Regional effects of curbing future deficits – Alternative ways to respond to increasing municipal expenditures

Juha Honkatukia[*]

Jouko Kinnunen[†]

Jussi Ahokas[*]

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[*] Government Institute for Economic Research VATT, Finland

[†] Government Institute for Economic Research VATT, Finland, Statistics and Economic Research Åland, ÅSUB

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Abstract

In this study we evaluate the regional effects of ageing and balancing of fiscal deficits by using a dynamic, regional AGE model for Finnish Economy. It uses MONASH-type dynamics. To study the effects of ageing, we make use of econometric results and long term anticipation results conducted by the European Commission for the parameter values determining the population-driven demand for public services. Public demand for age-dependent services is driven by a general growth trend, and by age-group specific parameters. Thus, foreseen changes in the age composition of the Finnish population is reflected the composition and volume of public demand.

Whereas the demographic development is an important aspect of our baseline, in our policy runs we use AGE analysis to study different measures to tackle the fiscal pressure on public sector finances. The public sector is divided in our model into tree subsectors: the central government, municipalities and social security funds. The issue increasing in importance as the public sector in Finland is in the red as a consequence of the financial crisis. The rapid ageing of the population is making things even worse. Finland is among the fastest ageing societies in Europe.

The present study introduces also a sub-regional analysis for one of the twenty regions of Finland, the Central Finland region. For the demographic development, we apply the population forecast of the Statistics Finland. Population is kept exogenous in our analysis.

State transfers to municipalities include a kind of Robin Hood-element that treats high- and low-income municipalities asymmetrically. In order to improve our description of the state transfers to municipalities, we introduced individual municipalities within each region for the purposes of the state transfer calculus. However, the historical status of the municipality within the income distribution is reflected in the amount of transfers it gets during the simulation period. In addition to rules-based transfers to municipalities, around a third of the transfers are based on more ad-hoc policy decisions. This part of the transfers is our policy variable in the analysis.

According to our simulation results, constraining the fiscal deficits of the public sector has considerable effects on the GDP growth. The size of effects varies between our alternative ways to curb the deficits: through state-level or municipal income taxation. The negative effects on GDP are greater if the public deficits are financed through higher state income taxes and transfers to the local administration than through municipal income taxation. However, using municipal taxation increases regional differences. From our sub-regional disaggregation of Central Finland we see how the sub-regions diverge in their development. Central region Jyväskylä would gain if municipal taxation, rather than state income taxation is used in cutting the deficits. As in several studies using new economic theory framework, we find a trade-off between efficiency and cohesion. Future improvements of our model will include making the demographic development endogenous through migration. In addition, commuting between regions may be taken into account explicitly.

1 Introduction

In this study we analyze the future development the financial standing of the Finnish local administration by region during 2010-2020. Our focus is on the alternative policies to curb public sector deficits. To be precise, we look into effects of raising local, municipal income taxes, or alternatively raising state income taxes to fund increased state transfers to municipalities. The study has been conducted using a combination of NUTS3 and NUTS4 levels. NUTS4 level has been used for one of the NUTS3 provinces, Central Finland, which is divided into six economic regions, which raises the number of regions to 25[‡].

CGE/AGE models as well as other tools have been increasingly used in studying the effects of ageing to the fiscal sustainability of the public sector in e.g. in Australia (see Horridge et al. 2005, and Giesecke and Meagher 2009) or in Denmark (Jensen et al, 2002), Sweden (Brunner, 2008) and Norway (Holmøy, 2007). Honkatukia, Marttila and Kinnunen (2009) studied ageing in Finland with VERM at NUTS2 level.

In constructing the base scenario of this study, we have used several information sources for regional economic growth, industry-level development and demographic changes. As in the earlier study of Honkatukia, Marttila and Kinnunen (2009), the demand of the public sector is driven by demographic changes, for which parameters were estimated from a combined public sector's regional accounts - population panel data set covering 77 economic regions. On the other hand, development of labour force affects each region's tax revenues. In the elaboration of the development of the economic standing of the local administration, we also take into account recent changes in the state support to municipalities. Regarding state taxation, we have incorporated the

[‡] This paper is an abridged version of Honkatukia – Kinnunen – Ahokas (2011). Note that one of the regions in the model, the autonomous province of Åland Islands, is left out of the result charts, as the original audience for this study was the readership in the mainland Finland.

changes in the direct and indirect taxation. For the coming years, we foresee further gradual increases in indirect taxation during 2011-2015, especially in VAT and energy taxation.

The structure of this paper is following. In section two the model and its data sources are presented, especially the disaggregation of the database to the level of economic regions for the province of Keski-Suomi and we also discuss the base-year data for public sector revenues and expenses. In section three we present our base scenario and discuss the methods to gauge the development of public expenditure. Section four presents the results of our policy scenarios. Section five concludes.

2 The structure and data sources of the VERM model

2.1 The model and its recent changes

Our workhorse in the analysis is VERM, a dynamic, regional, AGE model of the Finnish economy. The model is based on the well-known Australian TERM model, but has been extended in several aspects. First, we use very detailed data on the outlays and incomes of the central government, the municipal level, and social security funds to realistically study the provision and financing of public services and social security transfers and pensions. Secondly, we use occupational data to study the demand for labour especially in service provision. Thirdly, the model uses MONASH-type dynamics.

State support to municipalities amounts to two thirds of the level of total tax revenues of the municipalities. Hence, they are indispensable when one wants to study the development of financial standing of municipalities. Of this support, more than two thirds are special, rule-bound state transfers to the local government. The state transfers are directed to different functions of the local government: general allowance education and culture, health and social care, and redistribution of

tax revenues. The final third of state support consists of several, more disparate transfers with less unified payment rules. We assume that this final third of the state support is the policy variable is varied in the simulations. The transfer system itself is assumed to continue according to rules that were in place at the time of the analysis. In reality, minor changes are introduced to the transfer system annually.

