The Composition of Local Government Expenditure and Growth: Empirical Evidence from Sweden[*]

by

Linda Andersson[†] and Emelie Värja[‡]

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Abstract

The purpose of this paper is to analyze if there is a possibility to enhance the average income growth rate at the local level by redistributing expenditure between main functional areas of local governments. Based on a panel of Swedish municipalities spanning the period 1996-2013 we find that devoting large shares of expenditure on areas that increase labor supply, such as child care, and elderly and disability care is positively related to growth in income. We also find that consistent with previous studies infrastructure spending has a positive relationship with growth but the effect is declining in the level.

Keywords: expenditure, growth, local governments, spatial econometrics

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[†] Örebro University School of Business, SE-70182 Örebro, Sweden. Phone +46-19-30 35 56. E-mail: linda.andersson@oru.se.
[‡] Örebro University School of Business, SE-70182 Örebro, Sweden. Phone +46-19-30 33 15. E-mail: emelie.varja@oru.se.

1. Introduction

Economic growth is the center of attention for reasons such as maintaining or improving standards of living. There are obviously many factors affecting the level and speed of growth, where the local municipality assembly may have the direct power over some of these through the budget in terms of how expenditure is balanced between pure consumption and productive investments. The structure of tools to finance this expenditure (taxation or debt) may in itself also affect growth due to incentive effects for firms and individuals in terms of wage setting, labor supply and mobility of the tax base. On the other hand there are many external changes that the local authorities have no direct power over such as exits and entries of small or large firms. Such shocks can be transitory or permanent and the severity of the effects depends on the ability of the authorities and the local labor market to absorb them, and whether we consider the short or long run.

The objective of this paper is to empirically analyze the relationship between local economic growth and the structure of local public finance. In a Barro-style model of endogenous growth, the theoretical link between taxes, expenditure and growth depends on the level of taxes (i.e., the initial level of taxes and size of tax change), the composition of expenditure, as well as other factors. As Poot (2000) and Bania et al. (2007) point out, it is important to incorporate the full budget constraint of the government including debt, in addition to other standard controls. Public sector debt is affected by government spending decisions and the possibility or capability to raise balancing revenue, and can in turn affect the behavior of firms and households. Failure to consider the full budget constraint of the government may lead to inconclusive results as shown by Kocherlakota and Yi (1997).

A large share of the empirical literature is based on cross-country data and indicates that the long-run growth rate is negatively affected by taxes while productive government expenditure enhances growth; see e.g., Bleaney et al. (2001) and the survey by Poot (2000). With a cross-state perspective, mainly using U.S. data, the results are less unanimous across studies (Helms, 1985; Bartik, 1992; McGuire, 1992; Phillips and Goss, 1995; Besci, 1996; Engen and Skinner, 1996; Wasylenko, 1997; Lee and Gordon, 2005; Bania et al., 2007; Reed, 2008). Helms (1985) is one of the first studies that specifically separates out growth effects of various spending components of the local government. His results indicate that state and local tax increases slow down economic

growth if revenue is used for transfer payments. However, the negative effect of a higher tax may be counterbalanced if the local government uses revenue to finance improved publicly provided services, e.g., education and infrastructure. The impact of taxation on growth may however vary depending on the initial tax rate, where the growth enhancing productivity effect may be largest for low initial tax rates and the crowding out effect dominates for higher tax rates (Poot, 2000; Glomm and Ravikumar, 1997). Thus, in more recent studies it is common to allow for non-linearities in the effects of taxes (Bania et al., 2007) and potentially also in other fiscal variables (Clarke and Miller, 2014).

Most studies in this line of research have ignored distortions in terms of potential external effects on the expenditure and/or income side. Horizontal tax competition is an example of such an externality, which means that tax changes of one locality affects tax income of another locality due to mobility of the tax base.[1] Another example is spillover effects of public investments, which as noted by Munnell (1992) potentially are larger for small regions.

Our approach in this paper is based on Barro-style growth model of personal income at the local level and we augment it with an equation for migration in line with what has previously been done by e.g., Fagerberg et al. (1997), Aronsson et al. (2001), Lundberg (2003, 2006), and Värja (2016). We have access to Swedish municipality-level data over the period 1996-2013, where growth is measured in terms of average personal income and migration. Due to changes in the division of localities, the dataset will be modified to incorporate only municipalities with unchanged borders. An important methodological issue is namely to handle spatial effects, using spatial econometrics to control for the absorption capacity of the local labor market and mobility of the tax base. While previous studies have examined the growth effect of mainly tax-financed higher productive spending we here aim to contribute to the literature by studying growth effects of changing the composition of expenditure, holding total revenue constant, i.e., the increase in one expenditure category is not financed by an increase in income but rather by a redistribution from other expenditure areas. We motivate this approach by results in previous cross-country studies by e.g.,

[1] When state income tax is added to federal income taxes the marginal impact of state income tax may be greater and when the two levels of government tax the same tax base the combined tax rate tends to be inefficiently high (Holcombe and Lacombe, 2004).

Jonsson and Klein (2003) and Trabandt and Uhlig (2011) that indicate that Sweden is close to or even past the Laffer curve peak, which implies that it would be difficult for the general public sector in Sweden to increase tax revenue by increasing tax rates. Further, in a recent analysis based on municipality-level data for Sweden Nordström and Värja (2016) find that the elasticity of tax revenue with respect to the tax rate varies depending on the tax rate and is even negative for some tax rates. This means that in a country with an already high tax ratio such as Sweden it might not even be possible, or at least there is limited room, to increase the public sector and finance it by higher tax rates.

The paper is outlined as follows. The next section provides the theoretical framework and the empirical specification. Section 3 contains a brief description of the institutional background of the public sector in Sweden, followed by a presentation of the data in Section 4. The results are presented in Section 5 and discussed in Section 6, which also contains concluding remarks.

2. Local economic growth and local fiscal finance policy

To test growth effects of local fiscal finance policy we follow the work by Barro (1990) and Barro and Sala-i-Martin (1992b), which has previously been empirically tested by e.g., Bleaney et al. (2001), Bania et al. (2007), and Clarke and Miller (2014), and consider the following Cobb-Douglas production function of each of the *n* producers in jurisdiction *i* at time *t*

$$Y_{it} = Ak_{it}^{1-\alpha} g_{it}^{a} \tag{1}$$

where *A* is a positive constant, *k* is private physical capital, *g* is publicly provided productive input, and *a* is a parameter between zero and one. The local government finances the provision of productive inputs, consumption (non-productive) goods, *C*, and a potential surplus, *b*, by using a proportional income tax rate, τ, which gives us the local government budget constraint

$$n_{it}g_{it} + C_{it} + b_{it} = \tau_{it} n_{it} Y_{it} \tag{2}$$

With an isoelastic utility function Barro and Sala-i-Martin (1992) show that long run growth is given by[2]

$$y = w(1-\tau)(1-\alpha)A^{1/(1-\alpha)}(g/Y)^{\alpha/(1-\alpha)} - \mu \tag{3}$$

where *w* and μ are constants that contain parameters from the utility function.[3] Thus, the growth rate depends on the structural parameters of the production and utility functions (*w*, *s*, α and *A*), the tax rate (τ), and the ratio of productive public expenditure to output (g/Y). As pointed out by Bleaney et al. (2001) the budget surplus (*b*) is included to empirically control for the possibility that local governments may fail to balance the budget each period[4], and given that Ricardian equivalence prevails and there is no change in composition of expenditure and taxation, *b* is expected to have a zero effect on the growth rate.

