sciendo Zagreb International Review of Economics & Business, Vol. 26, No. 2, pp. 183-202, 2023

Faculty of Economics and Business, University of Zagreb and Sciendo. Printed in Croatia.
ISSN 1331-5609; UDC: 33+65
DOI: 10.2478/zireb-2023-0020
CONFERENCE PAPER

The Fiscal Consequences of Emigration: Evidence from Croatia

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Abstract: *This article examines how the large shock in emigration following Croatia's accession to the European Union affected local public finances. To do so, a difference in differences research design has been used on a balanced panel dataset of municipality level observations over a ten-year period. The areas that experienced the largest emigration in the post 2014 period saw a large negative decrease in total tax revenue over the subsequent years, mainly driven by income tax revenue decrease. The results of this research warn that large emigration flows can lead to a cycle of economic degeneration as local areas lose fiscal revenue to spend on local services, in turn making them less likely to attract citizens.*

Keywords: Croatia; Migration; Local Public Finance; Difference in Differences Design

JEL Classification: H71, F22

Introduction

According to the 2021 Census, the Republic of Croatia has a population of 3.87 million people. This means that during the past decade (as compared to the 2011 Census), the number of inhabitants decreased by close to 0.5 million or almost 10% of the population. The last decade in Croatian history overlaps with the accession to the European Union, which led to many demographic, economic, social, and judicial changes across the country. It allowed Croatian citizens to freely emigrate and gain access to labour markets in other European Union members which has led to a large emigration wave post 2014 (Ivandic, 2022) with the relative economic prosperity of the Western Member States having had a large pull effect on immigrants. The study of Croatia, as a predominantly labour net exporting country, invites a closer understanding of the regional divide in emigration and its economic consequences.

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A number of studies have estimated the economic consequences of the accession to the European Union at the aggregate level (Becker, Egger and Von Ehrlich, 2012; Lejour, Mervar, and Verweij, 2008, Black et al, 2010). However, there is less understanding about the economic consequences of this large emigration shock how it affected different local areas across Croatia. Therefore, it is important to understand whether, despite its positive effects at the aggregate level in promoting a series of socio-economic reforms, it has had negative effects on regions who experienced the largest emigration flows.

The following article aims to fill this gap in the literature by asking whether the shock in migration flows following EU accession affected local public finances. To do so, a detailed and newly matched dataset at the municipality level over the period of almost two decades is used. First, this research describes the heterogeneous effects of the accession to the European Union on migration flows across municipalities following results from Ivandic (2022). Next, this heterogeneity is used to examine how this exogenous shock in migration flows affected local public finances. The analysis uses an econometric research design known as the Difference-in-Differences that studies the causal differential effect of a treatment by comparing the average change over time in the outcome variable for the treatment area, compared to the average change over time for the control area. This method allows causal identification when using observational data by assuming that in the absence of treatment, the unobserved differences between treatment and control groups are the same over time.

The starting point of the analysis builds on the results from Ivandic (2022) showing that regions of Slavonia and regions bordering Bosnia and Herzegovina experienced a sharp increase in international emigration to EU Member States, having been granted access to the EU labour markets. Next, the research examines what were the fiscal effects in these 'hard-hit' areas. In areas that experienced high levels of emigration on average the total tax revenue dropped by around 40 percent yearly in the period after the EU accession. The fact that there are no differences in local finances in areas that experience high migration and areas that don't in the years preceding EU accession, confirms the internal validity of the research design. Specifically, this drop is driven primarily by a decrease in total income tax revenue. These results offer evidence that regional inequalities could lead to different migration patterns that in turn lead to a large loss in productivity at the local level and further exacerbate the inequality across regions.

The rest of the paper is structured as follows. The second section reviews the literature on this topic. The following section provides a detailed discussion of emigration patterns following the accession to the European union. The fourth section discuss the data and the research design used to estimate the causal findings, while the fifth section discusses the findings of the paper. Finally, the last section concludes by summarising the main findings and opening the discussion on further work in this area.

Literature Review

This research contributes to several strands of literature. First, it provides an insight into the positive and negative economic effect of accession to the European Union. The vast majority of articles about EU integration point out that the major success of the EU accession are the political and economic aspects, with an emphasis on macroeconomic stability and political security (Baldwin, Francois and Portes (1997), Breuss (2001)). Breuss (2001) concludes that the shortcoming of all these calculations is either that they did not include all possible integration effects which one can expect in case of EU enlargement as a specific kind of regional integration of a rich EU region with a poor Central and Eastern European Countries (CEEC) region, and on the other hand, they mostly analysed the consequences only for the blocks of CEECs, but not for all countries involved in this enlargement process.

Lejour, Mervar and Verweij (2008) calculated the potential economic effects of Croatia's Accession to the European Union and estimated Croatia will gain additional annual welfare benefits in the total of 1.1 billion euros and that GDP will increase by 1.1%, but that these effects are dependent on whether the quality of institutions improves in the meantime. The academic debate about the motivation for the EU integration is still ongoing and suggests that there are other considerations besides a material cost-benefit calculation (Sedelmeier, 2014). Although most studies focus on the effect on economic growth, some research shows insights into how particular reforms led to occasionally negative effects. Tomić (2020) finds that the liberalisation, pushed by EU accession, of employment protection for temporary and permanents contracts led to a rise in temporary employment. This article further develops these arguments empirically. These results give a detailed understanding that while many regions experienced economic growth due to EU accession, other local areas are losing a significant amount of their working age population which is further exacerbating their local finances.

