotes likelihood after matching. In case of dummy variables, following were considered as reference: single (versus married and divorced), education level 4 (versus other levels), occupation level 4 (versus other levels).

Source: author's estimates based on LFS data.

Table S2. Probit estimates in Fairlie procedure, dependent variable employment, sample native

Variables	Estimated coefficients (standard errors)						
	2006	2007	2008	2009	2010	2011	2012
1	2	3	4	5	6	7	8
Constant	-3,13***	-2,82***	-3,05***	-2,84***	-1,50***	-1,78***	-1,71***
	(0,13)	(0,15)	(0,16)	(0,20)	(0,13)	(0,14)	(0,14)
Age 15-24	-1,28***	-1,37***	-1,33***	-1,48***	-1,39***	-1,21***	-1,40***
	(0,08)	(0,09)	(0,09)	(0,09)	(0,09)	(0,10)	(0,10)
Age 50-65	0,02	-0,04	0,00	0,07	0,20**	0,18*	-0,01
	(0,08)	(0,09)	(0,09)	(0,09)	(0,10)	(0,10)	(0,10)
Urban	0,21***	0,10	0,13**	-0,14**	0,16**	0,12	0,20**
	(0,06)	(0,07)	(0,06)	(0,08)	(0,07)	(0,08)	(0,08)
Male	0,67***	0,61***	0,69***	0,67***	0,56***	0,76***	0,79***
	(0,06)	(0,07)	(0,07)	(0,07)	(0,07)	(0,08)	(0,08)
Married	1,11***	0,86***	0,96***	0,97***	1,10***	1,18***	1,27***
	(0,07)	(0,09)	(0,08)	(0,09)	(0,09)	(0,10)	(0,10)
Divorced	0,82***	0,70***	0,80***	0,64***	0,90***	0,98***	0,87***
	(0,14)	(0,17)	(0,15)	(0,15)	(0,18)	(0,19)	(0,18)

1	2	3	4	5	6	7	8
Edu3	-0,72*				-2,15***	-1,69***	-1,34***
	(0,39)				(0,20)	(0,19)	(0,17)
Edu5	1,71***	1,77***	1,96***	1,94***	1,19***	1,21***	1,15***
	(0,13)	(0,15)	(0,16)	(0,17)	(0,10)	(0,11)	(0,11)
Edu6	2,71***	2,64***	2,78***	2,95***	-0,09	-0,10	-0,08
	(0,12)	(0,14)	(0,15)	(0,16)	(0,14)	(0,16)	(0,15)
Edu7	1,84***	1,80***	1,92***	1,78***	2,23***	2,01***	2,07***
	(0,14)	(0,17)	(0,17)	(0,18)	(0,15)	(0,17)	(0,18)
Edu8	3,68***	3,63***	3,65***	3,76***	2,16***	1,49***	1,02***
	(0,14)	(0,17)	(0,17)	(0,18)	(0,25)	(0,23)	(0,25)
Edu9	2,63***	2,84***	2,69***	2,53***			
	(0,16)	(0,18)	(0,19)	(0,21)			
Edu10	1,47				0,16	0,55	0,16
	(0,95)				(0,68)	(0,45)	(0,41)
Edu11					1,11***	0,76***	0,52***
					(0,16)	(0,18)	(0,18)
Diagnostics							
N	6026	4017	5382	4205	4478	3461	3393
LogL	-1368,87	-987,40	-1084,77	-940,76	-909,52	-750,29	-740,45
PseudoR^2	0,62	0,60	0,61	0,64	0,66	0,61	0,62

Notes: *** denotes significance at 1 percent, ** denotes significance at 5 percent, * denotes significance at 10 percent. The relative low number of observations from the overall sample is due to the potential multicolinearity of some of the variables. In case of dummy variables, following were considered as reference: single (versus married and divorced), education level 4 (versus other levels).

Source: author's estimates based on LFS data.

Table S3. Probit estimates in Fairlie procedure, dependent variable unemployment, sample native

Variables	Estimated coefficients (standard errors)						
	2006	2007	2008	2009	2010	2011	2012
1	2	3	4	5	6	7	8
Constant	0,03	0,00	-0,03	-0,03	0,53***	0,84***	0,96***
	(0,06)	(0,07)	(0,07)	(0,08)	(0,07)	(0,07)	(0,08)
Age 15-24	-0,00	0,05	-0,05	-0,05	0,05	-0,10**	-0,09*
	(0,04)	(0,05)	(0,05)	(0,05)	(0,04)	(0,05)	(0,05)
Age 50-65	-0,88***	-0,93***	-0,81***	-0,78***	-0,88***	-0,99***	-0,99***
	(0,04)	(0,05)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)
Urban	0,02	-0,10***	-0,06**	0,06*	-0,04	-0,06*	-0,01
	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)
Male	-0,02	-0,01	-0,00	0,02	0,05*	0,08**	0,06*
	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)	(0,03)
Married	-0,34***	-0,24***	-0,28***	-0,31***	-0,34***	-0,35***	-0,30***
	(0,03)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)
Divorced	-0,43***	-0,24***	-0,33***	-0,32***	-0,30***	-0,34***	-0,36***
	(0,06)	(0,07)	(0,07)	(0,07)	(0,06)	(0,07)	(0,07)
Edu1	0,33**	0,24	0,37*	-0,26	-1,05***	-0,74**	-0,68**
	(0,16)	(0,22)	(0,21)	(0,27)	(0,37)	(0,34)	(0,32)
Edu2	0,42**	0,58*	0,46	-0,19	-0,30***	-0,37***	-0,33***
	(0,18)	(0,32)	(0,37)	(0,40)	(0,10)	(0,11)	(0,11)
Edu3	-0,13	-0,24**	-0,06	-0,05	-0,42***	-0,44***	-0,45***
	(0,08)	(0,10)	(0,09)	(0,10)	(0,04)	(0,05)	(0,05)

