ISSN 1503-299X

# WORKING PAPER SERIES

No. 16/2006

# DO LOCAL AUTHORITIES SET LOCAL FISCAL VARIABLES TO INFLUENCE POPULATION FLOWS?

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This version: September, 2006

# Do local authorities set local fiscal variables to influence population flows?

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**Abstract** The paper presents an empirical test of local fiscal competition in Norway based on the observation that interregional migration during the business cycle creates very different incentives for rural and urban municipalities to influence population movements. Panel-data evidence is presented suggesting that municipalities indeed attempt to control population flows. The sensitivity of municipal spending and revenue decisions to population movements varies between municipalities in a way that is consistent with the municipalities' incentives to influence location decisions of households.

**Keywords** Fiscal competition, local government

**JEL Classification** H73, R51

## 1. Introduction

A large theoretical literature examines how inter-jurisdictional competition for mobile households and firms affect local spending and tax decisions (see surveys by Wilson (1999), Wellisch (2000) and Wilson and Wildasin (2004)). Empirical studies of inter-jurisdictional competition typically estimate reaction function which shows how the spending and tax decisions of a jurisdiction depends on those of its competitors, usually assumed to be the neighbouring jurisdictions (surveys of empirical studies of strategic interactions between local governments are provided by Brueckner (2003) and Revelli (2005)). The main methodological challenge of this literature is to discriminate between alternative explanations for the observed spatial pattern of policy decisions. Correlations in spending and taxes between neighbours do not necessarily indicate that competition for resources is taking place; common shocks, spillovers and yardstick competition may also cause spatial correlations in spending and taxes.

Several recent contributions have included additional information about the preferences and constraints of local jurisdictions to discriminate between yardstick competition and other hypotheses (Bordignon, Cerniglia and Revelli 2003; Revelli 2006; Revelli and Tovmo 2006). However, to my knowledge, no study has tried to identify whether spatial correlations in local spending and taxes is due to fiscal competition rather than alternative explanations.

This paper presents an empirical test of local fiscal competition that does not use spatial correlations of policy decision to evaluate whether local authorities set spending and taxes to compete for mobile production factors. My approach is based on the observation that urban and rural municipalities in Norway face very different incentives to influence population flows. The reason is that migration from rural to urban areas is highly correlated with macroeconomic conditions. Population flows from the periphery to cities are large when the economy is booming and small

during downturns. This migration pattern suits urban municipalities well: people move in when unemployment is falling but not when unemployment is rising. In contrast, the time variation of population flows is painful for rural municipalities: people emigrate when jobs are created but not during recessions.

The very different consequences of inter-regional migration for urban and rural areas imply that municipalities in rural areas have stronger incentives to smooth population flows than municipalities in urban areas. Thus, if local authorities actually attempt to control population flows, we would expect the impact of out-migration on efforts to dampen outflows or raise inflows to be stronger in rural areas than in urban areas. This is exactly what we find: compared to urban municipalities, municipalities in rural areas respond to an increase in out-migration by spending more on day care and schools at the expense of health care and care for the elderly, and by cutting taxes and fees.

The remainder of the paper is organized as follows. Section 2 presents the basic argument, and section 3 describes the panel data sample. Section 4 presents the hypotheses to be tested and the basic empirical specification. Results are presented in section 5. Section 6 concludes.

**2. Outline of the basic argument**

If one were to assess whether local authorities set local fiscal variables to influence population flows, a natural approach would be to estimate cross-section or panel-data regressions using a measure of local inputs or local tax rates as dependent variable and the net out-migration rate as explanatory variable. The latter variable serves as proxy for the incentives to act strategically. The argument is that local communities which experience large net outflows of people will be more inclined to tailor fiscal decisions to the preferences of potential movers than communities which succeed in keeping the population stable or increasing.

However, using this empirical relation to draw inferences about the behavioural motives of local authorities is not straightforward. Population flows provide information about a community's future demographic structure and therefore the future demand for local government services. If local authorities adjust the level and composition of local government services in anticipation of future demand changes, local fiscal variables may become correlated with migration variables.