As the base year of VERM is currently 2004, that point of time is also our point of departure in the description of the transfer system. In 2010, the state transfer system was renewed, but the practical consequences of the reform were limited. Calculation of the transfers still follows basically the system as earlier (see e.g. Moisio et al, 2010). However, the changes have been taken into account here. The most remarkable change was related to education, were transfers were earlier calculated according to factual number of pupils, but from 2010 it was replaced by population in school age. Our model uses this renewed base for calculations from the beginning. However, factual numbers are imposed to the model between base year and years with available statistics (2004-2011). To reiterate, the basic parts of the state transfers to municipalities are:

- General allowance
- Health and social care transfer
- Education and culture transfer
- Redistribution of municipal tax income

The general allowance is calculated on the basis of population size, lagged changes in price level. In addition, several indicators measuring how peripherally the municipality is located affect the allowance. However, these measures hardly change over the course of time. It is rather different political decisions on the size of different parameters and weights that have changed more during 2004-2011.

Health and social care transfers are calculated by using age-specific cost coefficients for the services. The inhabitants are classified into five age groups:

- 0 -6 years
- 7-64 years
- 65-74 years
- 75-84 years and
- 85 years or more.

Furthermore, we divide the 7-64-year-olds into two categories (7-15 and 16-64) in order to readily have a measure for the school aged population.

Redistribution of the municipal tax income is a 'Robin Hood' system where a municipality receives a redistribution transfer if its tax income per capita is less than 91.86 per cent of the national average tax income per capita (redistribution cut-off level). The redistribution transfer amounts to the difference between the cut-off level and the tax income per capita. If the tax revenues of a municipality surpass the national average, 37 per cent of the tax income surpassing the average per-capita level is claimed by the state to finance the transfers to poorer municipalities. Due to this asymmetry in the system, we decided to create a municipal dimension to the model, just for the calculation of the redistribution transfer. Factual statistics of each municipality is being used for the period of 2004-2011 (payments in 2011 are based on 2009 figures), while from then on each municipality is assumed to follow the development of its corresponding region.

2.2 Data

There are several data sources which have been used in database formation. The most important sources are National and Regional Accounts, but also some micro-level datasets with individual observations are used. Little effort is put on describing MONASH- and TERM-type input-output structure, capital formation and balance of payment information which are available elsewhere (Dixon & Rimmer 2002; Horridge & Madden & Wittwer 2005, Honkatukia, 2009). Finally, data for econometric analysis is described.

In Finland, national supply and use tables are constructed annually (last for year 2005). The number of commodities depends of the reference year. The industry classification uses the national TOL 2002, based on NACE 20022 and ISIC Rev. 3.13 classifications. The commodities use national

KTTL classification, based on CPA4 and CPC5 classifications. Commodity classifications are designed to match with industries. For example, national TOL 2002 corresponds with national KTTL classification. Regional classification bases on NUTS6 classification at the third, provincial level which divides Finland in 20 regions. Latest regional input-output tables are available from year 2002.

Other important statistics for building TERM- and MONASH databases are capital stocks (both national and regional), financial accounts, balance of payments, data on imports by place of frontier crossing point, as well as a sample from income distribution statistics and Finnish Linked Employer-Employee Data (FLEED).

The data used for the econometric analysis are derived from Statistics Finland Regional Accounts database. For econometric studies LAU1 sub-regional classification is used. The LAU1 sub-regions coincide with the NUTS4 classification. The amount of LAU1 sub-regions has been changed in recent years. In Finland, there were 77 LAU1 in 2008.

Necessary data for government consumption by commodity, general government sub-sector, and by region are available only for the year 2002, derived from regional input-output tables. For econometric analysis, time-series data are needed. As a best approximation for dependent variables, we have used sub-regional output by industry and general government sub-sector. However, public consumption and production are very closely related.

Price indices from national accounts database are used to convert data into fixed prices, from which follows that the price changes are the same in every region. As an independent variable, data from Statistics Finland population statistics are used in various forms. The econometric analysis uses time-series from 1975 to 2006, consisting of sub-regional output and population projection data. The parameter values obtained from econometric study are incorporated with the population

projection is used to create a forecast from 2006 onwards. Price data from national accounts are used to transform output data in fixed price form.

The public sector demand is modelled in VERM as follows:

$$x_{c,z} = \alpha_{c,z} + \sum_g S_{c,z,g} * \varepsilon_{c,z,g} * p_g + f_{c,z}\,, \qquad (1):$$

where:

c	Commodity
z	Public sector: state, local administration, social security funds
g	Age groups: 0-6, 7-15, 16-64, 65-74, 75-84 and 85+ -year-olds
$x_{c,z}$	Change in the public demand of commodity c from subsector z (%)
$S_{c,z,g}$	Share of age group g of public demand of commodity c in public subsector z during the former period
$\varepsilon_{c,z,g}$	Demand elasticity with respect to population
p_g	Change in the size of age group g, per cent
$\alpha_{c,z}$	Trend growth of commodity c at subsector z
$f_{c,z}$	Additional variable to cater e.g. productivity-induced changes in public demand

Thus, the model takes into account both the general increase in population as well as changes in its age composition.

3 Development under base scenario

In constructing the base scenario, we make use of the earlier scenario work that gathered macro forecasts and specialist views both within ministries and in business on the development of

industries and on the changes in the occupational structure of labour demand (see. Honkatukia, Ahokas and Marttila, 2010; Ahokas and Honkatukia, 2011).

Changes in regional population are in a central role, as demographics dictate both the supply of labour and the development of public demand. To summarize, our regional baseline is set up so that it coincides with our national, industry-wise baseline, the main cause for differing development between regions being changes in the population size and structure.

We will briefly describe the national baseline before turning to regional level. Public demand is expected to grow considerably due to rapid ageing of the Finns. Demand for health and social services will increase labour demand with around 80,000 persons to around 430,000 by 2025 in total. This increase would be even higher if we did not assume considerable increase in productivity in these services. In addition, increased health, reorganization of the services and other social changes can reduce the demand for social services.

Another central set of assumptions concerns export prospects. Finland recovered from the recession in early 1990s through rapid growth in exports, especially in electronics which had rapid global increase in demand at that time.

As a consequence of the global financial crisis and its aftermath, exports demand declined sharply for almost all industries in 2009. During 2010 and 2011, the prospects have improved and exports (in total) have again resumed growth. We assume here that this growth will continue even in future. We believe that the exports growth will concentrate in service exports more than in the traditional exports industries (pulp and paper and metal industry including electronics).

