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ABSTRACT

In this paper we examine how Finnish municipalities' expenditures depend on the demographic structure of the population. More precisely, we scrutinize the role of foreign citizens: how does the share of foreign citizens out of the total population manifest itself in total expenditures and some key expenditure categories. The study makes use of Finnish panel data from 249 municipalities for the period 2000-2014. Empirical analyses show that foreign population tends to increase per capita expenditures up to the point where the respective semi-elasticity is about one. The result seems robust in terms of different control variables, subsamples of the data and different estimation techniques. Also, it is found that similarly, the unemployment rate of foreign citizens tends to increase municipalities' expenditures.

JEL Classification: H72, J15

Keywords: government expenditures, local public finance, migration

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1. Introduction

Currently, most European countries experience large flows of immigration that are manifested in many ways in the political landscape, labor markets and government expenditures and revenues. Surprisingly little is known about the economic consequences of these migration flows although migration to European countries is not a new phenomenon (consider e.g. migration to Germany in the 1960s and 1970s, migration to Portugal after the 1974 revolution and more recent labor flows from the Eastern Europe to Western Europe after the fall of communism[1]). Even though, we have previously experienced many periods of migration, it is not easy to generalize the findings because there have been huge differences in labor market conditions (in both emigration and immigration countries), skill levels, linguistic abilities, cultural background and so on. Thus, we cannot simply count the number of people, but more detailed information is needed.

Here, we try to provide some new evidence on this issue. But we only deal with costs and, moreover, we only focus on local authorities' costs. Although this means that we cannot really develop any sort of cost-benefit analysis, we can cover an area which is rather poorly analyzed in most economy-wide analyses. The local authorities' view is particularly important for countries like Finland where most (over two thirds) of public services are provided by municipalities (which also cover most of their expenditures by their own tax revenues).

Thus far, migration to Finland has been relatively small; people with foreign background represent only about six per cent of the total population. The biggest group of immigrants by far come from Estonia, which is very close to Finland in terms of linguistic, religious and other characteristics. Recently, most immigrants have been coming from the Near East and North Africa along with the refugee flows. All in all, the immigrant population is very heterogeneous, and heterogeneity has changed very much over time.

In terms of labor market performance, immigrants typically fall behind domestic population. In recent years, their unemployment rates have been roughly 30 per cent while the figure for the total population is about ten. There is also a 10-percentage point difference in employment rate and a roughly similar difference in the employment/population rate (for 2000-2014, 7 percentage points on average). Moreover, immigrants' pre-tax incomes are much lower than those of the domestic population (immigrants earning only somewhat above 50 per cent of the corresponding income of the domestic population).[2]

In general, the effect of migration has been studied rather extensively although the emphasis has been on the labor market (cf. e.g. Borjas (2003, 2009, 2013 and 2015), Card (1990) and Carrington and De Lima (1996). These analyses have utilized such "natural experiments" as the Cuban immigration wave (so-called Marielitos) to the US in the 1970s (Card 1990 and Borjas 2015), Portuguese citizens' escape form former colonies in the mid-1970s (Carrington

[1] See, however, Akgündüz, van den Berg and Hassink (2015) who examine the effects of recent refugee crisis on Turkish labor markets.

[2] As said, these numbers are subject to enormous heterogeneity. Thus for instance, the employment/population ratio for all immigrants for 2000-2014 is 36 per cent (with domestic population 43 per cent) but for Near East refugee countries (Syria, Iraq, Afghanistan and Somalia) it is only 10 per cent.

and De Lima 1996), French citizens' immigration to France after the Algerian Independence (Hunt 1992) and mass immigration to Israel after the collapse of communism in East Europe (Friedberg 2001). Immigration of Mexicans (and other Latin Americans) to the US has been studied rather extensively (see e.g. Greenwood 1996) and similarly immigration to Canada (Gross 2004), Germany (Glitz 2012), Sweden (Lundborg 2013) and Britain (Dustman et al (2005, 2008). Longhi et al (2010) provide a useful meta-analysis of these studies.

The analysis have ended with very different results. In particular, the debate between David Card and George Borjas has not converged to any sort of consensus. David Card's basic result is that immigration has had no negative impact on American workers. George Borjas' conclusion is quite the opposite: immigration has depressed the wages of low-skill native population considerably while leaving the wages of the rest of population rather unchanged.

As said however, the analyses mainly focus on labor market consequences, which we will consider only indirectly. Effects on public finance are obviously much more complicated – especially if one takes into account future income flows (Storeslesletten 2003). There is only one recent study which directly focuses on immigration-related costs and moreover, on the local level − that is the study of Gerdes (2011), which makes use of data on Danish municipalities. The difference is that Gerdes (2011) considers the issue from the point of view of the welfare state. Thus, he tries to answer the question: Does immigration reduce or increase welfare spending? Alesina et al (1999) as well as Alesina and Glaser (2004) argued strongly that ethnic fragmentation strongly reduces welfare spending (willingness to spend) but Gerdes' (2011) results are somewhat at odds with this view although the results were not very clear-cut and depend on which indicator of welfare spending was used in the estimating equation.