2.1 Empirical specification

The empirical analysis will be based on the following reduced form equation, where the average income growth rate between time *T*-*t* and *t*, $y_{it} = \ln(Y_{it}/Y_{it-T})$, is assumed to depend on the fiscal variables in (2), i.e., expenditure (*X*) and revenue (*R*), two-way fixed effects (time-specific effects, δ_t, and municipality-specific effects, γ_i), the initial income level (*Y*), other control variables included in the vector Z, and an error term (ε_{it}). In the estimations we will use $T = 5$.

$$y_{it} = \beta_1 Y_{it-T} + \sum_{j=1}^{l} B_j X_{ijt-T} + \sum_{j=1}^{r} B_r R_{ijt-T} + B_2 Z_{it-T} + \gamma_i + \delta_t + \varepsilon_{it} \tag{4}$$

In contrast to the standard approach in the literature where the fiscal variables are divided by personal income (*Y*) as in equation (3), we will hold total expenditure and total revenue constant,

[2] The assumption of an isoelastic utility function is also used in Barro and Sala-i-Martin (1992b), Bleaney et al. (2001), Bania et al. (2007) and the derivation is demonstrated in Clarke and Miller (2014).

[3] $w = 1/\theta$ and $\mu = \rho/\theta$, where $-\theta$ is the constant elasticity of marginal utility and ρ is the constant rate of time preference.

[4] A budget-balance requirement by law for Swedish municipalities was implemented in 2000. The law requires that a municipality that fails to report a minimum of a balanced result should adjust this within a two-year period.

respectively. Equation (2) describes the expenditure and revenue side of the local government budget constraint which is assumed to be linear, and hence, including our restriction

$$X_{lit-T} = -\sum_{j=1}^{l-1} X_{ijt-T} \qquad R_{rit-T} = -\sum_{j=1}^{r-1} R_{ijt-T} \tag{5}$$

In the estimation, we therefore have to omit one of the fiscal variables on the expenditure side and revenue side, respectively, to avoid perfect collinearity. The choice of omitted variables will affect the interpretation of the empirical results, since the omitted expenditure variable is the one assumed to decrease when the other expenditure share increases. Also the choice of excluded income will affect the interpretation of the results since this is the income type that is allowed to vary and thereby affect the composition of local government revenue. Thus, the interpretation of our results is slightly different from previous studies. We will also disaggregate operating expenditure further into eight major functional spending categories as they show up in the local government budget; general government services, infrastructure, culture and leisure, child care, education, elderly and disability care, social welfare, and directed activities. In addition, we follow Bania et al. (2007) and Clarke and Miller (2014) and allow for non-linearities to test the possibility of Barro-style growth hills of productive expenditure.

Population growth - or labor force growth or net migration - is usually included as a separate variable in the growth equation of personal income and instrumented for to control for interdependency and simultaneity; see, e.g., Barro (1990), Treyz et al. (1993), Barro and Sala-i-Martin (1995, chapter 11), Fagerberg et al. (1997), Bleaney et al. (2001), Bania et al. (2007), and Clarke and Miller (2014). A municipality with high income growth signals high earning potential, which may attract individuals to move there, which will stimulate labor supply and hence net migration. Even though the direct effect of migration on growth is probably small, the indirect effect that arises when a migrant is relatively more or less productive than the average current population may potentially be more important. Following previous studies based on Swedish data (Aronsson et al., 2001; Lundberg, 2003, 2006; Andersson et al., 2007; Värja, 2016) we also include a separate equation for net in-migration, $m_{it} = \ln\left(1 + \sum_{p=t-T}^{t} mig_{ip} \Big/ L_{it-T}\right)$ where L is population, with the same set of right-hand side variables as for the average income growth (y) equation in (5).

By estimating these two equations, it is (at least to some extent) possible to relate parameter estimates in the income growth equation to changes in labor supply and/or the composition of the labor force.

The average income level, *Y*, is expected to have a negative effect on the growth rate in accordance with conditional income convergence found by other studies (Barro and Sala-i-Martin, 1992a; Aronsson et al. 2001; Lundberg, 2003, 2006; Värja, 2016). The vector Z contains control variables for municipality *i*, including the shares of high and low educated individuals, the density, the age composition of the population, and a Herfindahl index to control for political fragmentation in the municipality assembly. The vector also contains the county tax rate which is motivated by Aronsson et al. (2000) who find evidence of vertical expenditure interactions due to tax base overlap based on Swedish data. We also include the local government debt level to control for the full financing options. Thus, by holding constant debt and fixing the budget constraint, we can analyse how the municipality chooses to reallocate between different expenditure categories while keeping the size of local government fixed. The unemployment rate is also included and can be seen as the probability of not receiving a job in the municipality, which implies that it is expected to be negatively related to the net migration rate. If unemployed individuals move from the municipality to find a job elsewhere, we expect the unemployment rate to be positively related to the average income growth rate. Further, according to previous studies by Glaeser et al. (1995) and Lundberg (2003) political stability is a determinant of growth, where political instability is negatively correlated with growth. We therefore expect a negative sign on the coefficient of the Herfindahl index.

2.2 Spatial interactions

Previous literature has found evidence of spatial interactions between local governments in Sweden, where there is a consistent positive relationship between the growth in average income or the net migration rate in neighboring municipalities and the growth rate of municipality *i* (Lundberg, 2006; Värja, 2016). Neglecting to control for an existing spatial dependence between neighboring municipalities can lead to biased and inconsistent estimates. One way to incorporate this spatial dependence in the estimations is to use a weight matrix (Anselin, 1988). In this paper we construct a weight matrix where the weights are based on the inverse distance to neighboring

municipalities, which means that closer neighbors are given a higher weight. Since we mainly think of the spatial interaction in terms of job opportunities, we only assign positive weights to municipalities that are included in the same job market region, and all other municipalities have a weight equal to zero.[5] Anselin (1988) shows that if there is a spatial interaction between municipalities and this are taken into account by a weight matrix the standard OLS estimates are inconsistent and biased. Our results are therefore based on the maximum likelihood estimator.

3. Institutional background

In Sweden, the public sector is structured into three levels of government; local governments (municipalities), regional governments (counties), and a central (national) government. The provision of many services, such as child care, care for the elderly, education and health care, was in the 1990s decentralized, or further decentralized, to the subnational levels. The national government tries to monitor the lower levels of government via legislation as well as via the intergovernmental grant systems. The subnational tiers do however, have considerable autonomy in deciding how to organize activities and allocate resources. National regulations are usually expressed in terms of the purpose of a certain type of service or effort and usually constitute a minimum required level. The localities and regions are then free to extend the services beyond this minimum level if available resources and preferences allow them to.