I will show that population flows in Norway depend on macroeconomic conditions in systematic ways and argue that these regularities can be used to evaluate whether the estimated relations between local fiscal variables and population flows are due to strategic behaviour on the part of the municipalities.

- Table 1 about here -

Table 1 presents some basic facts about population flows in Norway. I have allocated the municipalities of Norway to two subsamples, denoted urban and rural areas. The urban areas consist of the main city areas, all or most municipalities in the counties of Akershus, Østfold, Buskerud and Vestfold, and the southern belts of Hedemark, Oppland and Agder.[1] Municipalities located close to city areas are classified as urban if their migration patterns conform to that of urban areas.

Due to migration, rural areas lost on average 0.25% of their population each year from 1987 to 2004 whereas the average annual population increase of urban areas due to migration was 0.35% [2] Population flows are larger during booms (defined as

[1]The core municipalities of the five largest cities are omitted as their migration patterns seem to be idiosyncratic, conforming neither to those of urban or rural municipalities. Municipalities which have been amalgamated with other municipalities since 1987 are also omitted, leaving 156 urban municipalities and 253 rural municipalities.

[2]Due to migration to or from Norway, in-migration to urban areas does not equal out-migration from rural areas .

years with positive national employment growth) than during downturns. The pairwise correlations between net out-migration from rural areas and, respectively, change in national unemployment and national employment growth are -0.61 and 0.55; the corresponding correlations for urban areas are 0.41 and -0.58.

The correlations listed in the last column of the second part of Table 1 illustrate that variation in migration flows over the business cycle poses a serious problem for municipalities in rural areas. For the rural areas taken together, the correlation between net out-migration and change in the unemployment rate is -0.60. Thus, municipalities in rural areas suffer from relatively high outflows of people when unemployment is falling, whereas outflows are relatively modest when unemployment increases. The reason is that net-out migration from rural areas is negatively correlated with national unemployment which in turn is positively correlated with unemployment both in rural and in urban areas. Hence, urban areas siphon labour from rural areas exactly when rural areas need workers to fill jobs. In contrast, the migration pattern suits urban areas well: people move in when unemployment is falling but otherwise not.

The very different consequences of population movements during the business cycle imply that municipalities in rural areas have stronger incentives to smooth population flows than municipalities in urban areas. Thus, if municipalities actually attempt to control population flows, we would expect the impact of net out-migration on efforts to dampen outflows or raise inflows to be stronger in rural areas than in urban areas. If, on the contrary, municipalities merely respond passively to population movements, rural and urban municipalities should react roughly similar to changes in out-migration.

Macroeconomic variables are able to predict out-migration rates of individual municipalities quite well. Panel-data regressions for 1987-2004 explaining net out-migration rates at the municipal level as a function of macroeconomic variables

(national unemployment, change in unemployment, employment growth and vacancy rate) interacted with dummy variables for each county (two dummy variables for counties with both urban and rural municipalities), produce predicted net out-migration rates which are highly correlated with actual out-migration rates. The correlations are 0.41 and 0.32 for the urban and rural areas, respectively.

The interacted macroeconomic variables are good candidates as instruments for population flows. Not only do they predict net out-migration rates well, they are also unlikely to be correlated with the error term in regressions of local fiscal variables since local fiscal variables have at most a marginal influence on the national business cycle (Langørgen 1994). By using the interacted macroeconomic variables as instruments for net out-migration, we can be confident that any relation detected between local fiscal variables and population flows are not due to reverse causality.

**3. Data description**

In Norway, local government plays an important role in providing public services; about two-thirds of all government employees work in the local sector and most of these in the municipalities. Municipalities therefore have discretion to affect population flows if location decisions depend on the quality and volume of local government services.

We can distinguish between two types of local policy decisions. At the general level, municipalities can adjust total spending and the spending mix between the main municipal services. At the specific level, decisions can be directed at individual firms or persons. I will confine the empirical analysis to the first type of policy decisions as appropriate data about the latter are not available.