1	2	3	4	5	6	7	8
Edu5	0,46***	0,45***	0,40***	0,30***	-0,08**	-0,10**	-0,10**
	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)
Edu6	0,40***	0,38***	0,34***	0,23***	-0,31***	-0,50***	-0,50***
	(0,04)	(0,04)	(0,04)	(0,04)	(0,07)	(0,07)	(0,07)
Edu7	0,14**	0,11	0,10	0,01	-0,22***	-0,14*	-0,16*
	(0,06)	(0,07)	(0,07)	(0,07)	(0,08)	(0,09)	(0,09)
Edu8	0,34***	0,48***	0,37***	0,17**	0,18	0,24	0,45***
	(0,06)	(0,07)	(0,07)	(0,08)	(0,17)	(0,16)	(0,16)
Edu9	0,84***	0,84***	0,65***	0,74***	0,08	0,82*	0,51
	(0,08)	(0,09)	(0,09)	(0,09)	(0,60)	(0,48)	(0,43)
Edu10	0,95***	0,72**	0,38	0,88***	-0,36	-0,19	-0,42*
	(0,23)	(0,29)	(0,41)	(0,30)	(0,42)	(0,26)	(0,23)
Edu11	0,43				0,53***	0,50***	0,47***
	(0,54)				(0,09)	(0,09)	(0,09)
Edu12					1,54***	1,05**	0,70
					(0,49)	(0,47)	(0,51)
Edu13					1,11***	0,62**	0,89***
					(0,24)	(0,31)	(0,25)
Occ1	-1,41***	-1,49***	-1,30***	-1,39***	-1,33***	-1,97***	-2,01***
	(0,14)	(0,18)	(0,15)	(0,15)	(0,14)	(0,22)	(0,20)
Occ2	-0,46***	-0,40***	-0,33***	-0,51***	-0,45***	-0,79***	-0,91***
	(0,09)	(0,10)	(0,10)	(0,11)	(0,10)	(0,13)	(0,14)
Occ3	-0,67***	-0,87***	-1,01***	-0,83***	-0,93***	-1,09***	-1,16***
	(0,09)	(0,12)	(0,12)	(0,11)	(0,10)	(0,11)	(0,10)
Occ5	-0,31***	-0,28***	-0,32***	-0,26***	-0,32***	-0,42***	-0,48***
	(0,05)	(0,06)	(0,06)	(0,06)	(0,06)	(0,07)	(0,07)
Occ6	-0,05	-0,06	-0,09*	-0,20***	-0,22***	-0,38***	-0,41***
	(0,04)	(0,05)	(0,05)	(0,05)	(0,05)	(0,05)	(0,05)
Occ7	0,48***	0,42***	0,31***	0,30***	0,48***	0,32***	0,33***
	(0,05)	(0,06)	(0,06)	(0,06)	(0,06)	(0,07)	(0,07)
Occ8	-0,18***	-0,16***	-0,24***	-0,32***	-0,25***	-0,39***	-0,46***
	(0,05)	(0,06)	(0,06)	(0,06)	(0,06)	(0,06)	(0,07)
Occ9	-0,07	-0,13**	-0,22***	-0,28***	-0,14**	-0,32***	-0,31***
	(0,05)	(0,06)	(0,06)	(0,06)	(0,06)	(0,06)	(0,06)
Occ10	0,31***	0,36***	0,34***	0,22***	0,32***	0,17***	0,04
	(0,05)	(0,06)	(0,06)	(0,06)	(0,06)	(0,06)	(0,06)
Occ11	-0,13	0,04	-0,20		-0,97**	-0,07	-0,10
	(0,32)	(0,64)	(0,61)		(0,52)	(0,34)	(0,32)
NoOcc	-1,32***	-1,34***	-1,28***	-1,32***	-1,45***	-1,56***	-1,71***
	(0,03)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)	(0,04)
Diagnostics							
N	20638	14835	16077	15483	16267	12893	12551
LogL	-6941,55	-4802,05	-4896,52	-4673,95	-5190,91	-4198,98	-4187,79
PseudoR^2	0,17	0,18	0,16	0,16	0,20	0,22	0,24

Notes: *** denotes significance at 1 percent, ** denotes significance at 5 percent, * denotes significance at 10 percent. In case of dummy variables, following were considered as reference: single (versus married and divorced), education level 4 (versus other levels), occupation level 4 (versus other levels).

Source: author's estimates based on LFS data.