Second, this research relates to the academic literature in economic effects of migration flows. Most of this research examines the effects of immigration on wages and employment rates for non-immigrant workers (Dustmann, Hatton and Preston, 2005). This literature is far more abundant in looking at the effects of immigration on economic outcomes (Aksu et al. (2018); Manacorda et al (2012)), and scarce on the effects of emigration on economic outcomes in the origin country. Škuflić and Vučković (2018) use cross-country comparisons to find that emigration could also have an adverse effect on emigrant countries' labour markets by increasing the unemployment rate. Barrell, Ray and Riley (2007) highlight the impacts in the receiving and sending countries and pointed out that the workers emigrating from the poorest New Member States (NMSs) from the 2004 enlargement predominantly went to Ireland and the UK partly due to their liberal immigration policies adopted and restrictive policies adopted elsewhere in the EU. Franc, Časni and Barišić (2019) using a cross-country

comparison show that the increase in the overall unemployment rate in the emigration country will increase the emigration rate. This article overcomes the issues of other confounders leading to an omitted variable bias by focusing on within country variation rather than across countries comparisons and by using a difference-in-differences research design. Moreover, it allows overcoming the measurement error by focusing on within country variation across municipalities. While Draženović, Kunovac and Pripužić (2018) discuss that existing annual statistics underestimate the extent of emigration by 2.5 times which is in line with the newly released 2021 Census, note that as long as that measurement error is constant across municipalities (which it plausibly should be), the results in this research would not be affected.

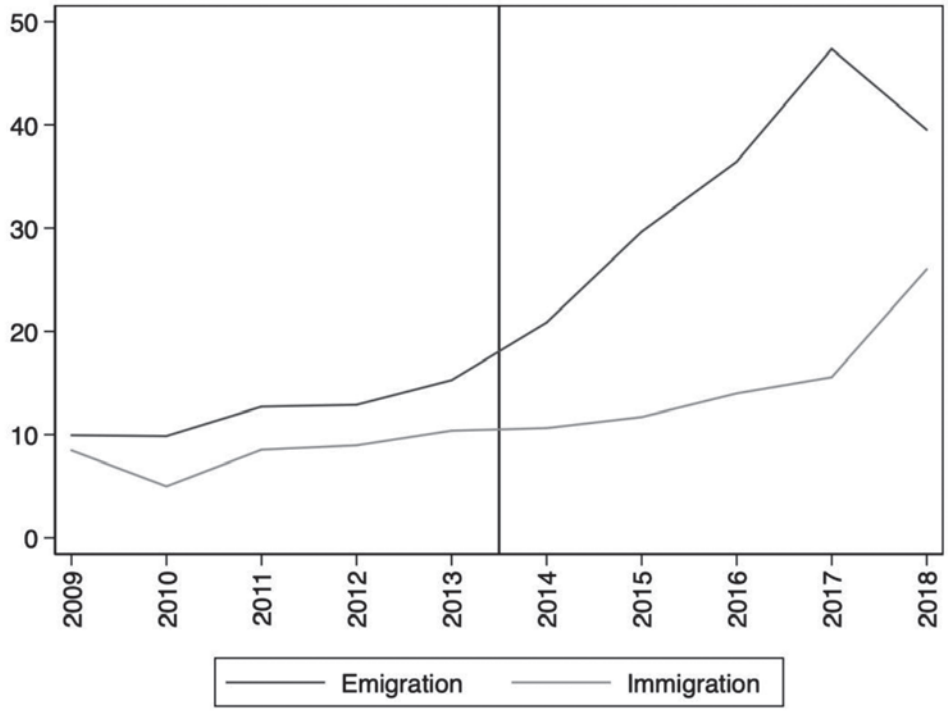
Emigration Patterns following EU Accession

The access to the European Union labour markets occurred in a staggered timeline. Even though the Republic of Croatia became a member of the European Union in July 2013, the Freedom of movement and labour rights for Croatian citizens workers in the European Union were granted over the following seven-year period. In July 2013 half of the 27 member states allowed Croatian citizens to work without restrictions in the labour market. In July 2015, two years after the accession, another seven countries, including Germany, allowed Croatian citizens to work without restrictions in the labour market. Malta, Netherlands, Slovenia and the United Kingdom extended their labour market in July 2018, and finally Austria did so in July 2020.

In Figure 1, one can observe that the liberalisation of labour markets to Croatian citizens in the period post 2013 had an immediate effect on international migration flow as discussed in Ivandic (2022). The black line on the Figure 1 marks July 2013 when Croatia entered the European Union. While immigration of foreign nationals to Croatia remains stable in the period 2011 to 2017 (with a first significant increase in 2018), yearly international emigration remains stable around 12 thousand in the period between 2011 and 2013 and soars up almost immediately from 2013. In the period 2016-2017, the international emigration quadrupled from its pre-2013 numbers to around 45 thousand people emigrating each year.

However, there is substantial variation in the level of emigration across the 576 Croatian cities and municipalities. To test whether there are inequalities in the extent of emigration, a measure of Exposure to emigration is calculated for each of the municipalities. Exposure to emigration is calculated as the total of international emigration in the period from 2011 to 2018 as a share of the average yearly population during that period.

Figure 1: International Emigration and Immigration Flows (in thousands), 2011-2018



Note: From Ivandic (2022). The black line marks July 2013 when Croatia entered the European Union.

This is visualised in Figure 2. A substantive part of Croatia coloured in white on the Figure experienced almost no emigration during this period. However, there are pockets of geographical areas with very high levels of emigration. Almost all of the region Slavonia and the inland municipalities of Dalmatia coloured in grey experienced a loss of 5 to 15% of their existing population as a result of international immigration to the European Union. Even more, municipalities in black, around the inland North West border to Bosnia and Herzegovina experienced a loss of 15 to 40% of their population due to international emigration. This numbers are very large in magnitude especially when most of the emigrants are known to be working-age population, hence the loss in productivity and labour in these areas is huge.