Municipalities and counties face their own budget constraints, with a budget-balance requirement by law since 2000. The subnational governments are only allowed to tax personal income and set their own tax rates without intervention from the national government, which means that even if the national government imposes obligations on the local governments, the municipality assemblies are at least in formal terms free to adjust the local income tax rate and to decide how much to spend on e.g., child care, education, and care for the elderly. The income tax is a proportional tax and is the main source of revenue. For the local tier as a whole the income tax as a share of total revenue was just over 66 percent 2005-2009, fell to 64 percent in 2010 in the aftermath of the global financial crises, and has since then increased to 65 percent in 2013. Other sources of revenue are intergovernmental grants, which amount to an average revenue share of 12

[5] The job market regions are based on the amount of commuters to and from the different municipalities.

percent, and user fees. There is, however, a large variation across the country, and in some areas intergovernmental grants are almost as important as taxes as source of income, while five municipalities in the Stockholm region net contribute to the grant system during the study period.

Throughout the time period the intergovernmental grants system in Sweden consists of both revenue and cost equalization, and also general and some specific grants. However, while the cost equalization system has remained a horizontal transfer system where the sum of grants between recipients and contributors is equal to zero, the revenue equalization system has been subject to changes. Up until 2005 revenue equalization was also a horizontal transfer system, but is thereafter merged with the distribution of general and specific grants by the national government and therefore a vertical transfer system mainly financed via the national budget. The cost equalization system consists of block grants and the localities are free to use the funds at their own discretion. The purpose of the grant is to support municipalities that face structurally different needs and higher costs than an average municipality.

4. Data

The empirical analysis is based on a dataset of 277 Swedish municipalities over the time period 1996-2013. Since there are a total of 290 municipalities in Sweden, this means that we exclude 13 municipalities. Eight municipalities are excluded since they were subject to consolidations (Nykvarn, Södertälje, Knivsta, Uppsala, Bollebygd, Lekeberg, Borås, and Örebro) and three are excluded since they have extra responsibilities that other municipalities do not have (Gotland, Malmö and Göteborg). When we decompose local government expenditure, there are missing values for the municipalities of Grums and Alingsås. When excluding municipalities, we create empty spaces in the spatial weight matrix, which will affect the coefficients of the spatial variables to some degree; not accounting for the missing municipalities' effects may bias the coefficient for the spatial effect, making the potential spatial effects smaller. However we are not interested in estimating the size of the spatial effect per se, but want to control for the effect of it, making this issue less severe.[6]

[6] Fully excluding the weight matrix changes the coefficients of other variables, where the coefficient on high educated becomes significant and positive, and the coefficients on density as well as directed activities become statistically

Net migration (mig_{it}) is measured as the sum of the migration into the municipality minus the migration out of the municipality. Migration can occur both across municipal borders and across country borders. Depending on the underlying reason for immigration to Sweden, a migrant's initial choice of location may be regulated. During the time period studied, there has been a large flow of refugees into Sweden, and these individuals have been directed to different municipalities according to agreements between the municipality and the national government.[7] The average income level (Y_{it}) and, thus, the income growth rate (y_{it}) are calculated for the population aged 20 and older[8]. When we use migration and not population in our definition of tax base growth, we disregard natural population growth. By using individuals older than the age of 20 for the average income, we try to avoid some of the dependence between age structure and the average income, which is in line with Lundberg (2003, 2006) and Aronsson et al. (2001). The Herfindahl index is calculated as the sum of the squared shares of votes for the different parties in the local election, to account for the political environment. All monetary variables are deflated by the national consumer price index, since there are no regional- or local-level price indices available. Table 1 presents the definition and content of all included variables in the estimations, and descriptive statistics are reported in Table 2. The composition of the different expenditure shares is explained in Table 1. The shares are calculated by dividing the cost of different functional categories with the total cost, which implies that the sum of all cost shares is equal to one. Total expenditure is equal to total revenue, and the revenue shares also sum to one.

5. Results

We once again want to remind the reader that the interpretation of the results presented in this section is somewhat different from other similar studies that use personal income as denominator

insignificant. The effect of expenditure on social welfare becomes positive and significant. So even with holes in the weight matrix it is important to control for spatial effects.

[7] We have also estimated the model including only domestic migration. In this case the effect of directed activities on net migration rate is negatively significant. This may indicate that refugees are placed in municipalities with large out-migration, or it could indicate that refugee's crowd out domestic migration. We therefore use the total net migration in the estimations.

[8] It can be argued that individuals of age 65 and older are not, or at least to a very limited degree, part of the labor force and will therefore have a limited effect on the tax base. However, this group of individuals may very well be quite mobile, and their income is still part of the taxable income for the localities. We have therefore opted for the inclusion of this group as well.

of the fiscal variables; see e.g., Helms (1985), Bleaney et al. (2001), Bania et al. (2007), and Clarke and Miller (2014). Instead we hold the size of the local government budget constant and allow only for a change in the composition of expenditure and income sources, respectively. To see if there are any justifications for this change in specifications we start by estimating a model where we in line with previous studies use personal income as denominator. We are well aware that there are different effects on growth depending on how income is gathered and allocated between expenditure areas, but we ignore this at this stage. The results are found in Table 3, where total expenditure is excluded to focus on the effects of total revenue. The coefficient is negatively significant which may indicate that there is little or no room for further increases in the size of local governments in Sweden. Thus, this gives us some justification for our specification where we analyze if municipalities can change the composition of expenditure to enhance growth. All specifications are estimated by maximum likelihood.[9]

(Table 3 about here)

In Table 4 we present results with a linear specification where local government expenditure is divided according to whether it can be considered productive, consumption or other; see the division of expenditure in Table 1 which is consistent with the theoretical and functional division used in e.g., Bleaney et al. (2001), Bania et al. (2007), and Clarke and Miller (2014). Consumption expenditure has no significant effect on the average income growth rate, which is reassuring and supports the theoretical model. Though, the results indicate that increasing the share of productive expenditure at the expense of a lower share of other expenditure will have a positive and significant effect on the growth rate of average income.

(Table 4 about here)

In all specifications of Table 1 we exclude tax revenue from the model. Both the coefficients for grants and fees, and other income are negatively significant which means that switching from tax

[9] We have also estimated the model with 2SLS and instrumented for the spatial weight matrix and the initial income level. The point estimates are rather stable to choice of estimator, however due to the less efficient estimation method of 2SLS compared to maximum likelihood the standard errors are larger when using 2SLS.

revenue to either of the other two income sources has a negative effect on growth. It is however important to keep in mind that causality may also go in the other direction. Municipalities receive intergovernmental grants based on a lower than average tax capacity and/or based on structural differences that may be correlated with growth.

The corresponding estimation results on the net migration rate are reported in columns 4-6 in Table 4. These results indicate that shifting from consumption to other expenditure or productive expenditure or the other way around has no significant correlation with the growth of net migration. There is no significant coefficient for any of the income shares either.

Regarding the results of our control variables we find a positive and significant effect of the spatial dependence. Consistent with previous studies using Swedish data (Aronsson et al., 2001; Lundberg, 2003, 2006; Värja, 2016) our results show evidence of conditional convergence indicated by the negatively significant relationship between the average income growth rate and the level of income. As predicted by the theoretical model the level of debt has no significant effect on the growth rate.