When we focus on the relationship between municipal expenditures and migrant population, there are, of course, many conflicting effects. One effect is just the above-mentioned "supply effect" where the willingness to provide public services depends on the ethnic diversity of the population. We would, however, rather stress the direct cost effect which reflects the fact that immigration tends to increase the costs of public services.

But why should then immigration (in the form of population share with a foreign background) affect municipalities' expenditures? There are several reasons for that but a common denominator for these costs is the need for providing additional public services. The most apparent is language (at least, in a country like Finland where most foreigners do not originally speak the language and the language is also considered difficult to learn in general). In the childcare and school system, extra expenditures have to be used on providing teaching in several other languages. Although there has not been cases in Finland where the language portfolio included over 30 languages, as it has been the case in the U.S, the existence of the language problem is generally acknowledged (more than ten languages is not an exception). Linguistic problems show up also in the need for interpretation and legal counseling services that also tend to increase municipalities' administrative costs. The employment and poverty rates of people with a foreign background are also quite different from those of the native population, which causes pressure on social assistance and housing assistance. Municipalities also have an obligation to provide community housing and at least in the short-run, migration flows put pressure on community housing. In Finland, municipalities are also responsible for (paying and administrating) social assistance, which is

the basic form of income subsidy. Also legal assistance and (during the sample period) consumer guidance are part of municipalities' compulsory services.

These consideration give some idea of the shape of the expenditure – foreign background population relationship even though we cannot really predict the exact shape of eventual function form. In our mind, set-up costs of additional devices for immigrants would imply a relative strong positive cost (expenditure) effect at very low level of immigrant population, which translates to high value of the respective elasticity. Beyond some threshold value in terms of immigrant population the effect of these fixed costs would diminish and the elasticity would decrease. It is, however, possible that with very high level of immigrant population unit costs could again increase because of some scale diseconomies of public services.

The problem is that causality does not necessarily run only from immigrant population to expenditures (costs) but possibly also in the opposite direction; municipalities with better services are obviously more attractive choices for immigrants. Because migrants (other than refugees) have thus far been able to choose rather freely their domicile, these choices could also explain the positive correlation between municipalities' expenditures and share of the population with a foreign background. The only theoretical argument against this explanation is the fact that in Finland, central government controls rather extensively the quality of public services (which is a prerequisite for central government's financial assistance to municipalities). Thus, the quality of services ought to be basically the same in all municipalities. But this quality control only represents a sort of minimum quality level and some room is left for "better-than-required" public services, which could provide an incentive to move to some specific municipality. To some extent, we can control this choice by the immigrants' unemployment rate of which we have data on the latter half of the sample period.[3]

In studying the cost channel, we have a very simple analytical framework. On the one hand, we have municipalities' expenditures – total expenditures and expenditures for major sub-categories – and, on the other hand, we have variables for the demographic structure of the population, most importantly the share of people with foreign background out of total population (denoted by FB).[4] So, we just look at the relationship between (both the level and the rate of change of) expenditures and the FB variable, given a set of control variables and fixed effects in the panel estimation set-up. The idea is simply to estimate the semi-elasticity of the foreign-variable and on the basis of that, evaluate possible consequences of changes in the demographic structure of the population. A significant emphasis is laid on two aspects: the causality/simultaneity issue and the issue of parameter stability. In other words, are the estimated values representative of the entire data sample or only of some specific observations or subsamples of the data.

The arguments presented above suggest that the effect of (the share of) foreign population on expenditures is positive and, indeed, that seems to be the case. But what is the magnitude of

[3] Immigrants (other than refugees) probably choose municipalities with highest income, lowest unemployment, best social services, largest foreign population, urban environment and so on. To some extent, we can control these with our control variables but still it is clear that the FB variable is not exogenous in a very strict sense.
[4] According to statistics Finland, people of foreign background include foreign citizens, people speaking foreign languages (and not Finnish or Swedish), foreign born Finnish citizens and their children. For details, see https://tilastokeskus.fi/tup/maahanmuutto/maahanmuuttajat-vaestossa.

the effect? This is something we try to find out in the next section. After going through the empirical analysis, we make some concluding remarks in the third section.

2. Empirical analysis

As pointed out earlier, the analysis boils down to estimating the following simple reduced form equation for costs:

$$\log(TC_{it}/P_t) = c_{0it} + c_1 FB_{it} + c_2 POP_{it} + c_3 DENS_{it} + c_4 OLD_{it} + c_5 Y_{it} + e_{it}, \quad (1)$$

where TC denotes total expenditures, POP total population, DENS population density, OLD the population share of the old (65 + years) and Y (a proxy for) log income[5]. Index i indicates the individual municipality and t the year. The error term is denoted by e_{it}. The model is estimated both in level and logs (and also log differences) but reporting concentrates on the log version, which allows for a semi-elasticity interpretation of the coefficient of the FB variable. Unfortunately, there are no data for the volume of expenditures (expenditures in fixed prices) at the municipality level and hence, we have to deflate the expenditure numbers by the aggregate price index of municipalities' production (P) or, alternatively by the (aggregate) wage index of municipalities' employees (W). In addition, we consider total costs (TC) to comprise major subcategories of expenditures: education expenditures (EDU) and social and health expenditures (SOS). All these are expressed in per capita terms[6].