Figure 2: Total Emigration as Share of Population across Municipalities

Note: From Ivandic (2022).

One thing becomes clear, emigration is not the comprehensive story of the whole of Croatia, it is a phenomenon present in concentrated areas across the country. As the goal is to capture local geographical areas that were strongly affected by the post-EU emigration, it is appropriate to use the right tail of the distribution of exposure in the next analysis. A municipality is defined as being *Treated* with post-EU emigration if 10% or more percent of its population emigrated abroad in the period 2014-2018. This operationalisation is used in the analysis of the economic consequences of high post-EU emigration.

Data and Methodology

Data

This research constructs a novel and unexplored dataset matched from several sources of data at the municipality level. In Croatia, the local government sector consists of counties as units of regional governance and municipalities and cities as units of local governance. Local governance consists of 428 municipalities and 127 cities. The first set of data comprises of series of yearly administrative records on internal and international migration, balanced at the municipality level in the Republic of Croatia. The main source of data is the Population and Migration Data at the municipal level collected by The Ministry of Interior of Croatia at the annual level from 2002 to 2018. The international migration statistics collects and processes data on international migration flows, i.e. the data on number and characteristics of persons who changed their country of residence in a given calendar year (this is captured in the variables *Emigration* and *Immigration* as the total number of people who emigrated/immigrated in the given year from/to the municipality). Data on migration encompass Croatian citizens and foreigners who have been granted temporary or permanent stay in the Republic of Croatia, however when the emigration numbers are broken down, a majority (around 95%) are Croatian citizens emigrating abroad. This data is complemented with total populations statistics from the Population and Migration Data from Croatian Bureau of Statistics at the annual level from 2002 to 2018 at the municipal level (variable *Average Population*). Table 1 shows the summary statistics of the main variables. It also contains averages of the variables *Emigration, Relative* and Immigration, Relative which is the total Emigration/Immigration in the given year and municipality divided by the recorded level of population living in that municipality in the year. The variable *Treated* is defined at the municipality level if 10% or more percent of its population emigrated abroad in the period 2014-2018

This data sources are complemented with the Local Finance Data from the Ministry of Finance at the annual level from 2002 to 2018 for every municipality and town (Šinković (2019); Ott, K., & Bajo, A. (2001)). In Figure A.1. the total collected tax revenue per capita is plotted for each municipality for the year 2018 to demonstrate the wealth of the data. The variable *Tax Revenue* is the total collected tax revenue across municipalities, while the variable *Income Tax Revenue* denotes the total collected tax revenue from income tax across municipalities. The functions, scope and organization of local units in Croatia are prescribed by the Law on Local and Regional Self-Government. Municipalities are established along the area of several populated places that represent a natural, economic, and social whole, and are connected by the common interests of the population. Municipalities and cities perform activities of local importance that directly meet the needs of citizens: landscaping and housing, spatial and urban planning, utilities, childcare, social welfare, primary health care,

education and primary education, culture, physical education and sports, consumer protection, protection and improvement of the natural environment, fire and civil protection, traffic in its area and other activities in accordance with special laws.

Table 1: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Treated	0.173	0.378	0	1	9435
Treated x After	0.051	0.22	0	1	9435
Average Population	7,662	35,649	241	788,554	9,435
Emigration, Relative	0.005	0.008	0	0.2	9,328
Immigration, Relative	0.003	0.005	0	0.107	9,328
Emigration	29	146	0	6,814	9,328
Immigration	22	112	0	6,398	9,328
Log(Tax Revenue)	15.002	1.367	10.175	22.436	9,315
Log(Income Tax Revenue)	14.764	1.378	9.523	22.371	9,314
Tax Revenue	17,890,184	193,833,111	0	5,542,587,995	9,358
Income Tax Revenue	15,048,497	171001768	0	5,192,919,535	9,358

Methodology

The aim of the analysis is to isolate the effect of migration following the accession to the European Union on local public finances. However, there are many observable and unobservable factors that might lead different municipalities to be differently affected by reforms during the accession process and have different levels of economic development. At the same time the distance to the border might affect levels of economic development but as well can differently affect migration preferences, and economic development certainly changes the state of local finances. In sum, isolating the causal effect requires a research design that can control for observable and unobservable confounders. For this reason, this research uses a difference in differences research design.

The main results of this research are obtained using a difference in differences research design (for a methodological overview, see Angrist and Pischke (2008), Lozano and Steinberger (2012)). Difference in differences (DiD) research design looks at the differential effect of a treatment by comparing the average change over time in the outcome variable for the treatment group, compared to the average change over time for the control group. Croatia's EU accession is a natural experiment which led to a huge, geographically heterogenous spike in emigration, and this shock allows to identify the effect of emigration on an outcome of interest, namely on local public finances. The accession to the European Union is treated as an event assuming that in absence of this event the time series data would have continued the same trend as until the event occurred.

The difference-in-differences (DiD) equation:

$$Y_{i,t} = \beta_1 [Treated_i \ x \ Post_t] + \delta_t + \alpha_i + u_{i,t} \quad \text{a(1)}$$

where $y_{i,t}$ is the dependent variable of the analysis, namely local public finance outcomes for in a municipality *i* at time *t*; α_i is a dummy for every municipality *i*; *Treated (with EU emigration)* is defined at the municipality level if 10% or more percent of its population emigrated abroad in the period 2014-2018*;* $Post_t$ is a dummy variable indicating that the year *t* is equal or larger than 2014 denoting the period of EU membership; and δ_t is a dummy for every year *t*. Standard errors have been clustered at the municipality level throughout all specifications.