The municipalities basically provide six types of services; day care, primary

education, culture, primary health care, care for the elderly and infrastructure. For five of these, I construct input measures which describe the municipalities' commitment of resources; good input measures are not available for infrastructure.

The Norwegian grant system was completely transformed in the mid eighties, and 1987 is therefore my first year of observation. For most municipal services, the spending categories listed in the municipal accounts have been redefined during the period covered by my study, making comparisons across years difficult. With one exception (culture), I use physical input measures (e.g. teacher man years per pupil) to characterize local fiscal decisions as physical input measures are less affected by changes in variable definitions than spending variables.

- Table 2 about here -

Table 2 presents summary statistics. The data sources are Statistics Norway, The Norwegian Social Sciences Data Base and the Norwegian Association of House Owners.

For three of the municipal services, primary education, primary health care and care for the elderly, I consider input of person years per user or potential user. To describe the supply of day care services, I use day care slots per child 0-6.[3]
As time series of physical input measures for cultural activities are not available, I study total per capita spending on culture.

The municipalities' main sources of revenues are grants from the government, income and wealth taxes, infrastructure fees and property taxes. As all municipalities employ the maximum income and wealth tax rates, decisions on fees and property taxes are the main revenue decisions made the municipalities. Aside

[3]In 1997 the age of entering primary education was lowered from seven to six years. The denominators of variables for day care and primary education are therefore altered from 1996 to 1997.

from health care and care for the elderly, for which the fee structure is heavily regulated by the state, fees are primarily levied for infrastructure services to residents (water, etc). Time series at the municipal level of average fees paid for a standardized apartment have been collected by the Norwegian Association of Home Owners for about one-fourth of the municipalities (their data set is unbalanced).[4]

Property taxes from hydroelectric power plants are an important source of revenues for many municipalities in rural areas. As these revenues presumably have a modest impact on location decisions (other than via local spending), I omit municipalities that receive property taxes from hydroelectric plants in the analysis of property taxes.[5] I also omit municipalities with less than 3000 inhabitants since many small municipalities are not allowed to levy property taxes, leaving a total of 114 municipalities.[6] The dependent variable is computed as total annual property taxes per capita.

The explanatory variable of main interest is the net out-migration rate, defined as annual net out-migration scaled by the population. I also allow input and revenue decisions to depend on the demand for and cost of producing local services. Many proxy variables for demand and cost factors do not vary across time and are therefore not included since I estimate fixed effects regressions. The following explanatory variables are included: Revenues from grants, income taxes and wealth taxes, and the population shares of children, pupils and elderly.

Earlier studies of Norwegian municipalities have shown that local spending and

[4]Borge (2000) provides detailed information about this data set.

[5]Time series of property taxes from persons and firms other than hydroelectric plants are not available, but there exists a cross-section survey from 1991 which allows identification of municipalities with property taxes from hydroelectric plants.

[6]Unfortunately, whether a municipality is allowed to levy property taxes has until recently not been precisely defined by the law and controversies have been settled by the courts on a case-by-case basis.

revenue decisions are affected by political attributes of the municipal council, including party fragmentation and ideological orientation (Kalseth and Rattsø 1998; Borge and Rattsø 2004; Borge 2005; Carlsen, Langset and Rattsø 2005). My explanatory variables include the share of socialist councillors and the Herfindahl index, which is a measure of party fragmentation in the municipal council.

Data on the input variables are available for the period 1987-2004 with the exception of primary education and care for the elderly for which consistent time series are available from the early nineties. Data on revenue variables are available from 1991.

Spending on culture and exogenous revenues (grants, income taxes and wealth taxes) are deflated by the price index for municipal consumption, whereas fees and property taxes are deflated by the consumer price index; 1987 is the base year in each case. Stock variables are registered at the end of the year if they are dependent variables and at the beginning of the year if they are explanatory variables.