In a next step we allow for non-linearities in the fiscal variables. The results are presented in Table 5 and indicate that changing the share of consumption expenditure at the cost of productive expenditure is negatively related to growth. The effect is decreasing and becomes positive at around 12 percent; the mean value of consumption share is 0.10. If we instead switch consumption expenditure for productive expenditure there is a negative effect if the share is too low. However when the share of productive expenditure increases over 83 percent allocating a larger share to productive expenditure is related to a positive growth effect. There is also a positive correlation between income growth and switching from consumption to other expenditure but this effect is also decreasing in the share. The results indicate that a larger share of productive expenditure is growth enhancing, but the share devoted to consumption expenditure is also increasing in the level.

(Table 5 about here)

To investigate our results further, we therefore disaggregate the expenditure shares into their main functional area in Table 6, still allowing for a non-linear relationship. A closer look at the coefficients for the different expenditure shares show that expenditure on directed activities is negatively correlated with the average income growth rate, irrespective of what other expenditure is excluded. When general government services are excluded there is no significant relationship. The coefficient on the squared term is statistically insignificant so the relationship seems to be linear, which means that the relationship does not dependent on the level of the share of spending on directed activities. There is a positive direct effect of infrastructure expenditure on the average income growth rate, though the effect is decreasing in the share already devoted. The switch point, i.e., the point at which the effect turns from positive to negative, is at around 6-8 percent of total expenditure devoted to infrastructure spending,[10] after this there is no further growth enhancing effect from switching to infrastructure. The mean value of share spent on infrastructure is now 6.5 percent. Child care spending has a negative and significant effect on the growth rate when looking at the coefficient, but the effect becomes positive in between 11 and 14 percent of total expenditure devoted to child care. This means that if a municipality increases the child care spending share even further this will be positively correlated with income growth; the mean value is around 10 percent of total expenditure. A similar relationship and interpretation is true for the spending share on elderly and disability care. In this case the switching point is at around 25 percent with a mean value of the share at 32 percent, but there is a minimum value at around 13 percent. The share of spending on social welfare has a negative relationship with the average income growth rate. The coefficient on the squared term is statistically significant at the 10 percent level, but the switching point is out of the range of observations. The maximum value of expenditure share devoted to social welfare is 0.109 and the switching point is above 11 percent, unless the excluded variable is directed activities in which case the switching point is around 8 percent.

(Table 6 about here)

Next we turn to the relationship between the net migration rate and the composition of expenditure. According to the results presented in Table 7 there appears to be a statistically significant (only weakly at 10 percent level for some excluded expenditure shares) relationship between the

[10] The exact switch point depends on what type of expenditure that is excluded from the equation.

infrastructure spending share and net migration The relationship becomes negative when more than 8 percent of total expenditure is devoted to infrastructure if we look at the results when social welfare is the excluded expenditure. If the share devoted to child care is larger than 13 percent it has a positive relationship with net migration if expenditure is taken from the share devoted to elderly and disabled.

(Table 7 about here)

6. Discussion and concluding remarks

The purpose of this paper was to analyze if there is a possibility to enhance the average income growth rate at the local level by redistributing expenditure between main functional areas of local governments. By fixing the different shares of expenditure we keep the budget constant and we are hence able to evaluate effects of re-distributions of the budget within the local governments. Our findings show that the expenditure share on directed activities is always negatively related to income growth and a decrease in the share of this expenditure is positively related to growth. One possible explanation for this result is related to an increase in inequality in the income distribution between the poorest and richest that Sweden has experienced since the 1980s (Björklund and Jäntti, 2011). If a municipality has a large share of inhabitants that rely on social support, the average income growth rate would be lower for that municipality. Giving a large support to this group without giving incentives to participation in the labor market may create a lock-in effect, and thereby reduce labor supply.

The expenditure shares that show a positive relationship with the rate of growth in income that we can identify are child care, and elderly and disability care. Expenditure on both these areas facilitates an increase in labor supply. Regarding expenditure on directed activities, which to a large extent contain support to refugees, increasing the support may yield a lock-in effect where new residents get fewer incentives to participate on the labor market. Decreasing the share of expenditure on directed activities may also increase labor supply, which in that is case growth enhancing. We also find a positive and significant coefficient on infrastructure expenditure, however the effect is decreasing and then becomes negative at a spending share of around 7

percent. This implies that there is a limit to the positive effect of infrastructure spending, which implies that it is not possible for the average municipality to enhance growth by increasing the infrastructure budget share.

There is an obvious causality issue in studies of the relationship between public expenditure and growth. On the one hand Wagner's law dictates that there tends to be a high income elasticity of demand for the kind of services provided by the public sector. As a nation grows richer the citizens will hence demand relatively more publicly provided services which will lead to an increase in the size of the public sector. On the other hand, according to Keynesian theory it is at least in the short run possible to increase GDP by an increase in spending, specifically productive spending according to the endogenous growth literature.

The causality question is usually approached by Granger causality tests to find the nexus between public spending and growth. The results are however not conclusive and appear to depend on the country in question, time period, and type of public expenditure. Evidence based on Swedish aggregate infrastructure investment data by Krüger (2012) show that the direction of causality depends on the time scale, i.e., in the short run there is a unidirectional causality from infrastructure investments to growth, while the opposite is true in the long run. As pointed out by Bleaney et al. (2001) the causality issue is highly important but also inherently difficult to handle, especially when decomposing expenditure in different categories.

We present results where we allow for non-linear relationships in the fiscal variables, where we only include a second-order polynomial. Including a third-order polynomial would allow for an even more complex relationship. However, the range of our data is limited and even if devoting a larger share of expenditure on a specific area than what we have observed here there is probably a limit to the relationship between compositional effects on growth, but it is not yet reached within our observable data. The fact that we find evidence of non-linearities can indicate that there are other factors that drive the amount of different expenditures and not just growth, and that these factors potentially drive growth. This can be exemplified by a municipality with a high spending share on e.g., infrastructure. As shown in previous studies (see, e.g., Helms, 1985; Clarke and Miller, 2014) productive expenditure such as infrastructure can have a growth enhancing effect.

However, according to our results this positive effect is decreasing and can even become negative for high enough spending shares.

References

Andersson, L., Lundberg, J. and Sjöström, M. (2007). Regional Effects of Military Base Closures: The Case of Sweden. *Defence and Peace Economics* 18(1), 87-97.

Anselin L. (1988). *Spatial Econometrics*: *Methods and Models*. Kluwer, Dordrecht.

Aronsson, T., Lundberg, J. and Wikström, M. (2000). The Impact of Regional Public Expenditures on the Local Decision to Spend. *Regional Science and Urban Economics* 30(2), 185-202.

Aronsson, T., Lundberg, J. and Wikström, M. (2001). Regional Income Growth and Net Migration in Sweden, 1970–1995. *Regional Studies* 35(9), 823-830.

Bania, N., Gray, J.A. and Stone, J.A. (2007). Growth, Taxes, and Government Expenditures: Growth Hills for U.S. States. *National Tax Journal* 60, 193-204.

Barro, R.J. (1990). Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy* 98, S103-S125.