The temporal effects and parallel trends are estimated by including the yearly leads and lags into the previous Equation 1:

$$Y_{i,t} = \sum_{t=-3}^{3} \beta_{i,t} [Treated_i \times Post_t] + \delta_t + \alpha_i + u_{i,t} \quad (2)$$

There are two points worth noting, First, this research design exploits regional variation in the impact of the emigration following accession. It does so by comparing the trends in areas that experiences high levels of emigration (if 10% or more percent of its population emigration abroad in the period 2014-2018) to areas that experience smaller level of emigration. In the robustness analysis reported in Table A.2. this definition of *Treated* has been altered to different definition of the treatment and control group, where the top 25% of municipalities by emigration levels are coded as the treatment group while the bottom 25% of municipalities by emigration levels have become the control group. Moreover, in a further robustness check in Table A.1., the binary definition of Treated is replaced by the continuous measure of the treatment as defined by the share of total emigration in the population.

Second, the dependent variables of interest are local public finance outcomes for municipality *i* in year *t* from the Ministry of Finance. In Figure A.1. the absolute levels of the total local tax revenue per capita are visualised across the country. As the variation in the levels of local finances (revenue and spending) vary substantially across municipalities and the distributions of local finances have a very right skewed distribution, the dependent variable is transformed to the log. This allows the distribution of the log variable to be more symmetric, reduce the influence of outliers and the residuals of the regression will also follow a normal distribution. In Figure A.2., the log-transformed distribution of the two main variables (total tax revenue and total income tax revenue) is visualised. More intuitively, the log transformations of the dependent variable allow to evaluate the percentage change in the outcome variable which is especially important as levels of the variables vary substantially across municipalities.

The key identifying assumption here is known as parallel trends, i.e. the assumption that fiscal revenue trends would be the same in both areas in the absence of

treatment (Angrist and Pischke (2008)). Treatment induces a deviation from this common trend. The difference-in-differences research design allows the treatment and control areas to differ in characteristics that effect the treatment, as this difference is captured in the municipality fixed effect α_i. Moreover, general changes in time or policy that followed the accession but affected all the areas equally are captured in the δ_t that control for unobserved but area-invariant reforms and changes across time. The parallel trends assumption can be investigated by using data on multiple periods before the event (European Union accession).

In sum, this method allows causal identification when using observational data by assuming that in the absence of treatment, the unobserved differences between treatment and control groups are the same over time. The approach removes biases in post-intervention period comparisons between the treatment and control area that could be the result from permanent differences between those areas, as well as biases from comparisons over time in the treatment area that could be the result of trends due to other causes of the outcome. More intuitively, it controls for many potential threats to causal estimation. For example, if we consider that potentially different areas received different EU regional or project funding that eventually caused different emigration patterns and affected local finances, this would be controlled for in this design as we observe no differential pre-trends across the treatment and control areas in the years preceding 2014 when pre-accession funding was occurring. On the other hand, if we assume that areas bordering the Member states would have both had differential emigration patterns, but also benefited differently in tax collected (e.g. through tourism), this would be captured by the fixed effect for each municipality.

Results: Emigration Effects on Local Public Finance

The main outcome of interest is the total collected tax revenue at the municipality level. The results of the difference in differences estimation on total tax revenue (log transformed) are reported in Table 2. A municipality is defined as being *Treated with EU emigration* if 10% or more percent of its population emigration abroad in the period 2014-2018. In total this is 96 municipalities, or 17% of the total number of municipalities. Column 1 reports the standard difference in differences coefficient from Equation 2, while column 2 reports the full leads and lags from Equation 3. In Column 3, the period of analysis is extended back to 2002 capturing almost two decades of data. This allows controlling for a longer time-period in the possible pre-trends.

For easier interpretation, the results in column 2 (the preferred specification) are visualised in Figure 4. In areas that experienced high levels of emigration on average the total tax revenue drops by 30-40 percent yearly in the period after the EU accession. It is worth stressing that there are no differences in local finances in areas that experience high migration and areas that don't in the years preceding EU accession

as shown by the result that the coefficients on the pre-trends are not jointly significant. Moreover, the inclusion of the municipality dummies controls for any time-invariant differences across the treatment and control areas such as the structure of their local economies.

Table 2: Main Results: Fiscal Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**L(Tax)**	**L(Tax)**	**L(Tax)**	**L(Inc.Tax)**	**L(Inc.Tax)**	**L(Inc.Tax)**
Event, t-2		-0.015	-0.048**		-0.018*	-0.070***
		(0.012)	(0.020)		(0.010)	(0.021)
Event, t-1		-0.034**	-0.068***		-0.035***	-0.087***
		(0.014)	(0.022)		(0.013)	(0.024)
Event		-0.070***	-0.104***		-0.078***	-0.130***
		(0.017)	(0.023)		(0.016)	(0.027)
Event, t+1		-0.330***	-0.363***		-0.392***	-0.443***
		(0.039)	(0.044)		(0.045)	(0.052)
Event, t+2		-0.284***	-0.317***		-0.327***	-0.378***
		(0.035)	(0.040)		(0.038)	(0.047)
Event, t+3		-0.364***	-0.397***		-0.443***	-0.494***
		(0.044)	(0.050)		(0.053)	(0.059)
Event, t+4		0.230***	0.197***		0.249***	0.198***
		(0.059)	(0.065)		(0.065)	(0.070)
Treated x After	-0.147***			-0.180***		
	(0.024)			(0.028)		
Observations	4,400	4,400	9,315	4,400	4,400	9,314
R-squared	0.965	0.967	0.964	0.957	0.960	0.958
Municipality Fixed Effect	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Period	2010-2018	2010-2018	2002-2018	2010- 2018	2010- 2018	2002- 2018