Another built-in assumption concerns the activity rate of labour, which we assume to rise from the current 68 per cent to 75 per cent by the end of 2025. This assumption is in line with the policy target of the Finnish government. Figure 1 depicts the change in population during the simulation period.

Figure 1. Assumptions concerning labour and population

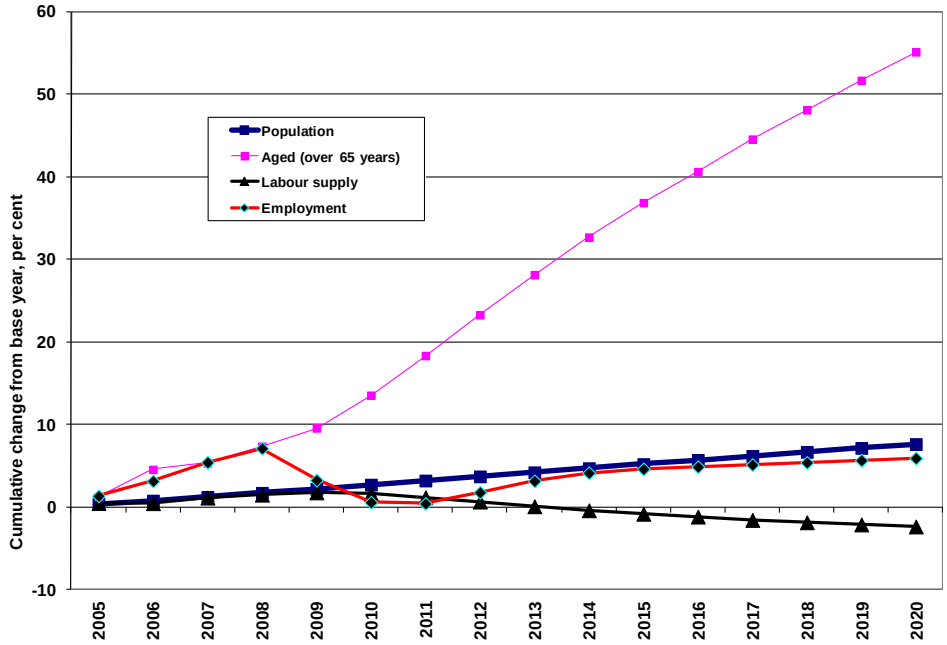
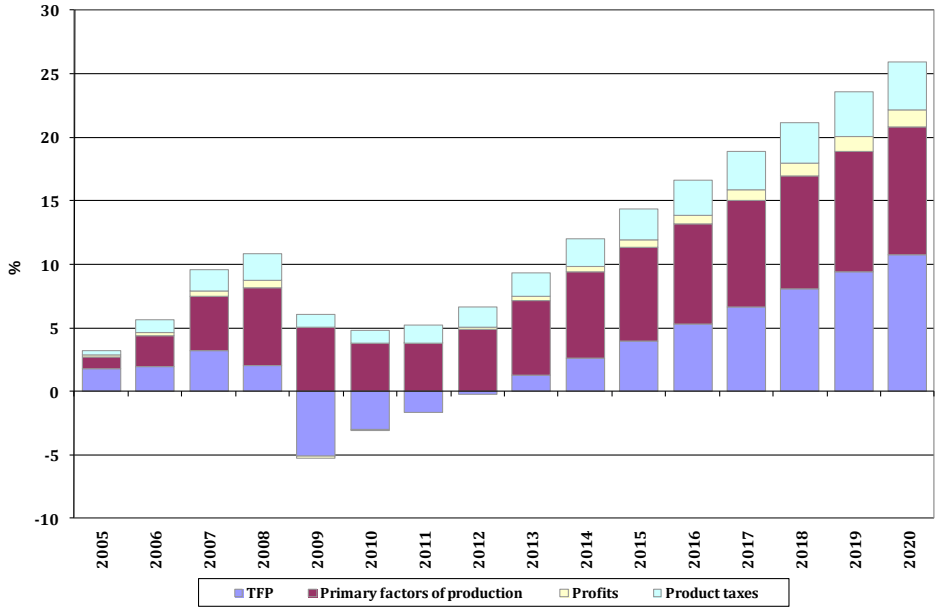


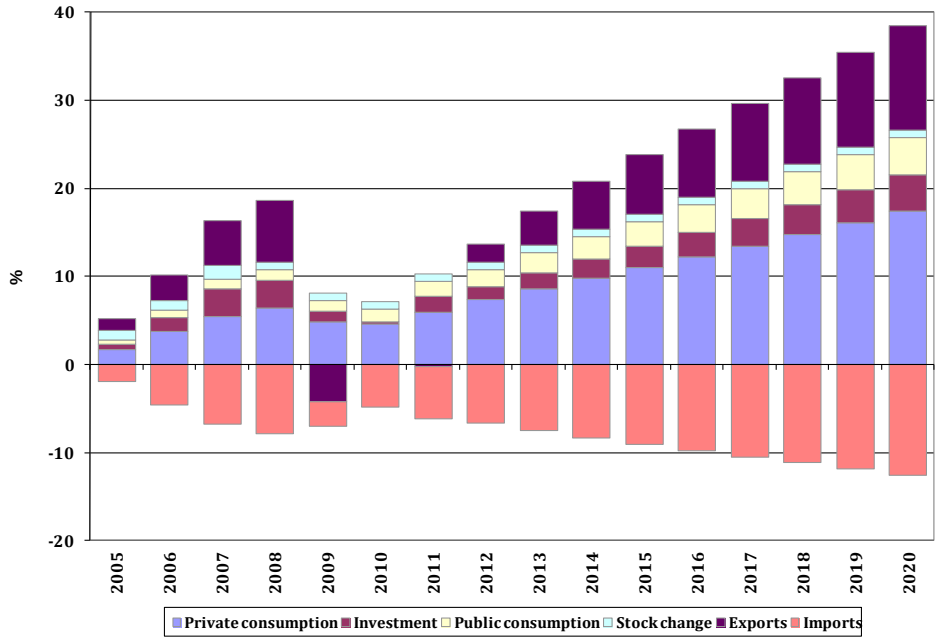
Figure 2 shows the development of supply-side GDP items. Real GDP growth hovers around 2.3 percent during the last years of study period. The Finnish economy approaches full employment, as unemployment rate drops to around 4 per cent and labour supply shrinks as the large age cohorts born right after World War 2 leave the labour market. Economic growth is consequence of rapid TFP growth and increased activity rate.