Barro, R.J. and Sala-i-Martin, X. (1992a). Convergence. *Journal of Political Economy* 100, 223-251.

Barro, R.J. and Sala-i-Martin, X. (1992b). Public Finance in Models of Economic Growth. *The Review of Economic Studies* 59, 645-661.

Barro, R.J. and Sala-i-Martin, X. (1995). *Economic Growth*. MIT Press, Cambridge MA.

Bartik, T.J. (1992). The Effects of State and Local Taxes on Economic Development: A Review of Recent Research. *Economic Development Quarterly* 6, 102-111.

Becsi, Z. (1996). Do State and Local Taxes Affect Relative State Growth? Federal Reserve Bank of Atlanta *Economic Review* 81, 18-36.

Björklund, M and Jäntti, M. (2011). *Inkomstfördelningen i Sverige*. SNS Välfärdsrapport 2011. SNS Förlag, Stockholm

Bleaney, M., Gemmel, N. and Kneller, R. (2001). Testing the Endogenous Growth Model: Public Expenditure, Taxation and Growth over the Long Run. *Canadian Journal of Economics* 34, 36-57.

Clarke, C.A. and Miller, S.M. (2014). Can State and Local Revenue and Expenditure Enhance Economic Growth? A Cross-State Panel Study of Fiscal Activities. Working Paper No. 2014-25, Department of Economics, University of Connecticut.

Engen, E. and Skinner, J. (1996). Taxation and Economic Growth. *National Tax Journal* 49, 617-42.

Fagerberg, J.G., Verspagen, B. and Caniels, M. (1997). Technology, Growth and Unemployment across European Regions. *Regional Studies* 31, 457–466.

Glaeser, E.L., Scheinkman, J.A. and Shleifer, A. (1995). Economic Growth in a Cross-section of Cities. *Journal of Monetary Economics* 36, 117–143.

Glomm, G. and Ravikumar, B. (1997). Productive Government Expenditures and Long-run Growth. *Journal of Economic Dynamics and Control* 21, 183-204.

Helms, L.J. (1985). The Effect of State and Local Taxes on Economic Growth: A Time Series – Cross Section Approach. *The Review of Economics and Statistics* 67, 574-582.

Holcombe, R.C and Lacombe, D.J. (2004). The Effect of State Income Taxation on Per Capita Income Growth. *Public Finance Review* 32(3), 292-312.

Jonsson, M. and Klein, P. (2003). Tax distortions in Sweden and the United States. *European Economic Review, 47*(4), 711-729.

Kocherlakota and Yi (1997). Is There Endogenous Long-Run Growth?: Evidence from the U.S. and the U.K. *Journal of Money, Credit and Banking* 29(2), 235-262.

Krüger, N.A. (2012). Does Infrastructure Really Cause Growth? The Time Scale Dependent Causality Nexus between Infrastructure Investments and GDP. CTS Working Paper 2012:15, Centre for Transport Studies, Stockholm.

Lee, Y. and Gordon, H.R. (2005). Tax Structure and Economic Growth. *Journal of Public Economics* 89, 1027-1043.

Lundberg, J. (2003). On the Determinants of Average Income Growth and Net Migration at the Municipal Level in Sweden. *The Review of Regional Studies* 33(2), 229-253.

Lundberg, J. (2006). Using Spatial Econometrics To Analyze Local Growth in Sweden. *Regional Studies* 40, 303–316.

McGuire, T. (1992). Review of "Who Benefits from State and Local Economic Development Policies". *National Tax Journal* 45, 457-459.

Munnell, A.H. (1992). Infrastructure Investment and Economic Growth. *Journal of Economic Literature* 6(4), 189-198.

Nordström, M. and Värja, E. (2016). The Local Income Tax Laffer Curve in Sweden. Mimeo.

Phillips, J. and Goss, E. (1995). The Effect of State and Local Taxes on Economic Development: A Meta-Analysis. *Southern Economic Journal* 62, 320-333.

Poot, J. (2000). A Synthesis of Empirical Research on the Impact of Government on Long-Run Growth. *Growth and Change* 31, 516-546.

Reed, W.R. (2008). The Robust Relationship between Taxes and U.S. State Income Growth. *National Tax Journal* 61, 57-80.

Trabandt, M. and Uhlig, H. (2011). The Laffer Curve Revisited. *Journal of Monetary Economics*, 58(4), 305-327.

Treyz, G.I., Rickman, D.S., Hunt, G.L. and Greenwood, M.J. (1993). The Dynamics of U.S. Internal Migration. *The Review of Economics and Statistics* 75, 209–214.

Värja, E. (2016). Sports and Local Growth in Sweden: Is a Successful Sports Team Good for Local Economic Growth? Mimeo.

Wasylenko, M. (1997). Taxation and Economic Development: The State of the Economic Literature. *New England Economic Review* (Federal Reserve Bank of Boston), March/April, 37-52.

Table 1: Variable content

Variable name	Content
Personal income	Mean personal income in thousand SEK per capita for the population of the age 20 and above, Price adjusted and taken in logs in the estimations
County Tax rate	County tax rate in percent
Debt	long-term and short-term liabilities, price adjusted and taken in logs in the estimations
Municipal Income	
Grants and fees (1)	Cost equalization and general government grants and property tax in per capita
Financial income (2)	Financial income per capita
Tax revenues (3)	Total tax revenues for the municipality per capita (tax base * tax rate)
Other income (4)	The difference between total municipal income and total municipal expenditures, includes results, pension earnings, and other income. (A negative result is counted as an income, as a positive result then reduces this value.)
Total municipal income	The sum of 1, 2, 3 and 4
Municipal Expenditures	
Total net operating expenditures (5)	Local total net operating expenditures, SEK per capita
General government services	Local net expenditures on general government services, as board activities costs for general elections and support to political parties, SEK per capita
Infrastructure	Local net expenditures on infrastructure, as streets and roads, business promotions, tourism activities, parking, parks, environmental health etc., SEK per capita
Culture and leisure	Local net expenditures on culture and leisure, support to libraries, cultural associations and student organizations, museums, music, arts, sports and leisure facilities and recreation centers, SEK per capita
Child care	Local net expenditures on child care, this includes expenditures for all pre-school and after-school care, SEK per capita
Education	Local net expenditures on education, SEK per capita
Elderly and disability care	Local net expenditures on elderly and disability care, including transportation home care and special housing, SEK per capita

Social welfare	Local net expenditures on social welfare, including financial assistance, institutional and foster care, SEK per capita
Directed activities	Local net expenditures on directed activities, including refugee reception and expenses for employment promotion, SEK per capita
Business activities (6)	Local net expenditures on business activities, common examples are energy water and waste management, SEK per capita
Financial costs (7)	Financial costs in SEK per capita
Total expenditures	The sum of 5, 6 and 7

Income shares

Share tax revenues (8)	Tax revenues divided by total municipal income
Share other income (9)	Financial income plus other income divided by total municipal income
Share grants and fees (10)	Grants and fees divided by total municipal income