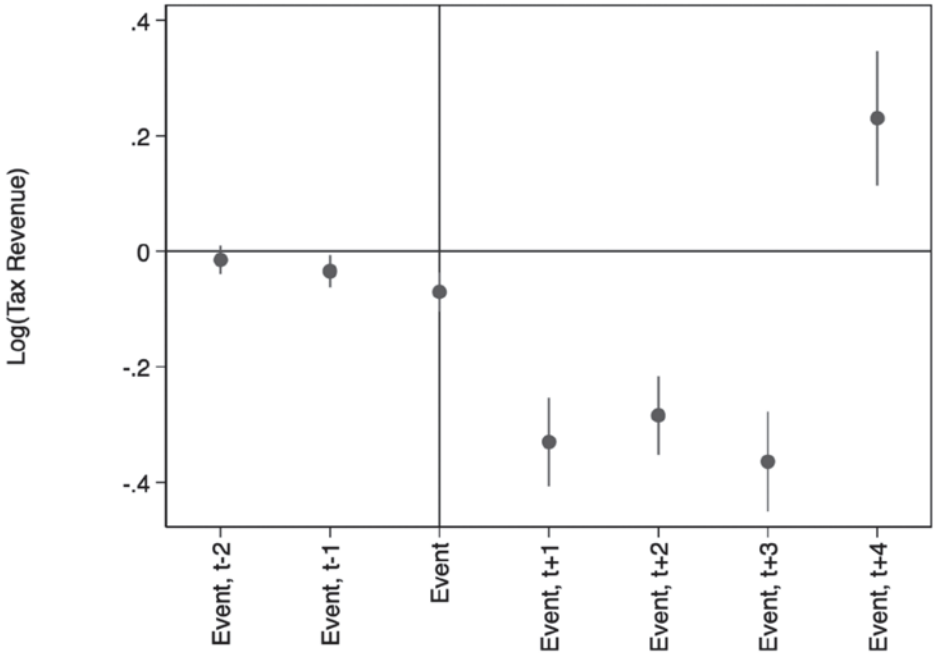
Clustered standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Note: Author's calculation. Source of data is the Croatian Bureau of Statistics (CBS) and Ministry of Finance (MoF).

The negative and sizeable effect in collected tax revenues following EU accession comes from the effect of emigration. There is also considerable variation in the magnitude of the estimates by each year. We observe that in the first year the total tax revenue decreased by on average 7 percent, up to 28-33 percent decrease in the following three years. We also observe that in the fifth year the effect becomes positive, although this is somewhat unexpected, it also does mirror the overall emigration trends as shown in Figure 1 where in the last year, emigration starts to decrease. There could be additional factors administered at the local level that are

further changing this trend in the long run, or a mechanical regression to the mean effect could be present. Next, I explore specifically what is driving most of this effect when the total tax revenue is disaggregated across categories.

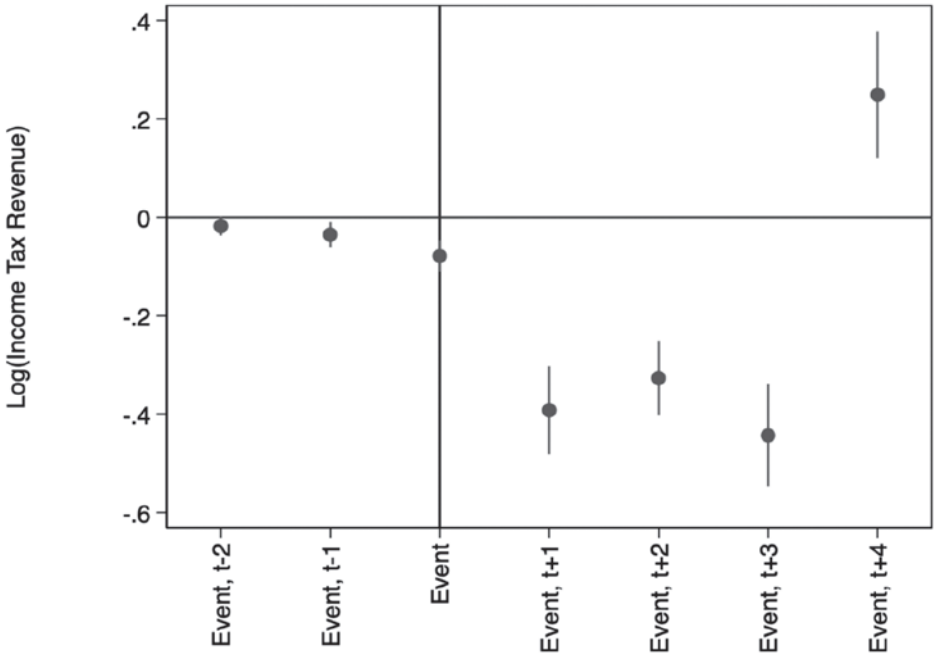
Figure 4: Difference in Differences: Effect of Emigration on Tax Revenue



Note: Author's calculation. Source of data is the Croatian Bureau of Statistics (CBS) and Ministry of Finance (MoF). The black line marks the year 2014, the first full year of Croatian EU membership.