Figure 2. Contribution of production-side GDP items to cumulated growth, per cent



The demand side of the economy is shown in figure 3 which clearly shows the importance of exports for our baseline scenario. The contribution of exports to economic growth is here of the same size as it was in the beginning of 00-decade. The contribution of net exports to growth is positive from year 2011 onwards. Growth in service exports is reflected in the diminishing importance of imports – whereas exports used to be very intensive user of imported intermediate goods, service exports uses intensively domestic labour. Another item contributing to growth is private consumption that is boosted by wages that increase their share of the value added as labour becomes increasingly scarce.

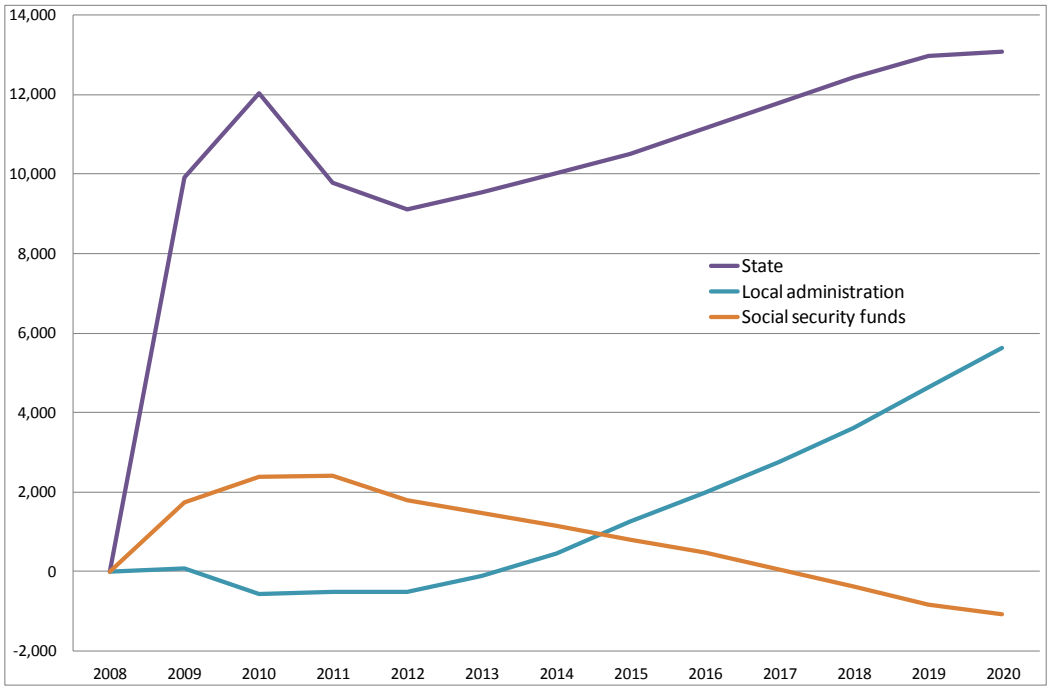
Figure 3. Contribution of expenditure-side GDP items to cumulated growth, per cent



The development of public finances along the baseline is depicted by the figure 4 below. In our baseline closure, the deficits of the public subsectors are allowed to vary (whereas tax rates are exogenous) so that we can see where the set of current policy rules seem to lead the public finances.

First, we see that the recession of 2008-2009 dented considerably the state finances, as the cumulative deficit grew rapidly to 12 billion euro. During the short recovery in 2010-2012, the accumulation of state deficit stops and starts declining, but age-related expenses start denting the budget balance. Thus the foreseen and baked-in baseline increases in taxation do not succeed in reducing the accumulated. Second, it is evident from the figure 4 is that under the current system of transfers to local administration, expenses are set to grow faster than municipal revenues, and deficit starts to accumulate from 2013 onwards.

Figure 4. Accumulated deficits from 2008 onwards, million euro



Regional population growth from 2004 is described in Figure 5. We see that the growth is highly uneven. Jyväskylä economic region, which is the central area of Keski-Suomi province, grows at a rate similar to that of Uusimaa, the capital city province of Finland[§].

The share of population aged 65 or more grows rapidly, but even in this respect there are considerable regional differences both in the pace and in the level of the share of the aged. From figure 6 we can read that all the other economic regions of Keski-Suomi save central region Jyväskylä have the highest share of elderly in the population. Capital province Uusimaa and Jyväskylä both have vibrant universities and thriving businesses that keep the age structure youthful through continuous national migration to these regions.

[§] The economic regions (NUTS4) belonging to Keski-Suomi (Central Finland) province are: Jyväskylä, Joutsa, Keuruu, Jämsä, Äänekoski and Saarijärvi-Viitasaari.