The sum of 8,9 and 10 is equal to one

Expenditure shares

Share of productive expenditures (11)	
Share general government services	Expenditures on general government services dividend by total expenditures
Share infrastructure	Expenditures on infrastructure dividend by total expenditures
Share child care	Expenditures on education dividend by total expenditures
Share education	Expenditures on child care dividend by total expenditures
Share elderly and disability care	Expenditures on elderly and disability care dividend by total expenditures
Share of consumption expenditures (12)	
Social welfare	Expenditures on social welfare dividend by total expenditures
Culture and leisure	Expenditures on culture and leisure dividend by total expenditures
Share other expenditures ***(13)***	
Share business activities	Expenditures on business activities dividend by total expenditures
Share financial costs	Financial costs dividend by total expenditures
Share directed activities	Expenditures on directed activities dividend by total expenditures

The Sum of 11 12 and 13 is equal to one

High educated	The share of people in the municipality that have at least 3 years of college education
Low educated	The share of people between 25 and 65 that have at least high school education but less than three years of college education
Unemployment	The share of unemployed people in the municipality, in logs
Herfindahl index	The sum of squares of the share of votes for the different parties in the local elections

Old	The share of people in the municipality above the age 65
Young	The share of people in the municipalities aged 0-6
Density	in logs
W*y	Weight matrix times the growth in neighboring municipalities

Table 2: Descriptive statistics, year 2005

	Mean	Std.dev.	Min.	Max.
Income growth	.0863775	.0189864	.015234	.1311601
Net in-migration	-.0080295	.0285911	-.1583152	.0721834
Municipal Income				
Grants and fees	8212.798	5300.272	-10502	24749
Financial income	582.2852	724.3874	8	5189
Tax revenues	30590.86	2751.013	23550	48665
Other income	-343.2816	1187.116	-5137	3375
Total municipal income	39042.66	4442.704	29259	56243
Municipal Expenditures				
Total net operating expenditures	38027.03	3958.202	29364	51474
Culture and leisure	1800.657	438.1862	522	3396
General government services	620.5271	224.701	294	1526
Infrastructure	2553.025	726.4635	826	6517
Child care	4210.065	749.6882	2575	6833
Education	13721.78	1409.731	7750	17397
Social welfare	2166.141	655.294	656	4217
Elderly and disability care	12670.06	2976.162	4528	22036
Directed activities	284.7617	186.3208	-122	1390
Business activities	579.4404	686.0038	-1563	4035
Financial costs	436.1949	426.7414	0	2744
Total expenditures	39042.66	4442.704	29259	56243
Income shares				
Share financial income	.0152658	.0191388	.0001865	.1360371
Share Tax revenues	.7928106	.1114113	.5423075	1.266856
Share grants and fees	.201069	.1072606	-.3414101	.4797668
Share other income	-.0093381	.0301225	-.1259069	.0724202
Expenditure shares				
Share productive expenditures	.8652126	.0272216	.746874	.9408578
Share general government services	.0157195	.0046432	.0080231	.0335356
Share infrastructure	.0648455	.0140158	.0200973	.1334384
Share child care	.1097988	.0262727	.0518015	.1975769
Share education	.3534325	.0354312	.2627475	.4643134
Share elderly and disability care	.3214164	.0480105	.1298426	.4194776
Share consumption expenditures	.1026324	.0228669	.0504325	.1800233
Share culture and leisure	.0461713	.0098064	.0130503	.0826084
Share social welfare	.0564612	.0188067	.0131973	.1096551

Share other expenditures	.0321544	.0192955	-.0056217	.1133119
Share business activities	.0139184	.0147221	-.0426536	.0785629
Share financial costs	.0110192	.0105188	0	.0703518
Share directed activities	.0072168	.0044571	-.0032308	.030307
Personal income	210.3657	25.54813	175.5	391.8
County Tax rate	10.51054	.6382467	9.42	12.27
Debt	19779.66	11560.45	5286	87447
Low educated	.2926726	.0303824	.2280601	.3705548
High educated	.1358119	.062292	.0665296	.4907002
Unemployment	.0395415	.0106952	.013	.076
Young	.0709802	.0113084	.0483452	.1089228
Old	.1956742	.0358039	.0987668	.29391
Municipal tax rate	21.44545	1.079065	17.58	23.79
Herfindahl index	.2518054	.0441252	.178901	.416736
Density	120.6805	422.159	.2	4106.9
No. of observations	277			

Table 3: Estimation results of local average income growth and migration, 1996-2013, Maximum likelihood estimations

Dependent variable	*y*	*m*
Total revenue	-0.007***	-0.002***
	(0.00)	(0.00)
Personal income	-0.437***	-0.115***
	(0.04)	(0.04)
County tax rate	0.004***	-0.000
	(0.00)	(0.00)
Debt	0.002	0.002
	(0.00)	(0.00)
High educated	0.008	-0.017
	(0.01)	(0.01)
Low educated	-0.022*	-0.012
	(0.01)	(0.01)
Unemployment	0.000	-0.006*
	(0.00)	(0.00)
Herfindahl index	-0.074***	-0.047
	(0.03)	(0.03)
Old	0.002	0.017
	(0.01)	(0.01)
Young	0.001	0.028**
	(0.01)	(0.01)
Density	0.049**	-0.124***
	(0.02)	(0.03)
Spatial W*y	0.332***	0.592***
	(0.02)	(0.05)
N	1108	1108
AIC	-6997.2	-6737.4
BIC	-6917.0	-6657.2

Notes: Robust standard errors clustered on municipalities are reported in parenthesis, and *, **, *** indicates significance on the 10, 5 and 1 percent level.

Table 4: Estimation results of local average income growth and migration, 1996-2013, Maximum likelihood estimations

Excluded type of expenditure	Productive	Consumption	Other	Productive	Consumption	Other
Dependent variable	*y*	*y*	*y*	*m*	*m*	*m*
Productive exp.		0.037	0.077**		0.081	-0.013
		(0.04)	(0.04)		(0.05)	(0.04)
Consump. exp.	-0.037		0.040	-0.081		-0.094
	(0.04)		(0.06)	(0.05)		(0.06)
Other exp.	-0.077**	-0.040		0.013	0.094	
	(0.04)	(0.06)		(0.04)	(0.06)	
Grants and fees	-0.070***	-0.070***	-0.070***	0.002	0.002	0.002
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
Other income	-0.035*	-0.035*	-0.035*	0.003	0.003	0.003
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
County tax rate	0.006***	0.006***	0.006***	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Debt	0.003	0.003	0.003	0.001	0.001	0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Personal inc.	-0.412***	-0.412***	-0.412***	-0.090*	-0.090*	-0.090*
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
High educated	0.011	0.011	0.011	-0.015	-0.014	-0.015
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Low educated	-0.029**	-0.029**	-0.029**	-0.010	-0.010	-0.010
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	-0.003	-0.003	-0.003	-0.007**	-0.007**	-0.007**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Herfindahl	-0.098***	-0.098***	-0.098***	-0.054*	-0.054*	-0.054*
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Old	-0.001	-0.001	-0.001	0.015	0.015	0.015
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Young	-0.001	-0.001	-0.001	0.026**	0.026**	0.026**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Density	0.033	0.033	0.033	-0.139***	-0.139***	-0.139***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Spatial W*y	0.370***	0.370***	0.370***	0.608***	0.608***	0.608***
	(0.03)	(0.03)	(0.03)	(0.05)	(0.05)	(0.05)
N	1108	1108	1108	1108	1108	1108
AIC	-6845.6	-6845.6	-6845.6	-6719.3	-6719.3	-6719.3
BIC	-6750.4	-6750.4	-6750.4	-6624.1	-6624.1	-6624.1

Notes: Robust standard errors clustered on municipalities are reported in parenthesis, and *, **, *** indicates significance on the 10, 5 and 1 percent level.