Some cross sections of the data for 2014 are illustrated in figures 1-4 below. By scrutinizing the graphs, we immediately recognize a set of high expenditure municipalities which are all rather small in terms of population and also in terms of foreign population. Practically all those municipalities are situated in Lapland that is rather a remote and sparsely populated area in northern Finland. Quite obviously, these special circumstances have to be taken into account when considering the mapping between costs and demographics.[7] In this study, this is done by using the above mentioned control variables and the fixed effect as well as by weighting the results so that the results correspond better to the nation average (in Finland, the smallest municipality in the sample has only 760 inhabitants while the biggest (Helsinki) has 620 000 inhabitants.[8] As the weight factor, we use the square root of population.

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[5] Y is obtained by dividing per capital tax revenues by the tax rate. Although, the municipality tax is basically a flat tax, there is large basic income allowance, which makes the tax rate actually progressive and hence Y is not exactly equal to average pro-tax income of the municipality population.

[6] All costs are so-called net costs that is, costs of producing services net of services sold and bought to/from other municipalities. The municipality classification corresponds to year 2013, values for municipalities that have ceased to exist (due to consolidation of municipalities) prior to 2013 have been calculated using a simple weighted average method.

[7] The relationship between municipalities' costs and population size is analyzed in e.g. Moisio and Uusitalo (2013) and Saarimaa and Tukiainen (2015) focusing the potential effects of consolidation of municipalities. Similar studies have also been done elsewhere (see e.g. Dollery and Fleming 2006 and Reingewertz 2012). In general, these studies suggest that per capita costs follow some sort of U-curve – or at least that very small municipalities are not cost-effective.

[8] The share of foreign background population in Finland was 5.9% in 2014 but the corresponding unweighted average value for FB variable was only 1.9%. The smallest municipalities are located in Åland, which is an

Now, let us turn to the results. First, we scrutinize the unweighted data and the results from a conventional panel data set-up where we use both fixed effects (with the level form of the data) and first differences of the data. In Table 1, we show results for a very simple bivariate model while the results with control variables are reported in Table 2. As a rule, we use only OLS because we assume that the right hand side variables are indeed exogenous. Of course, this is not necessarily the case because – as already argued – better communal services could provide an incentive to move to the municipality with best services[9]. To account for this possibility, we also allowed the FB variable to be endogenous and estimated the equation by the panel GMM (Arellano-Bond) estimator.

The use of fixed effects is a conventional way of taking into account various background variables (like production structure, income level, location, climate and so on). Unfortunately, individual fixed effects are not completely harmless because they absorb most of the cross-section variation in the data and in terms of demographic effects, only the cross-section variation is of primary interest. Thus, we also produce a set of estimates without using fixed municipality effects but only the control variables (and fixed time effects). In fact, this does not make much difference and the elasticity (coefficient estimate of FOREIGN) only decreases when we drop the individual fixed effects (see Table 3, first column).

In general, the (semi)elasticity is about one (take into account that the FB variable is expressed in percentage terms). In other words, if the share of the people with foreign background increases from zero to ten percent (that is in fact the range of variation in the data), per capita expenditures increase by ten per cent. The elasticity appears to be roughly constant over different segments of the data. Thus, we can basically use the same number to project the evaluation of costs for all other values of the FB variable. This conclusion even applies to GMM results that are reported in Table 3. When using this estimator, we write the estimating equation in a conventional partial adjustment form:

$$\log(TC_{it}/P_t) = c_{0it} + c_1 FB_{it} + c_2 POP_{it} + c_3 DENS_{it} + c_4 OLD_{it} + c_5 Y_{it} + c_6 \log(TC_{it-1}/P_{it-1}) + e_{it}, \quad (2)$$

In estimating equation (2), we experiment rather extensively with different sets of instruments even though it appears that the choice of a specific set of instruments would not crucially affect the results. To illustrate this, we report two sets of results: one with a lagged value of all variables as instruments and another with several extra variables (such as tax rates and the number of municipal employees) as instruments[10]. In fact, the GMM results come quite close to the OLS results, which suggests that estimating specification is not

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autonomous part of Finland. Åland's municipalities are not, however, included in the sample because different financial arrangements and migration policies.

[9] The problem is that we do not know the quality of services but only their cost. The unit costs of public services are a poor proxy for the quality because the price level differs significantly between different areas, most notably between Helsinki metropolitan area and Northern Finland.