Figure 5. Population growth from 2004, per cent

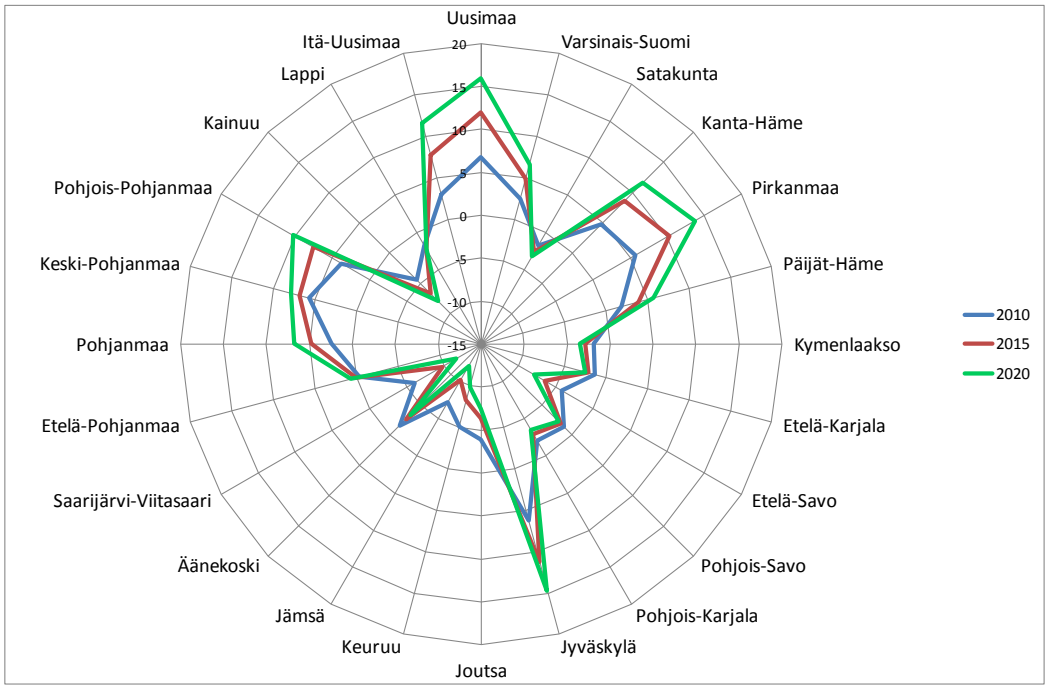
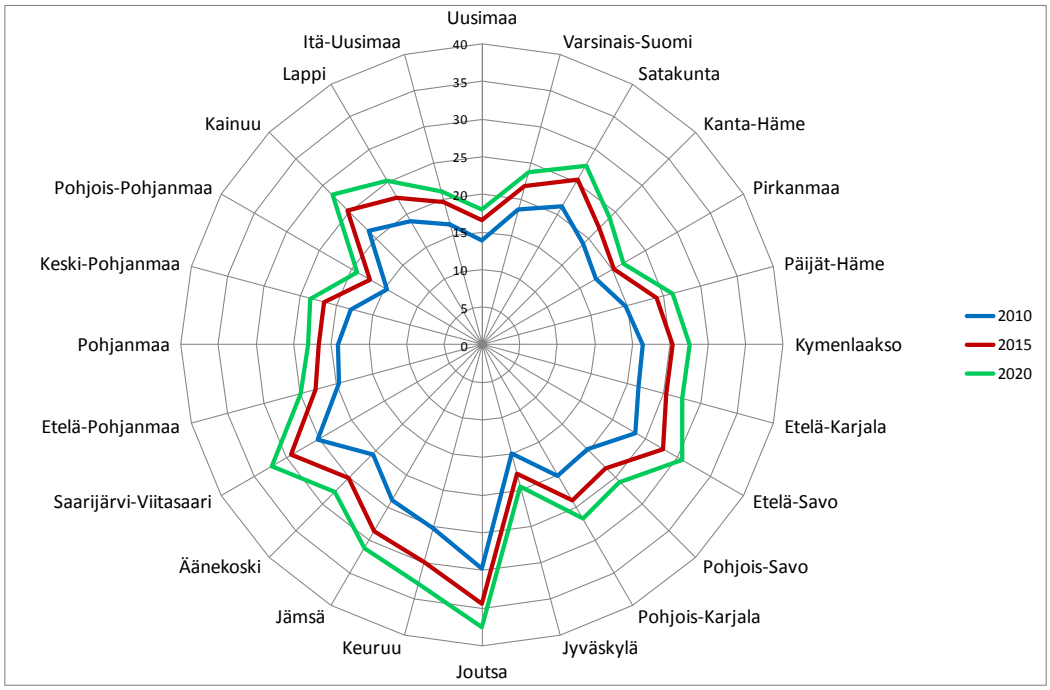


Figure 6. Share of elderly (65+) of population, per cent



GDP growth bears a resemblance with population growth, although the correspondence is far from perfect. For example, within Keski-Suomi province, Jyväskylä's economic growth is fourfold to that of the other NUTS4 regions belonging to Keski-Suomi.

Figure 7. GDP growth from 2004, per cent

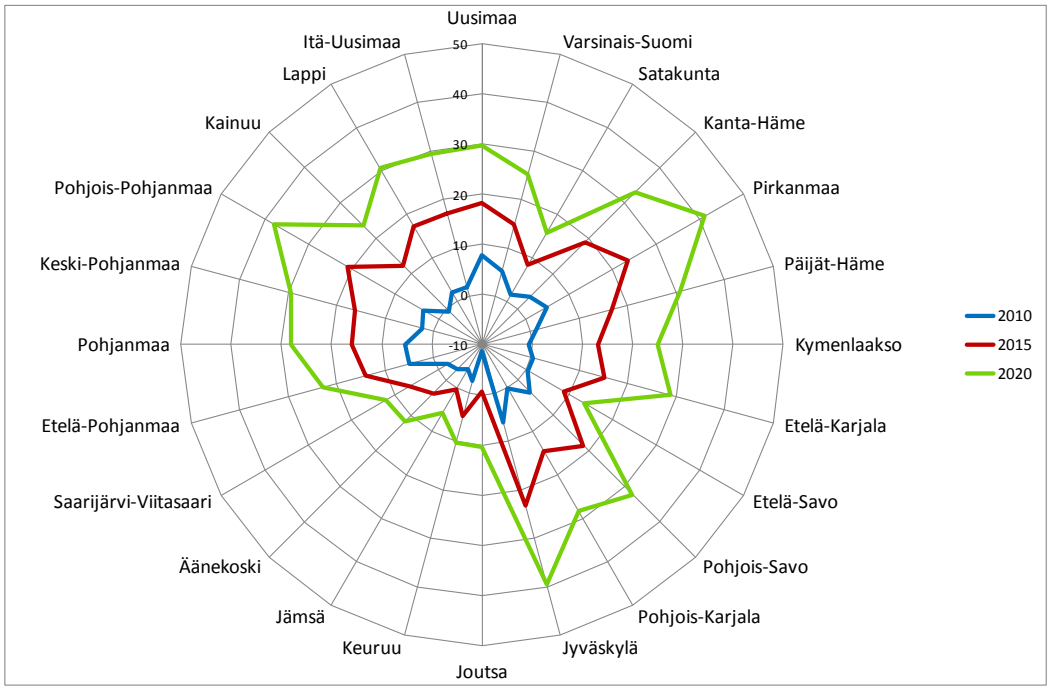
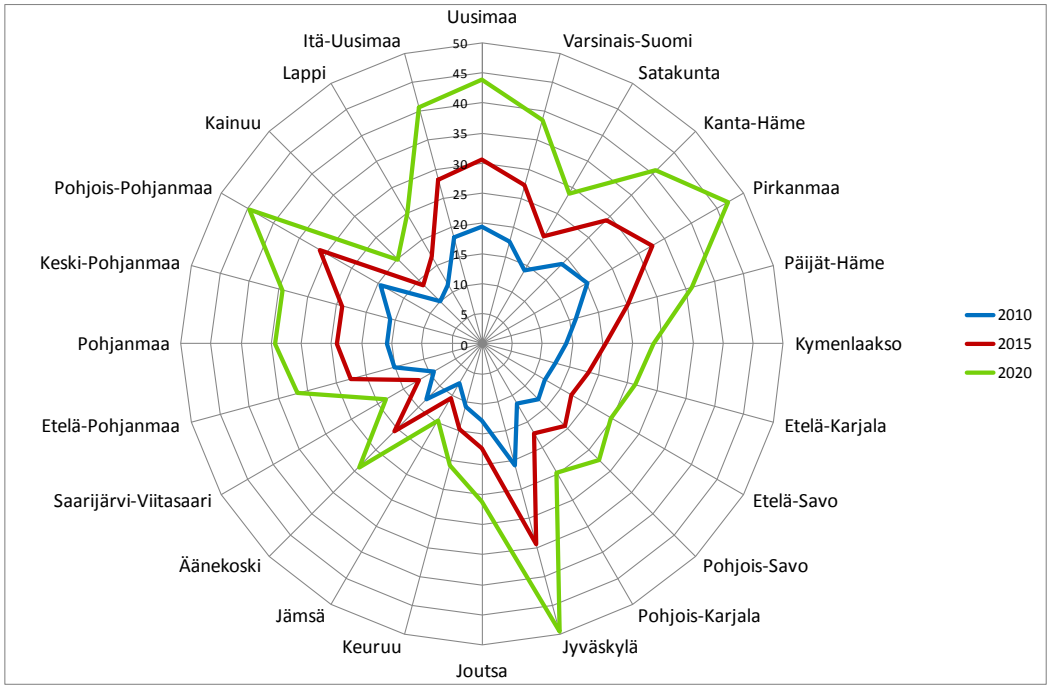