Table 5: Estimation results of local average income growth and migration, 1996-2013, Maximum likelihood estimations with non-linear fit

Excluded type of expenditure	Productive	Consumption	Other	Productive	Consumption	Other
Dependent variable	*y*	*y*	*y*	*m*	*m*	*m*
Productive exp.		-2.423***	-0.072		0.129	-0.454
		(0.64)	(0.49)		(0.63)	(0.54)
Productive exp. squared		1.455***	0.093		-0.027	0.267
		(0.38)	(0.30)		(0.37)	(0.33)
Consumption exp.	-0.704***		-0.625***	0.062		0.133
	(0.18)		(0.20)	(0.19)		(0.22)
Consumption exp.	2.989***		2.985***	-0.638		-0.966
	(0.77)		(0.86)	(0.76)		(0.88)
Other expenditures	0.038	0.222**		-0.028	0.048	
	(0.07)	(0.09)		(0.08)	(0.09)	
Other exp. squared	-0.825	-2.269***		0.292	0.341	
	(0.50)	(0.62)		(0.44)	(0.58)	
Share grants and fees	-0.067***	-0.065**	-0.068***	0.002	0.002	0.003
	(0.03)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
Share other income	-0.030	-0.033*	-0.030	0.002	0.004	0.002
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
County tax rate	0.006***	0.005***	0.005***	0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Debt	0.002	0.002	0.002	0.002	0.002	0.002
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Personal inc.	-0.430***	-0.423***	-0.438***	-0.088*	-0.092*	-0.088*
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)
High educated	0.015	0.014	0.018	-0.015	-0.014	-0.015
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Low educated	-0.035**	-0.037***	-0.035***	-0.008	-0.010	-0.009
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	-0.002	-0.002	-0.002	-0.007**	-0.007**	-0.007**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Herfindahl index	-0.096***	-0.098***	-0.099***	-0.055*	-0.055*	-0.056*
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Old	-0.005	-0.004	-0.006	0.015	0.014	0.015
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)

Young	-0.002	0.000	-0.002	0.026**	0.026**	0.027**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Density	0.038	0.036	0.036	-0.141***	-0.140***	-0.141***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Spatial W*y	0.341***	0.355***	0.340***	0.609***	0.608***	0.607***
	(0.03)	(0.03)	(0.03)	(0.04)	(0.05)	(0.05)
N	1108	1108	1108	1108	1108	1108
AIC	-6874.9	-6877.3	-6869.0	-6717.2	-6716.1	-6717.6
BIC	-6769.7	-6772.1	-6763.8	-6612.0	-6610.9	-6612.4

Notes: Robust standard errors clustered on municipalities are reported in parenthesis, and *, **, *** indicates significance on the 10, 5 and 1 percent level.

Table 6: Maximum likelihood estimations with separated expenditures and non-linier relationship for income growth

Excluded type of expenditure share	Education	Culture and leisure	General gov. services	Infrastructure	Child care	Elderly and disability care	Social welfare	Directed activities
Education		-0.354	-0.036	-0.198	0.047	-0.215	-0.186	-0.006
		(0.22)	(0.23)	(0.24)	(0.21)	(0.20)	(0.20)	(0.21)
Education squared		0.253	0.257	0.222	-0.198	0.202	0.261	0.258
		(0.28)	(0.28)	(0.31)	(0.27)	(0.27)	(0.28)	(0.28)
Culture and leisure	-0.308		-0.204	-0.358	-0.405	-0.404	-0.291	-0.144
	(0.48)		(0.49)	(0.47)	(0.48)	(0.48)	(0.47)	(0.47)
Culture and leisure squared	4.601		4.970	4.501	4.958	4.892	4.399	4.680
	(4.47)		(4.33)	(4.47)	(4.49)	(4.49)	(4.44)	(4.41)
General government services	0.244	0.088		0.117	0.261	0.196	0.233	0.350
	(0.45)	(0.46)		(0.45)	(0.44)	(0.44)	(0.45)	(0.41)
General government services squared	-8.198	-8.801		-5.843	-10.132	-8.288	-8.427	-6.613
	(10.02)	(9.72)		(10.08)	(9.80)	(9.88)	(10.14)	(9.14)
Infrastructure	0.475***	0.297**	0.608***		0.402***	0.386***	0.465***	0.641***
	(0.11)	(0.15)	(0.16)		(0.12)	(0.11)	(0.12)	(0.14)
Infrastructure squared	-3.196***	-3.210***	-3.116***		-3.187***	-3.115***	-3.195***	-3.188***
	(0.77)	(0.76)	(0.77)		(0.78)	(0.74)	(0.78)	(0.75)
Child care	-0.621***	-0.841***	-0.530***	-0.713***		-0.793***	-0.650***	-0.487***
	(0.16)	(0.18)	(0.19)	(0.16)		(0.15)	(0.16)	(0.18)
Child care squared	2.657***	2.852***	2.885***	2.818***		3.050***	2.769***	2.829***
	(0.52)	(0.53)	(0.53)	(0.53)		(0.54)	(0.54)	(0.54)
Elderly and disability care	-0.332**	-0.523***	-0.197	-0.364**	-0.495***		-0.405**	-0.180
	(0.17)	(0.18)	(0.18)	(0.17)	(0.18)		(0.16)	(0.19)
Elderly and disability care squared	0.643**	0.664**	0.658**	0.620**	0.789***		0.749***	0.676**

	(0.27)	(0.27)	(0.27)	(0.28)	(0.28)		(0.25)	(0.27)
Social welfare	-0.234	-0.407**	-0.093	-0.268*	-0.293*	-0.368***		-0.062
	(0.15)	(0.19)	(0.19)	(0.16)	(0.15)	(0.13)		(0.17)
Social welfare squared	1.850*	1.807*	1.865*	1.795*	1.610	2.362***		1.858*
	(0.98)	(0.97)	(0.98)	(1.00)	(1.01)	(0.88)		(0.98)
Directed activities	-0.256**	-0.437***	-0.085	-0.307**	-0.324**	-0.370***	-0.271**	
	(0.12)	(0.16)	(0.15)	(0.13)	(0.14)	(0.11)	(0.13)	
Directed activities squared	4.320	4.398	2.438	3.429	3.953	5.749	4.472	
	(4.52)	(4.41)	(4.00)	(4.45)	(4.80)	(4.32)	(4.64)	
Business activities	0.131**	-0.048	0.275**	0.070	0.047	0.051	0.130*	0.301***
	(0.07)	(0.12)	(0.13)	(0.09)	(0.07)	(0.07)	(0.07)	(0.11)
Business activities squared	-2.265***	-2.347***	-2.360***	-2.256***	-2.148**	-2.440***	-2.361***	-2.354***
	(0.87)	(0.86)	(0.88)	(0.87)	(0.92)	(0.85)	(0.89)	(0.85)
Financial cost	0.062	-0.121	0.197	0.013	-0.006	-0.008	0.065	0.228*
	(0.09)	(0.13)	(0.15)	(0.10)	(0.09)	(0.09)	(0.10)	(0.13)
Financial costs squared	-0.172	-0.198	-0.169	-0.180	-0.189	-0.103	-0.281	-0.190
	(0.61)	(0.60)	(0.61)	(0.61)	(0.64)	(0.58)	(0.61)	(0.60)
Other income	-0.051***	-0.051***	-0.052***	-0.046**	-0.053***	-0.048**	-0.053***	-0.051***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Grants and fees	-0.076***	-0.077***	-0.079***	-0.079***	-0.069***	-0.074***	-0.080***	-0.079***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Spatial W*y	0.284***	0.279***	0.277***	0.293***	0.322***	0.290***	0.297***	0.279***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
N	1108	1108	1108	1108	1108	1108	1108	1108
AIC	-6931.9	-6930.8	-6930.8	-6914.0	-6903.6	-6921.9	-6927.4	-6932.0
BIC	-6756.5	-6755.4	-6755.4	-6738.6	-6728.2	-6746.5	-6752.0	-6756.6