[10] The J-test values are alarmingly large even though they still stay at reasonable levels given the number of instruments. This suggests that some improvements in instrumenting would still be desirable.

completely at odds with theory and data. Also, the use of GLS as the estimator (Table 3) produces estimates that are practically the same as obtained with OLS and GMM.[11]

As for the results for the weighted data (Table 4), the results do not really differ from the unweighted data either. Again we find that the (semi)elasticity of the FB variable is about one (in levels, maybe somewhat lower, but with first differences somewhat larger).

The coefficients of the control variables seem to follow rather similar patterns for different estimated equations. The share of old people is clearly the most important and robust determinant of per capita expenditures, which obviously makes sense because the cost structure is strongly age-dependent. In the same way, the income variable Y performs systematically in the right way indicating that part of higher income translates into higher municipality expenditures. Due to lack of municipality level prices, we cannot say whether the income effects show up primarily in the cost level (due to higher wages) or in the volume of municipality services, which in turn could reflect higher income-induced demand for public services. Higher income also implies larger tax base, which makes it possible to finance larger public services (also in the sense of public policy).

The sign of population density is generally negative reflecting longer distances, need for decentralization of public service production and diseconomies of scale, which all increase expenditures. By contrast, the sign of the size of the municipality is generally positive which suggests that economies of scale do appear in municipal expenditures (this is in fact consistent with most previous studies). One has, however, to be careful with more far-reaching conclusions with respect to population and population density because they are in time series sense highly multi-collinear and may hence produce spurious coefficient estimates.

As for the control variables, we also used the unemployment rate of foreign citizens UF. Unfortunately, the municipality level data go back only to year 2009; thus, we were only able to analyze the subsample 2009-2014. Analyses reported in Table 5 show two findings: first, unemployment rate of foreign citizens is positively related to the size of the population with foreign background, presumably reflecting some sort of excess supply factor, and second, the UF variable is positively related to total expenditures even in the case where the FB variable (and other controls) are included. It is not difficult to explain the latter result; it is clear that unemployment creates pressure to public expenditures via different channels – income subsidy, public housing, child care and so on. Perhaps, it is more important to acknowledge the fact that the unemployment rate of foreign citizens is positively related to the (relative) size of migrant population; hence, increase in migrant population affects public expenditures also through externalities of possible increased unemployment.

Finally, the robustness of results is scrutinized by estimating the coefficient of FB for different subset of municipalities that are classified according to the size of the municipality and the share of population with a foreign background. The results that are presented in Figure 5 illustrate quite clearly that the sign of the effects stays the same (with a couple of exceptions, however) but the magnitude of the elasticity varies more. The biggest difference appears to be with municipalities with very few people with foreign background. Unweighted

[11] Notice that when we use the ”partial adjustment type specification” such as in equations 3-8 in Table 3, the long-run values of the coefficients are roughly three times bigger than the short-run values.

estimates are very high while weighted rather small. The outcome probably reflects the fact that in small municipalities, the set-up costs of basic services for immigrants (such as interpretation or counseling services, translation of documents and so on) are relatively high compared with municipalities with existing facilities. More formal threshold model estimation (equations 11 and 12 in Table 4, cf. e.g. Granger and Teräsvirta 1993) point to the same direction: the coefficient of FB variable is larger in municipalities where migrant population is relatively small (less than two per cent). Otherwise, it is not easy to find clear differences in the values of this coefficient. Thus, if we use real income as the threshold variable, we cannot find different regimes for the effects of the share of population with foreign background at conventional significance levels ($p \leq 5$ %). Only if we change the size of the test, these three different regimes are detected but even then, the coefficient values are rather similar suggesting that basic results do not depend on some specific observations/subsamples of the data.

3. Concluding remarks

It seems that migration at the local level is not cost neutral but may become a real burden for municipal finances, at least if the level and/or the rate of change is very big. Surely, this has to be taken into account when designing migration policies. The observation also suggests that highly aggregative (National Accounts level) studies of migration effects may miss a point in neglecting some important grass-roots elements of costs at local level where most public services are produced. Of course, this may equally well apply to benefits.

From the analytical point of view, the difficult issue is causality: do municipal expenditures react to migration or does migration react to expenditures (services and transfers provided by local authorities) directly or indirectly. It looks like the first interpretation makes more sense but it is very hard to achieve affirmative evidence on this issue. But maybe that is not crucial from the point of view of public policy. Even though migration also reacted to expenditures, this would not nullify the cost burden channel, which is of prime importance in policy decisions.