Figure 8. Growth of public consumption of municipalities from 2004, per cent

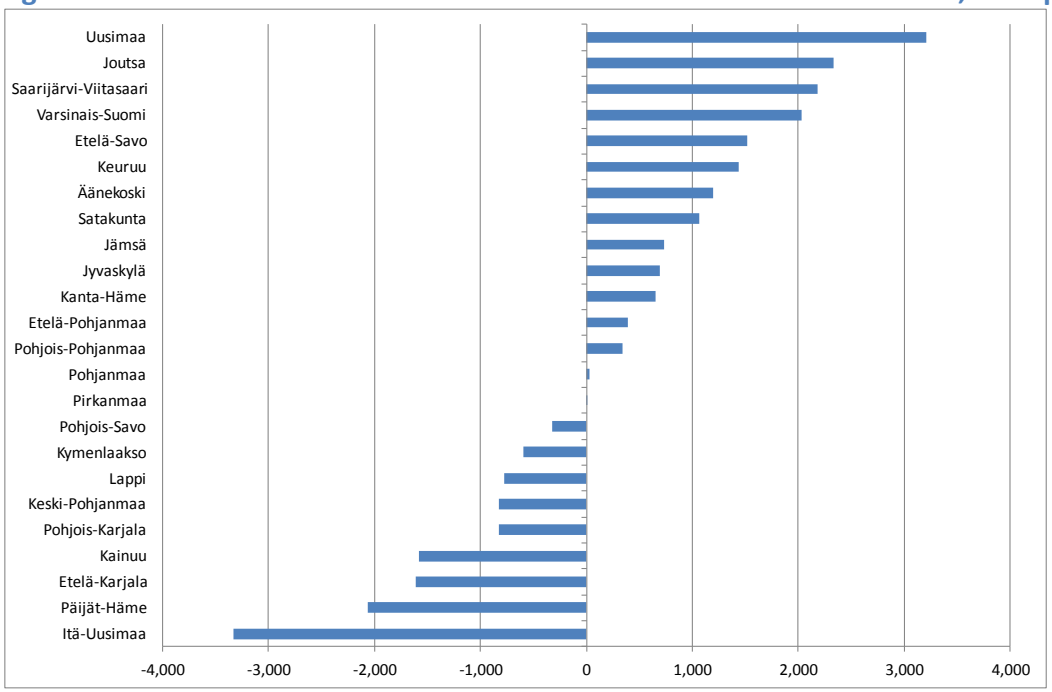


Public consumption of local administration grows along with the changes in age structure, as it varies most according to age structure. Thus, in areas like Äänekoski (peripheral, aged) and

Uusimaa (central, to be rapidly ageing) the growth of public consumption of local administration grows more than GDP, total population, or the number of elderly.

Let us now consider the local administration's deficits. It is interesting to note that the metropolitan region Uusimaa would suffer from highest deficits per capita by 2020. This has to do with two factors: the Robin Hood of system state support systematically favors peripheral regions, but more importantly, the ageing phase of the capital region is such that the number of elderly rises rapidly during the simulation period. All of the Central Finland NUTS4 regions belong to those who incur increasing deficits per capita. The fastest increase is among the peripheral small regions of Central Finland. Energy-producing Itä-Uusimaa with refineries would actually benefit from the increases in energy taxes that are part of the baseline assumptions. The accumulation of deficits for the whole municipal and other public sectors was depicted in figure 4 above.