In Figure 5, the results of the difference in differences estimation on the total income tax revenue (log transformed) are shown. When total taxes are disaggregated across its main categories, one can observe that the main effect is driven by a drop in income tax revenue. On average the total income tax revenue drops by around 40 percent yearly in the period after the EU accession. Similarly, the insignificance of pre-trends shows there are no differences in local finances before EU accession in areas that will experience high migration and areas that won't.

Figure 5: Difference in Differences: Effect of Emigration on Tax Revenue



Note: Author's calculation. Source of data is the Croatian Bureau of Statistics (CBS) and Ministry of Finance (MoF). The black line marks the year 2014, the first full year of Croatian EU membership.

In the robustness analysis reported in Table A.2. the definition of *Treated* has been altered to different definition of the treatment and control group, where the top 25% of municipalities by emigration levels are coded as the treatment group while the bottom 25% of municipalities by emigration levels have become the control group. Moreover, in a further robustness check in Table A.1., the binary definition of Treated is replaced by the continuous measure of the treatment as defined by the share of total emigration in the population. Finally, in Table A.3. county by year fixed effects are included to account for differential economic outcomes through time across regions. In these additional analyses, the results remain unchanged in magnitude and direction.

Conclusion

Understanding local differences at the municipality level is very important in understanding the consequences of emigration across Croatia. A newly merged dataset combining various data sources to explore the effects of heterogeneity of emigration flows on local public finances is used in this study. The research shows that the areas that experienced the largest emigration in the post 2014 period saw a large negative

decrease in total tax revenue over the subsequent years, mainly driven by income tax revenue decrease. As a significant proportion of the working age population emigrated, on average the total income tax revenue decreased by around 40 percent yearly in the period after the EU accession. The results of this research warn that large emigration flows can lead to a cycle of economic degeneration as local areas lose fiscal revenue to spend on local services, in turn making them less likely to attract citizens.

Further research can tackle other dimensions of this phenomenon – understanding how emigration varies geographically allows a deeper understanding in what are the 'push' and 'pull' factors in these areas. Are there factors beyond economic opportunity that can explain this variation? For example, do childcare provision and child allowances act as a 'pull' factor in retaining working age populations? Can other instruments such as childcare, social welfare, and education provision that are under the local jurisdiction counteract the negative economic opportunities? Although these questions remain open for further analysis, this newly merged dataset could allow preliminary analysis of these hypotheses.

Declarations

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of interest/Competing interests

There is no conflict of interest/Competing interests.

Availability of data and material

The data to replicate the results from this article is not publicly available but can be obtained by requesting it directly from the author for scientific purposes.

Code Availability

The code to replicate the results from this article is not publicly available but can be obtained by requesting it directly from the author for scientific purposes.

Authors' Contributions

Not applicable as the article is single-authored.

Appendices

Table A.1: Robustness: Continuous Treatment

	(1)	(2)	(3)	(4)
VARIABLES	**L(Tax)**	**L(Tax)**	**L(Inc. Tax)**	**L(Inc.Tax)**
Event, t-2		-0.040		-0.239
		(0.198)		(0.230)
Event, t-1		-0.148		-0.321
		(0.213)		(0.224)
Event		-0.285		-0.489**
		(0.215)		(0.226)
Event, t+1		-1.868***		-2.539***
		(0.306)		(0.289)
Event, t+2		-1.394***		-1.879***
		(0.421)		(0.447)
Event, t+3		-1.961***		-2.731***
		(0.435)		(0.506)
Event, t+4		1.655***		1.573***
		(0.463)		(0.493)
Emigration x After	-0.762***		-1.026***	
	(0.152)		(0.163)	
Observations	4,400	9,315	4,400	9,314
R-squared	0.965	0.964	0.957	0.959
Municipality Fixed Effect	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Period	2010-2018	2002-2018	2010-2018	2002-2018

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Author's calculation. Source of data is the Croatian Bureau of Statistics (CBS).
The black line marks the year 2014, the first full year Croatia was an EU Member State.

Table A.2: Robustness: New Definition of Treatment and Control Municipalities

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**L(Tax)**	**L(Tax)**	**L(Tax)**	**L(Inc.Tax)**	**L(Inc.Tax)**	**L(Inc.Tax)**
Event, t-2		-0.024	-0.038*		-0.024*	-0.068***
		(0.016)	(0.022)		(0.014)	(0.023)
Event, t-1		-0.045***	-0.059**		-0.039**	-0.083***
		(0.017)	(0.023)		(0.017)	(0.025)
Event		-0.073***	-0.088***		-0.062***	-0.106***
		(0.019)	(0.026)		(0.019)	(0.028)
Event, t+1		-0.326***	-0.341***		-0.386***	-0.430***
		(0.044)	(0.048)		(0.049)	(0.055)
Event, t+2		-0.265***	-0.279***		-0.307***	-0.351***
		(0.039)	(0.045)		(0.043)	(0.051)
Event, t+3		-0.335***	-0.349***		-0.416***	-0.460***
		(0.048)	(0.052)		(0.055)	(0.060)
Event, t+4		0.247***	0.233***		0.266***	0.222***
		(0.063)	(0.069)		(0.069)	(0.075)
Treated x After	-0.130***			-0.159***		
	(0.022)			(0.026)		
Observations	4,400	2,196	4,659	4,400	2,196	4,658
R-squared	0.965	0.961	0.955	0.957	0.952	0.948
Municipality Fixed Effect	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Period	2010-2018	2010-2018	2002-2018	2010-2018	2010-2018	2002-2018

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Author's calculation. Source of data is the Croatian Bureau of Statistics (CBS).