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Figure 1 Total expenditures and municipality size in 2014

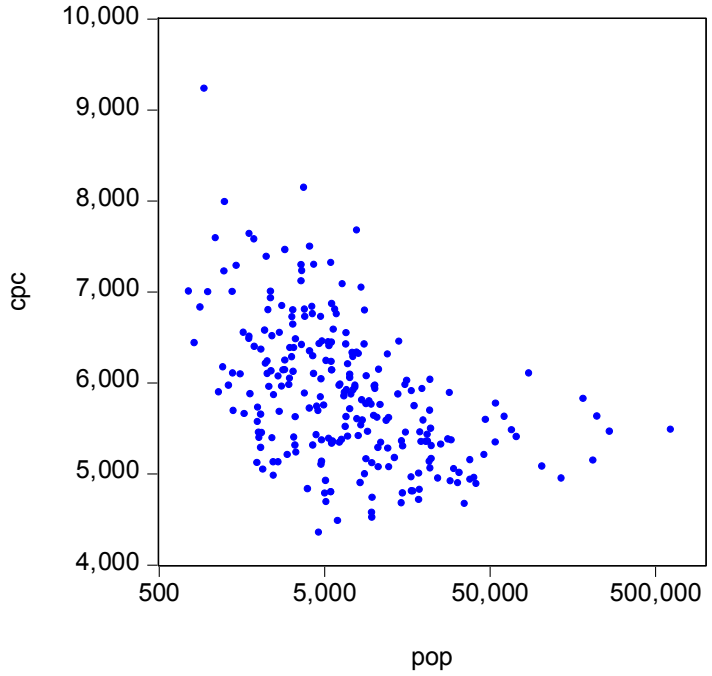
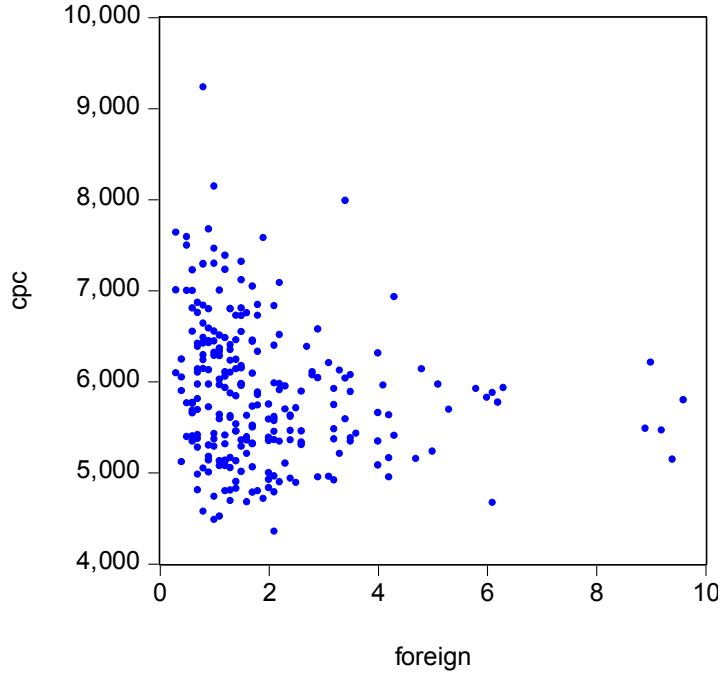


Figure 2 Total expenditures and share of foreign residents in 2014



Expenditures is expressed in per capita terms, residents with foreign background denotes the corresponding percentage share of total population.