Figure 9. Accumulated deficits of local administration from 2008 to 2020, euro per capita



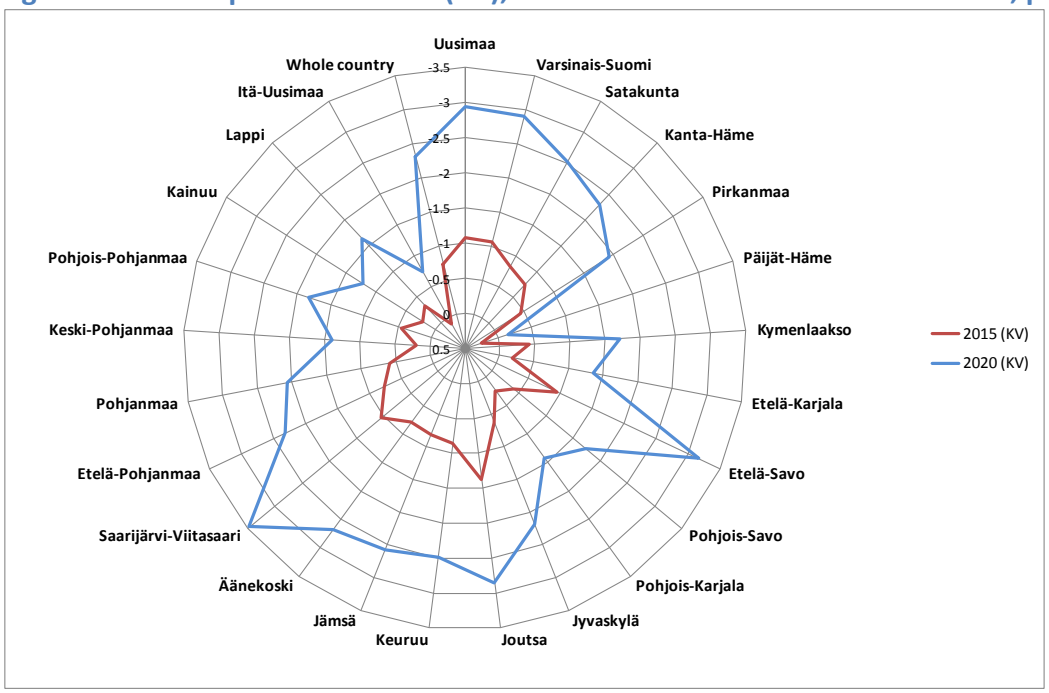
4 Results for policy scenarios

In what follows, we study the effects of two different ways to curb the deficits within the municipal sector. We assume that the deficits are curbed in both alternatives from year 2010 onwards. First, we assume that the balancing is done through higher municipal income taxation (we call scenario as KV). The second alternative involves raising the state support to municipalities, which is financed through higher state income taxation (scenario VOS). The tax increases are allocated to labour income and income transfers, but not to capital income.

As both alternatives involve raising taxation for labour income, they have repercussions on the labour market. Raising taxes tends to lower real wages, but as we assume that real wages are sticky and adjust gradually over time, the labour market adjusts initially through lower employment, which lowers GDP in the short run (see Dixon and Rimmer, 2002, for more on this closure). In the long run, the higher taxes also affect investment growth, which dents GDP in a more permanent fashion. The size of the regional GDP effect in the municipal tax alternative depends primarily on the on size of tax increase, and secondarily on the development of region's main trading regions. In the state support alternative (VOS), the consequences hinge on the changes in the state support and on the size of the income tax increase that is equal for all the regions.

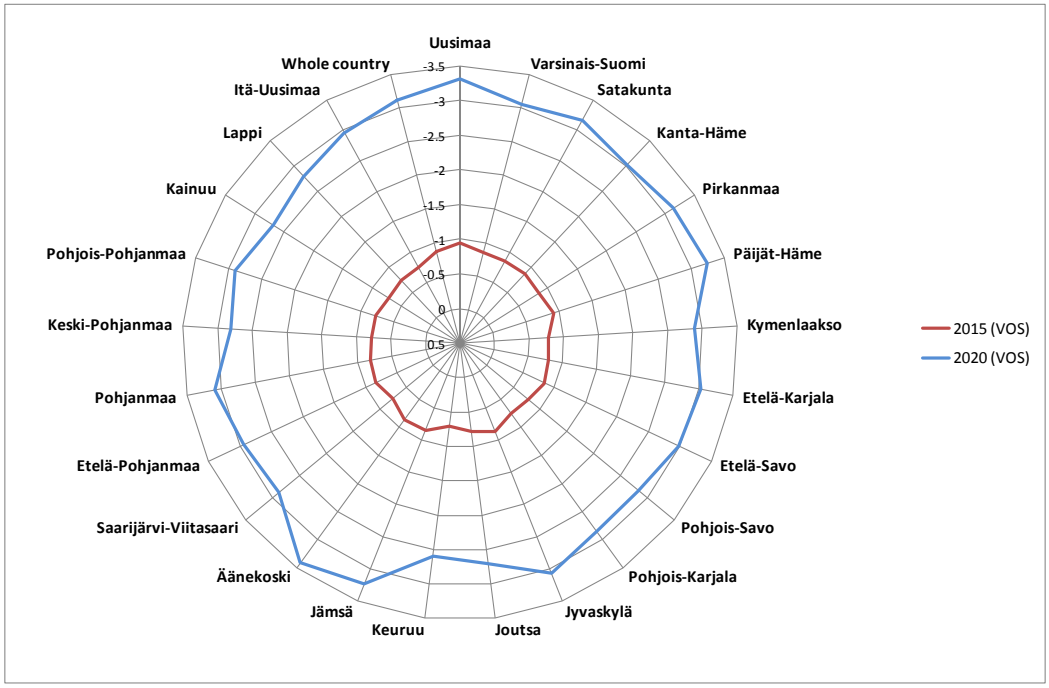
Deviation of GDP from baseline for municipal tax scenario (KV) is depicted for each region in figure 10. In figure 11 shows the effects for the state income tax scenario (VOS). For the sake brevity and clarity, the results are shown only for two years. We see clearly that KV scenario leads to higher variation in GDP losses (note inverted scale; most negative values are on the outer rings). For the whole country, the GDP losses are higher for VOS scenario. For only few regions, KV scenario would be more costly in terms of GDP loss. These regions are the ones that are accumulating the highest deficits under baseline scenario.

Figure 10. Municipal tax scenario (KV), deviation of GDP from baseline value, per cent



Note: inverted scale, lowest values on outer rings.