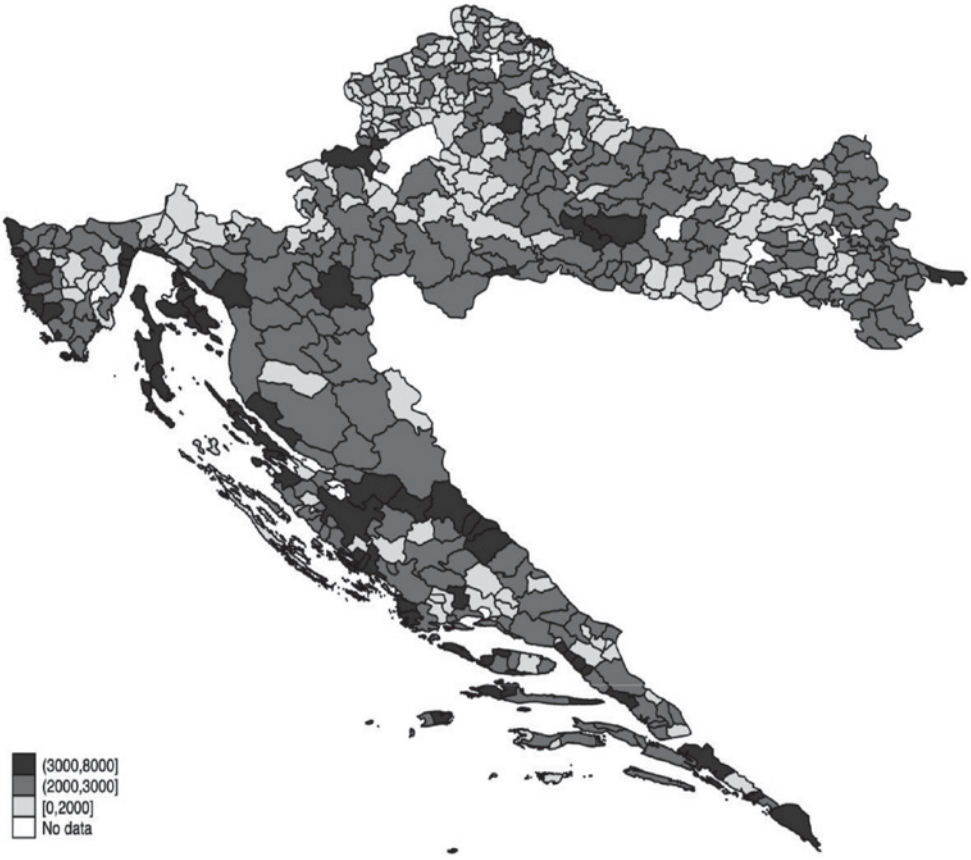
Table A.3: Robustness: Including County by Year Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	**L(Tax)**	**L(Tax)**	**L(Tax)**	**L(Inc.Tax)**	**L(Inc.Tax)**	**L(Inc.Tax)**
Event, t-2		0.006	-0.037		0.004	-0.036
		(0.017)	(0.024)		(0.014)	(0.026)
Event, t-1		-0.013	-0.056**		-0.018	-0.058**
		(0.017)	(0.026)		(0.015)	(0.029)
Event		-0.031	-0.074***		-0.034*	-0.074**
		(0.019)	(0.029)		(0.018)	(0.033)
Event, t+1		-0.185***	-0.229***		-0.241***	-0.281***
		(0.046)	(0.051)		(0.052)	(0.061)
Event, t+2		-0.187***	-0.231***		-0.223***	-0.264***
		(0.042)	(0.049)		(0.046)	(0.057)
Event, t+3		-0.228***	-0.271***		-0.303***	-0.344***
		(0.050)	(0.056)		(0.060)	(0.068)
Event, t+4		0.061	0.017		0.057	0.017
		(0.062)	(0.069)		(0.069)	(0.075)
Treated x After	-0.111***			-0.143***		
	(0.028)			(0.032)		
Observations	4,392	4,392	9,298	4,392	4,392	9,297
R-squared	0.973	0.973	0.968	0.967	0.968	0.963
Municipality Fixed Effect	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
County x Year Fixed Effects	YES	YES	YES	YES	YES	YES
Period	2010-2018	2010-2018	2002-2018	2010-2018	2010-2018	2002-2018

Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Author's calculation. Source of data is the Croatian Bureau of Statistics (CBS).

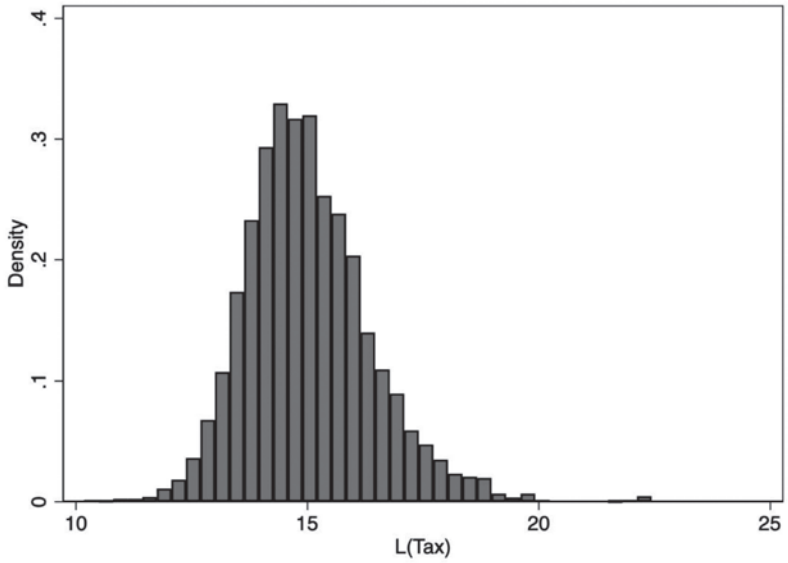
Figure A.1: Geographical Distribution of Taxes Collected (Per Capita), 2018