Figure 3 Educational expenditures and the size of the municipality in 2014

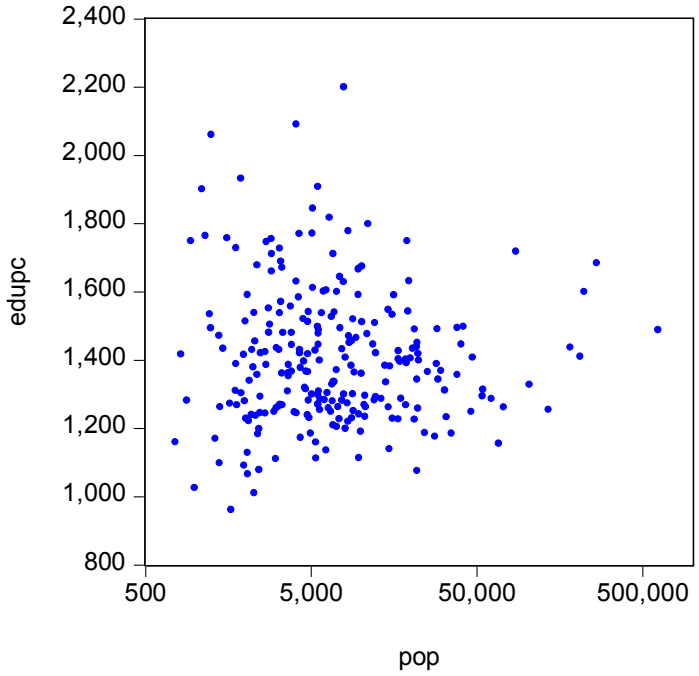


Figure 4 Social and health expenditures and the size of the municipality in 2014

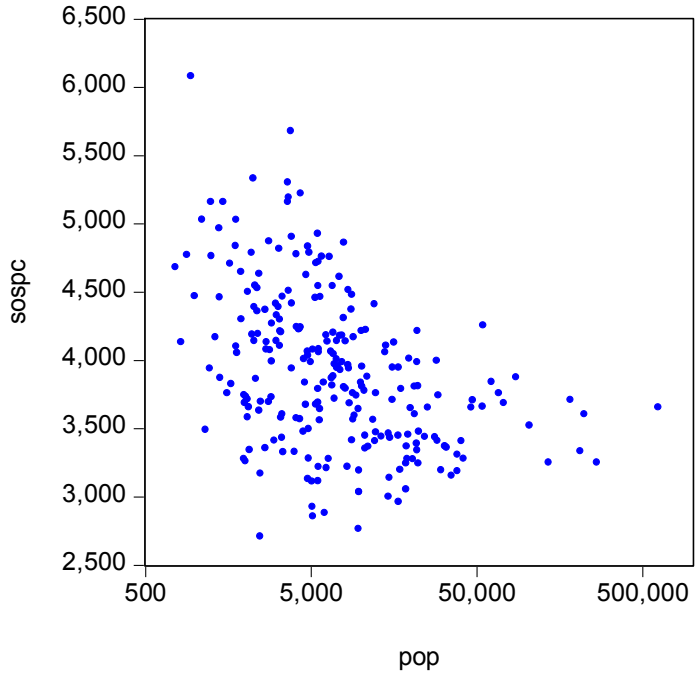
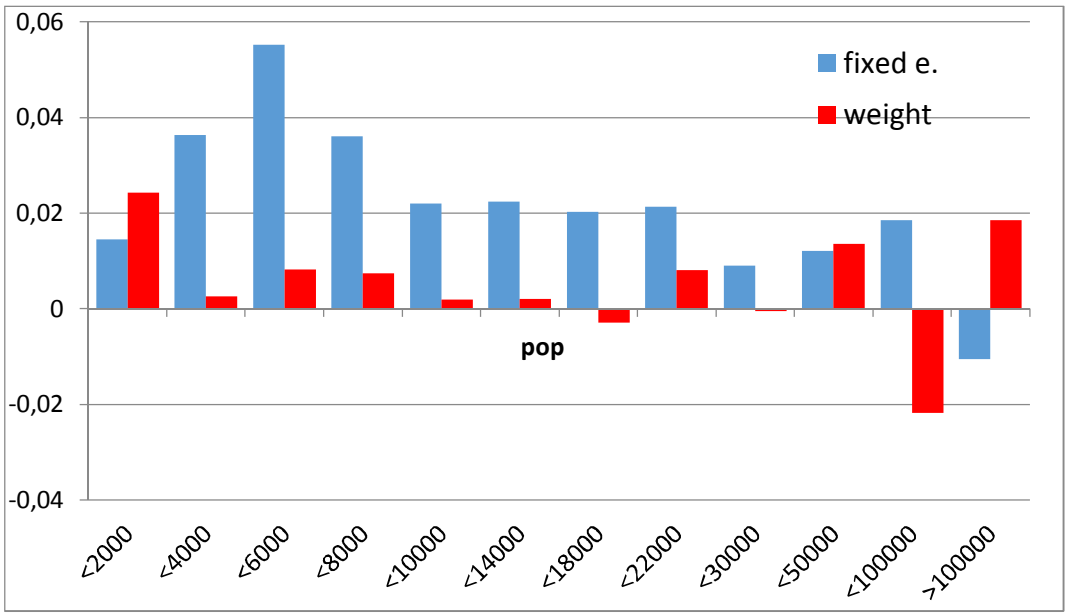
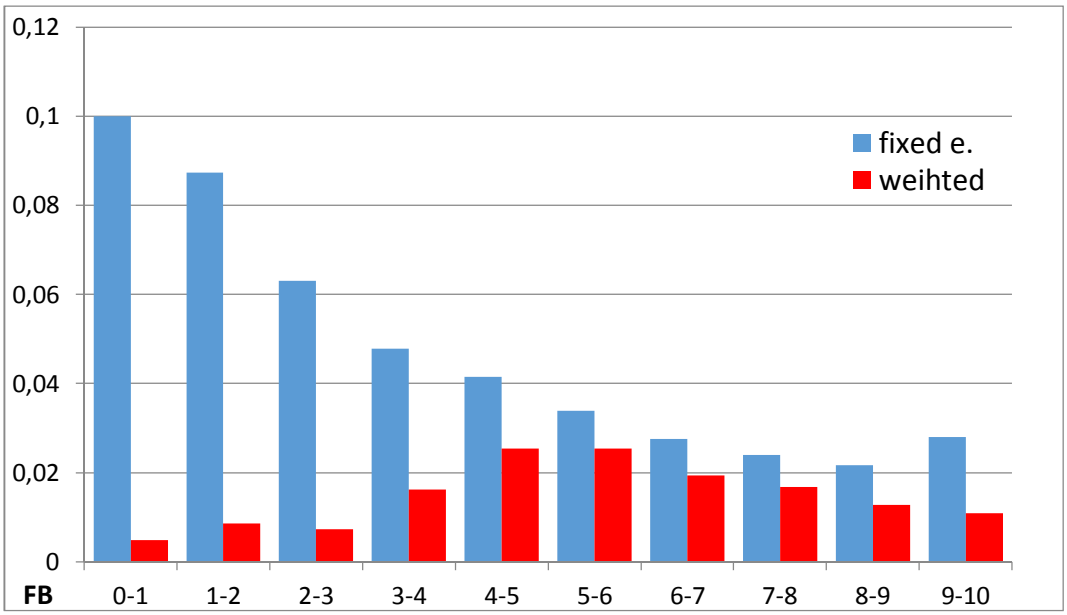