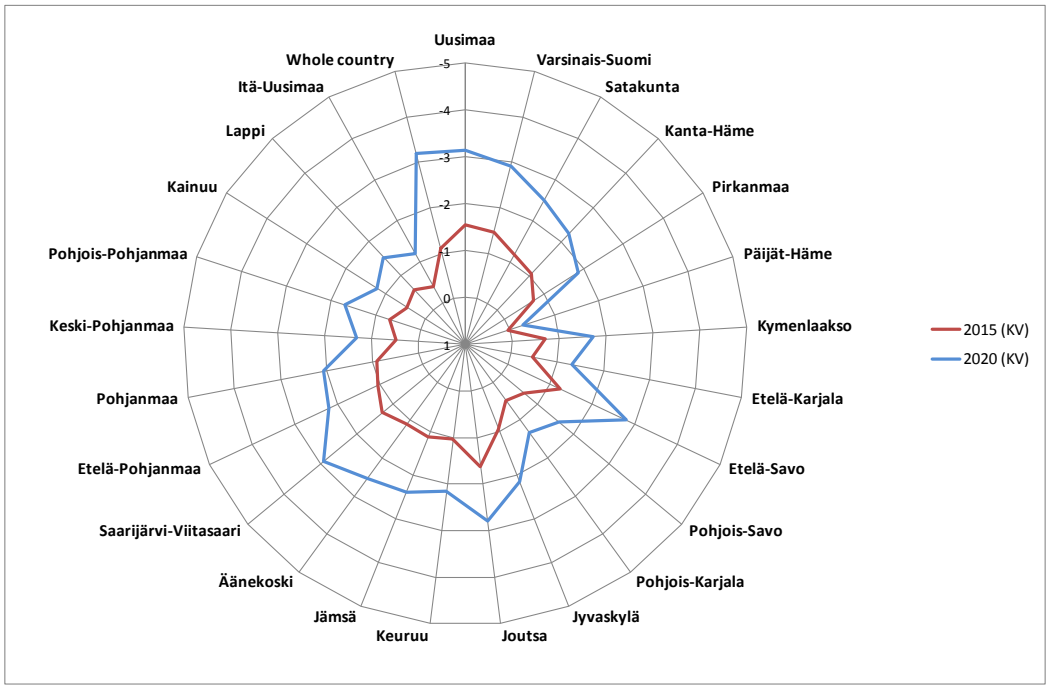
Figure 11. State income tax scenario (VOS), deviation of GDP from baseline value, per cent



Note: inverted scale, lowest values on outer rings.

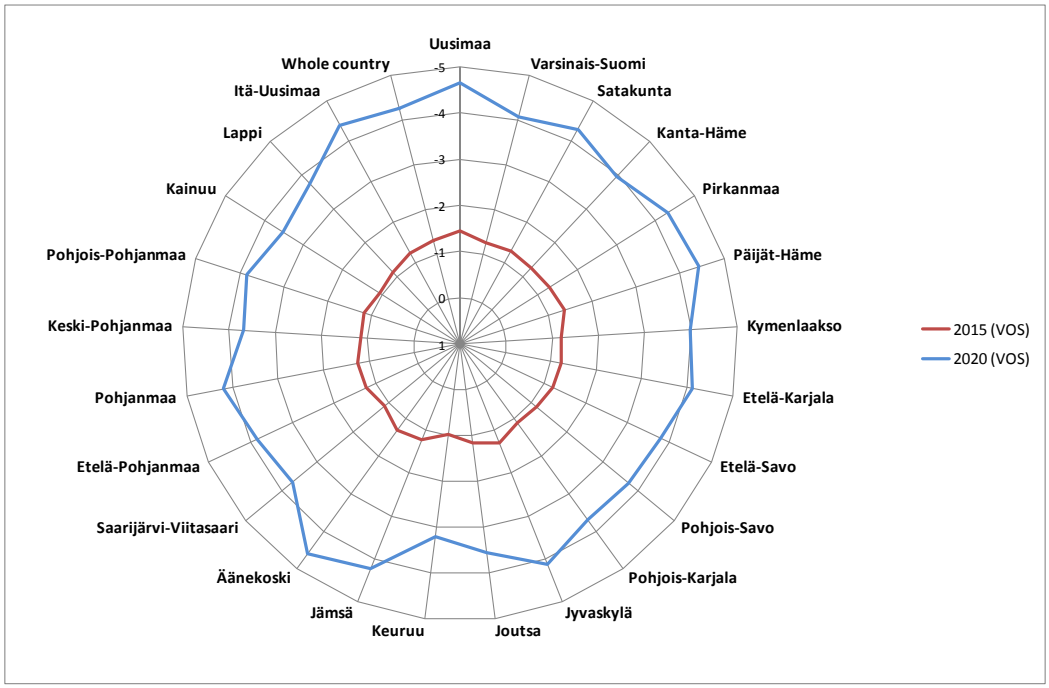
Effects on labour market differ as well, but more or less the same message is conveyed by the results. Municipal tax affects the labour market less than using state income tax and transfers. However, the differences are even greater here (see figures 12 and 13 below).

Figure 12. Employment effects of municipal income tax, deviation from base %



Note: inverted scale, lowest values on outer rings.

Figure 13. Employment effects of state income tax and transfers, deviation from base %



Note: inverted scale, lowest values on outer rings.

These results are principally based on the dynamic effects of financing state transfers. While raising the municipal taxes affects mainly the region in question, raising state transfers and state income taxes affects negatively the state of all the regions. Already in our baseline run, regions that during the last decades have had weaker development will have to participate more in the financing of state transfers, as the effects of ageing population start showing more markedly in the growth centres. This will naturally weaken the growth prospects of the smaller, peripheral regions. But when income taxes are raised in the whole country, the international competitiveness of the country is weakened, and the exports and GDP growth decline. The same message is conveyed also by other model variables, like private consumption and investments, but we omit those results here for the sake of brevity.

5 Discussion

Our results show that by using state transfers to local administration, regional economic development can be evened out, even within the provinces. However, during the coming years the pressures to increase public expenditure are so marked that the dynamic effects of the state transfer system will slow down the general economic growth, which means that increasing regional cohesion comes with a cost. Our results are of close kin to conclusions provided by the new economic geography studies on the difficulty of reaching simultaneously both regional cohesion and growth (see e.g. Ottaviano and Pinelle, 2004; or Meyer, 2005). The economic policymaking will have to balance out these competing goals according to the preferences of the electorate.

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