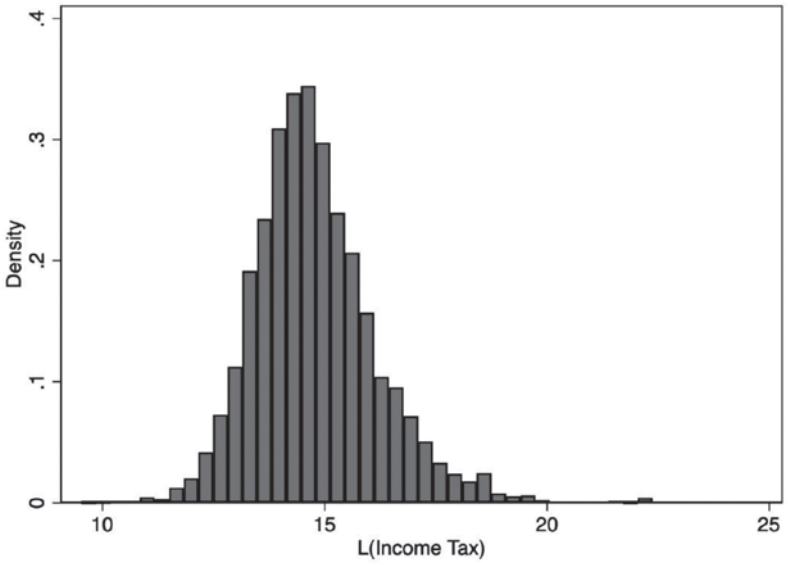
Note: Author's calculation. Source of data is the Ministry of Finance (MoF).

Figure A.2: Distribution of the Log Transformed Total Tax and Income Tax Revenue

a)



b)



Note: Author's calculation. Source of data is the Ministry of Finance (MoF).

REFERENCES

Angrist, J. D., & Pischke, J. S. (2008). Mostly harmless econometrics: An empiricist's companion. Princeton university press.

Baldwin, R.E., Francois, J.F., and Portes, R., 1997. The costs and benefits of eastern enlargement: the impact on the EU and central Europe. Economic Policy, 12(24), p. 127-176.

Barrell, R., Ray, J. F., and Riley, R., 2007. EU enlargement and migration. Assessing the Macroeconomic Impact. London: NIESR Discussion Paper.

Becker, S., Egger, P., and Von Ehrlich, M., 2012. Too much of a good thing? On the growth effects of the EU's regional policy. European Economic Review, 56(4), p.648-668.

Black, R., Pantîru, C., Okólski, M., & Engbersen, G. 2010. A continent moving west?: EU enlargement and labour migration from Central and Eastern Europe (p. 344). Amsterdam University Press.

Breuss, F., 2001. Macroeconomic effects of EU enlargement for old and new members. WIFO Working Papers, 143, Vienna: Austrian Institute of Economic Research (WIFO).

Draženović, I., Kunovac, M. and Pripužić, D., 2018. Dynamics and determinants of emigration: the case of Croatia and the experience of new EU member states. Public Sector Economics, 42(4), p.415-447.

Dustmann, C., Hatton, T. and Preston, I., 2005. The labour market effects of immigration. The Economic Journal, 115(507), p.F297-F299.

Franc, S., Časni, A. and Barišić, A., 2019. Determinants of Migration Follow-ing the EU Enlargement: A Panel Data Analysis. South East European Journal of Economics and Business, 14(2), p.13-22.

Ivandic, R. "Heterogeneous consequences on emigration following European Union accession: Evidence from Croatia", Proceedings of FEB Zagreb 13th International Odyssey Conference on Economics and Business, ISSN 2671-132X Vol. 4, No. 1, pp. 1-1190, June 2022, Zagreb

Lejour, A., Mervar, A., and Verweij, G., 2008. The economic effects of Croatia's accession to the EU. Economics Discussion Paper. 2008-6.

Lozano, F. A., & Steinberger, M. D., 2012. Empirical methods in the economics of international immigration. Handbook of Research Methods in Migration, 163-185.

Manacorda, M., Manning, A. and Wadsworth, J., 2012. The impact of immigration on the structure of wages: theory and evidence from Britain. Journal of the European economic association, 10(1), pp.120-151.

Ott, K., & Bajo, A., 2001. Lokalne financije i lokalni proračun u Republici Hrvatskoj. Financijska teorija i praksa, 25(3), 311-449.

Pavić, D., and Ivanović, I., 2019. Razlike u prikupljanju migracijskih podataka: usporedba Hrvatske i odabranih europskih zemalja. Migracijske i etničke teme, 35(1), p.7-29.

Sedelmeier, U., 2014. Europe after the eastern enlargement of the European Union: 2004-2014. Europe for Citizens. Heinrich Böll Stiftung European Union, 1-12.

Šinković, Z. «Financiranje jedinica lokalne i područne (regionalne) samouprave.» Zbornik radova Pravnog fakulteta u Splitu 56.1 (2019): 223-250.

Škuflić, L., and Vučković, V., 2018. The effect of emigration on unem-ployment rates: the case of EU emigrant countries. Economic research, 31(1), p.1826-1836.

Tomić, I., 2020. Employment protection reforms and labour market outcomes in the aftermath of the recession: Evidence from Croatia. Public Sector Economics, 44(1), p.3-39.