Figure 5 Coefficient of the FB variable according to municipality size and FB





The values are estimated so that only the coefficient of the FB variable is allowed to change over the respective values of pop and FB. Fixed denotes a model with fixed cross-section effects (+plus the other controls) while weighted denotes a model where the data are weighted by the square root of population.

Table 1 Estimates of a simple bivariate regression

	1	**2**	**3**	**4**	**5**	**6**
constant	31.171 (219.30)	26.993 (274.13)	3.434 (810.85)		3.289 (961.00)	
FB	2.639 (23.43)	1.715 (22.18)	.077 (23.47)	0.029 (5.97)	0.059 (22.16)	.023 (5.30)
R^2	0.734	0.776	0.735	..	0.778	..
SEE	2-566	1.878	0.073	0.038	0.063	0.037
DW	0.794	0.862	0.802	1.815	0.871	1.878
dep. var	TC/P	TC/W	log (TC/P)	Δlog (TC/P)	log (TC/W)	Δlog (TC/W)
panel	FE	FE	FE	NO	FE	NO

t-ratios are inside parentheses. The sample size is 3735, however with differencing 3486. All estimates are panel OLS estimates. In the panel setting, FE denotes fixed individual (municipality) effects in the estimating equation and NO a specification without these effects. When differencing the left-hand side variable, all right-hand side variables are also differenced.

Table 2 Estimates with control variables

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
constant	2.986 (74.46)		1.820 (61.21)		2.252 (36.13)		2.776 (27.62)	
FB	.025 (5.19)	.019 (2.88)	.045 (9.48)	.006 (7.80)	.032 (4,32)	.027 (3.05)	.0257 (5.26)	.019 (2.89)
pop	-.041 (0.30)	-.030 (0.12)	-.211 (1.19	.277 (0.44)	-.094 (0.62)	-.213 (0.88)	-.023 (0.22)	-.015 (0.06)
dens	-.366 (2.17)	.029 (0.06)	-.005 (0.01)	-.067 (0.05)	-.639 (2.56)	.220 (0.68)	-.381 (2.26)	.001 (0.26)
old	2.651 (13.85)	1.265 (2.30)	1.119 (9.66)	.991 (2.98)	4.103 (13.75)	1.778 (2.22)	2.656 (13.83)	1.267 (2.30)
Y							.044 (2.44)	.027 (2.06)
R^2	0.868	..	0.715	..	0.834	..	.863	
SEE	0.052	0.036	0.110	0.079	0.067	0.042	0.052	0.036
DW	0.851	1.966	0.670	2.238	0.790	1.827	0.867	1.964
dep var	log (TC/P)	Δlog (TC/P)	log (EDU/P)	Δlog (EDU/P)	log (SOS/P)	Δlog (SOS/P)	log (TC/P	Δlog (TC/P)
panel	FE	NO	FE	NO	FE	NO	FE	NO

Notation is the same as in Table 1.

Table 3 Alternative estimates of the basic model

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
constant	3.182 (426.01)	3.041 (428.88)	.833 (24.72)	.975 (27.09)	.522 (8.86)	.540 (10.56)	.662 (12.58)				
FB	.012 ((7.53)	.006 (4.35)	.006 (5.06)	.005 (4.28)	.007 (5.49)	.005 (4.49)	.003 (3.48)	0.014 (4.83	.012 (3.73)	.012 (4.53)	.011 (3.56)
pop	.048 (9.87)	.052 (11.41)	-.089 (1.50)	.100 (1.74)	-.064 (1.08)	-.052 (1.61)	-.053 (1.71)	-.162 (2.19)	-.131 (1.68)	-.095 (1.38)	-.084 (1.14)
dens	-.006 (7.46)	-.006 (7.86)	-.046 (0.38)	-.005 (0.38)	-.074 (0.62)	-.104 (1.59)	-.134 (2.14)	-.327 (3.47)	-.423 (3.18)	-.360 (3.08)	-.439 (3.56)
old	1.614 (47.44)	1.519 (47.30)	.646 (15.58)	.650 (16.71)	.638 (15.48)	.731 (16.28)	.763 (18.37)	.681 (6.90)	1.029 (9.53)	.640 (6.75)	.984 (9.56)
Y					.064 (6.45)	.061 (7.97)	.071 (9.14)			.043 (6.76)	.034 (3.47)
lagged dep.var			733 (27.83)	.678 (56.88)	737 (67.68	.730 (66.47)	.665 (55.48)	.726 (31.57)	.552 (19.07)	.751 ((32.14)	.586 (19.96)
R^2	0.399	0.388	0.947	0.942	0.948	0.966	0.961	..	..	..	..
SEE	0.106	0.101	0.032	0.031	0.032	0.031	0.031	0.44	0.042	0.045	.042
DW	0.351	0.327	2.116	2.067	2.123	2.114	2.095	135.11*	137.37*	136.0**	137.3**
dep var	log (TC/P)	log (TC/W)	log (TC/P)	log (TC/W)	log (TC/P)	log (TC/P)	log (TC/W)	Δlog (TC/P)	Δlog (TC/W)	Δlog (TC/P)	Δlog (TC/W)
panel	NO	NO	FE	FE	FE	GLS: FE	GLS: FE	GMM: DIF	GMM: DIF	GMM: DIF	GMM: DIF