Notes: Robust standard errors clustered on municipalities are reported in the parenthesis, and *, **, *** indicates significance on the 10, 5 and 1 percent level. All specifications include the following full set of same control variables: time-specific effects, municipality-specific effects, share of high educated, share of low educated, Herfindahl index, density, share of old, share of young, unemployment rate, average personal income, and a spatial growth effect.

Table 7: Maximum likelihood estimations with separated expenditure and non-linier relationship for net migration rate

Excluded type of expenditure share	Education	Culture and leisure	General gov. services	Infrastructure	Child care	Elderly and disability care	Social welfare	Directed activities
Education		0.051	-0.066	0.014	0.174	0.032	0.131	0.145
		(0.27)	(0.31)	(0.29)	(0.26)	(0.27)	(0.27)	(0.30)
Education squared		-0.110	-0.085	-0.108	-0.298	-0.103	-0.103	-0.100
		(0.40)	(0.40)	(0.41)	(0.36)	(0.41)	(0.41)	(0.40)
Culture and leisure	0.617		0.424	0.554	0.604	0.571	0.671*	0.690*
	(0.38)		(0.40)	(0.38)	(0.38)	(0.38)	(0.38)	(0.40)
Culture and leisure squared	-5.583		-4.930	-5.692	-5.609	-5.510	-5.527	-5.563
	(3.47)		(3.48)	(3.51)	(3.46)	(3.49)	(3.48)	(3.55)
General government services	0.548	0.476		0.421	0.560	0.518	0.614	0.631
	(0.38)	(0.39)		(0.38)	(0.37)	(0.38)	(0.38)	(0.40)
General government services squared	-9.028	-7.923		-6.904	-9.590	-9.119	-9.107	-9.173
	(7.89)	(7.95)		(7.86)	(7.85)	(7.94)	(7.92)	(8.62)
Infrastructure	0.439*	0.414*	0.303		0.428*	0.400*	0.499**	0.516*
	(0.23)	(0.24)	(0.29)		(0.23)	(0.23)	(0.24)	(0.27)
Infrastructure squared	-2.850*	-2.863*	-2.721*		-2.897*	-2.839*	-2.843*	-2.848*
	(1.55)	(1.57)	(1.56)		(1.59)	(1.57)	(1.57)	(1.55)
Child care	-0.327*	-0.342	-0.443**	-0.392*		-0.360**	-0.251	-0.236
	(0.17)	(0.21)	(0.22)	(0.20)		(0.17)	(0.18)	(0.22)
Child care squared	1.333**	1.273*	1.295*	1.319**		1.303**	1.261*	1.266*
	(0.57)	(0.66)	(0.66)	(0.67)		(0.65)	(0.67)	(0.66)
Elderly and disability care	-0.015	-0.033	-0.136	-0.063	-0.089		0.053	0.063
	(0.20)	(0.23)	(0.23)	(0.21)	(0.20)		(0.20)	(0.25)
Elderly and disability	0.085	0.071	0.084	0.064	0.170		0.073	0.081

care squared								
	(0.32)	(0.32)	(0.32)	(0.32)	(0.31)		(0.30)	(0.31)
Social welfare	-0.038	-0.073	-0.167	-0.105	-0.076	-0.089		0.035
	(0.18)	(0.19)	(0.20)	(0.18)	(0.17)	(0.16)		(0.21)
Social welfare squared	-0.163	-0.085	-0.144	-0.068	-0.065	-0.064		-0.143
	(1.10)	(1.10)	(1.09)	(1.09)	(1.09)	(1.01)		(1.09)
Directed activities	-0.070	-0.092	-0.164	-0.132	-0.082	-0.114	-0.010	
	(0.26)	(0.29)	(0.29)	(0.27)	(0.25)	(0.25)	(0.26)	
Directed activities squared	-0.324	-0.784	-1.921	-0.968	-0.678	-0.011	-0.221	
	(9.02)	(9.15)	(9.16)	(9.11)	(8.77)	(9.01)	(9.07)	
Business activities	0.052	0.025	-0.070	-0.021	0.027	0.012	0.111	0.128
	(0.09)	(0.14)	(0.14)	(0.11)	(0.09)	(0.09)	(0.10)	(0.16)
Business activities squared	1.033	1.090	1.008	1.106	1.127	1.039	1.059	1.057
	(1.07)	(1.09)	(1.09)	(1.11)	(1.07)	(1.08)	(1.09)	(1.08)
Financial cost	-0.024	-0.048	-0.152	-0.086	-0.044	-0.061	0.036	0.053
	(0.09)	(0.14)	(0.15)	(0.11)	(0.10)	(0.09)	(0.11)	(0.18)
Financial costs squared	0.210	0.224	0.253	0.249	0.243	0.235	0.228	0.221
	(0.53)	(0.53)	(0.53)	(0.52)	(0.54)	(0.53)	(0.53)	(0.53)
Other income	-0.002	-0.002	-0.003	0.002	-0.003	-0.001	-0.001	-0.001
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Grants and fees	-0.006	-0.007	-0.007	-0.005	0.001	-0.005	-0.005	-0.005
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Spatial W*y	0.582***	0.580***	0.582***	0.589***	0.599***	0.582***	0.583***	0.583***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
N	1108	1108	1108	1108	1108	1108	1108	1108
AIC	-6725.5	-6722.9	-6723.3	-6713.0	-6720.2	-6725.5	-6725.6	-6725.6
BIC	-6550.1	-6547.5	-6547.9	-6537.6	-6544.9	-6550.1	-6550.2	-6550.3

Notes: Robust standard errors clustered on municipalities are reported in the parenthesis, and *, **, *** indicates significance on the 10, 5 and 1 percent level. All specifications include the following full set of same control variables: time-specific effects, municipality-specific effects, share of high educated, share of low educated, Herfindahl index, density, share of old, share of young, unemployment rate, average personal income, and a spatial growth effect.