*) J-statistic with instrument rank equal to 44. **) J-statistic with instrument rank equal to 47.
In equations 8 and 9, the set of instruments includes only lagged value of the right-hand side variables while in equations 10 and 11, the set also includes the lagged tax rate, lagged municipality's personal/population ratio and lagged real per capita income.

Table 4 Weighted estimates of the basic model

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
constant				3.190 (573.40)		1.989 (60.24)		2.674 (126.30)			2.016 (22.12)	1.889 (22.91)
FB	.013 (19.96)	.031 (15.91)	.006 (5.69)	.016 (7.56)	.026 (9.12)	.037 (4.40)	-.005 (0.22)	.016 (3.76)	.022 (2.16)	.004 (4.12)		
FB1											.020 (3.77)	.010 (1.58)
FB2											.011 (13.17)	.012 (5.93)
FB3												.014 (15.85)
pop			.054 (19.67)	.046 (15.809	.190 (2.14)	.030 (1.11)	.243 (0.38)	.022 (1.76)	.279 (0.96)	.053 (18.72)	.026 (8.92)	.026 (8.99)
dens			-.057 (12.87)	-.005 (11.74)	-590 (3.54)	-.008 (1.78)	-.268 (0.22)	.001 (0.32)	-.846 (1.31)	-.056 (12.57)	-.032 (7.41)	.037 (9.07)
old			1.282 (43.37)	1.498 (52.72)	1.096 (11.27)	.450 (2.84)	1.848 (2.96)	1.857 (18.23)	1.811 (2.76)	1.342 (39.42)	.901 (14.82)	.
Y										.032 (3.45)	.009 (0.67)	-.041 (2.81)
lagged dep.var											.422 (19.57)	.400 (17.47)
R^2	0.329	..	0.589	0.527	..	0.166	..	0.574	..	0.591	0.664	0.670
SEE	0.112	0.038	0.088	0.106	0.038	0.203	0.118	0.106	0.040	0.088	0.079	0.078
DW	0.249	1.649	0.300	0.415	1.761	0.420	2.169	0.503	1.550	0.295	1.316	1.299
dep var	log (TC/P)	Δlog (TC/P)	log (EDU/P)	log (TC/P)	Δlog (TC/P)	log (EDU/P)	Δlog (EDU/P)	log (SOS/P)	Δlog (SOS/P)	log (TC/P)	log (TC(P)	log (TC/P)
panel	dum	NO	dum	NO	NO	NO	NO	NO	NO	dum	NO	NO

The data are weighted by $pop^{½}$. DUM indicates that the estimating equation includes annual dummy variables. Equation 11 and 12 are Threshold model estimates. In the equation, the threshold variable is FB with the threshold value 0.02 while in equation 12 it is real income with thresholds 9661 and 12606 respectively. In equation 11, the H_0 for linear model is rejected at the 5 per cent significance level and in equation at the 10 per cent level.

Table 5 Estimates with foreigners' unemployment rate

	1	**2**	**3**	**4**	**5**
constant	18.587 (11.71)		3.588 (790.90)	3.506 (389.22)	3.513 (461.63)
FB	3.214 (3.38)	2.421 (1.74)		0.048 (10.46)	0.006 (6.75)
100*UF			.034 (1.94)	.129 (0.78)	.117 (5.22)
R^2	0.683	..	0.822	0.838	0.051
SEE	10.054	10.370	0.056	0.053	0.112
DW	1.506	2.061	1.658	1.656	0.654
dep. var	UF	Δ(UF)	log (TC/P)	log (TC/P)	log (TC/P)
panel	FE	no	FE	FE	weighted

The sample size is 1275. UF denotes the unemployment rate of foreign citizens. The weight -variable is again the square root of population.

The **Aboa Centre for Economics (ACE)** is a joint initiative of the economics departments of the Turku School of Economics at the University of Turku and the School of Business and Economics at Åbo Akademi University. ACE was founded in 1998. The aim of the Centre is to coordinate research and education related to economics.

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