**4. Specification and hypotheses**

All reported regressions include dummies for years. Dummy variables for municipalities are also included as F-tests overwhelmingly reject OLS against fixed effects. My empirical specification is:

$$FISCAL_{it} = \beta_1 MIGRA_{it-1} + \beta_2 MIGRA_{it-1} * RURAL_i + \mathbf{CONTROLS}_{it}\boldsymbol{\beta_3} + \alpha_i + \alpha_t + \varepsilon_{it},$$

where $FISCAL_{it}$ represents the respective input and revenue variables, $MIGRA_{it}$ is the net out-migration rate, $RURAL_i$ is a dummy variable which takes on the value one for municipalities in rural areas, $\mathbf{CONTROLS}_{it}$ is a vector of explanatory variables, $\alpha_t$ is a set of year dummies included to control for any effects of aggregate factors common to all municipalities, $\alpha_i$ represents municipal fixed effects, and $\varepsilon_{it}$ is the error term. Subscripts i and t refer to municipality and year, respectively. Since

some time will elapse between population flows are observed and policy decisions are implemented, net out-migration is lagged one year.

The coefficient of main interest is $\beta_2$. If municipalities attempt to influence population movements, an increase in net out-migration should prompt a stronger fiscal response in rural areas than in urban areas since municipalities in rural areas are more interested in smoothing population flows. Thus, if local authorities seek to control population flows, $\beta_2$ should be positive for fiscal variables that retard net out-migration and negative for fiscal variables that raise net out-migration.

Whether and how a fiscal variable affects net out-migration depends on the characteristics of mobile versus immobile citizens. In Norway, a typical mover is young (below 45) with a high education level (Carlsen 2005). Thus, we expect that a municipality which attempts to slow down net out-migration will increase spending on day care and schools at the expense of health and care for the elderly, and cut fees and property taxes.

**5. Results**

Table 3 presents the panel data regressions. Net out-migration and the interaction term are instrumented with macroeconomic variables (national unemployment, change in unemployment, employment growth and the vacancy rate) interacted with county dummy variables. I report two regressions for each dependent variable: one with all explanatory variables and one where only statistically significant control variables are included.

- Table 3 about here -

The results strongly suggest that local authorities attempt to influence population flows. The coefficient of the interaction term is positive for day care and primary

education and negative for primary health care, care for the elderly, fees and property taxes. Hence, compared to urban municipalities, municipalities in rural areas react to out-migration by spending more on services which mainly benefit mobile population groups, giving less priority to services targeted at less mobile groups and reducing fees and property taxes. The coefficient of the interaction term is statistically significant for three dependent variables (day care, health care and fees) and, depending on the specification, significant or close to significant for health care, care for the elderly and property taxes.

The quantitative effects are strongest for day care, health care and fees. Relative to urban municipalities, rural municipalities raise the number of day care slots per child by 4 percentage points (0.28 standard deviations), reduce physician density by 0.116 person years per $10^3$ inhabitants (0.30 standard deviations) and reduce infrastructure fees by 243 NKR per apartment (0.22 standard deviations) in response to an increase in net out-migration by one standard deviation. The corresponding effects on schools, care for the elderly and property taxes are weaker (0.1–0.15 standard deviations).

It is interesting that the coefficients of net out-migration and the interaction term have opposite signs for all services but culture. The reason is probably that the spending implications of out-migration for rural municipalities following from changes in future demand are opposite to those following from the incentives to influence population flows: higher out-migration reduces the demand for day care and primary education but raises the incentives to give priority to these services in order to slow down out-migration. A simple regression explaining local priorities as a function of net out-migration is therefore not sufficient to identify strategic behaviour on the part of the municipalities. A strategic motive can only be identified by a comparison of rural and urban municipalities.

## 6. Conclusion

Despite the existence of a large theoretical literature on inter-jurisdictional competition for mobile production factors, we still have limited knowledge of whether local authorities actually attempt to affect location decisions when determining the size and composition of local spending. This paper uses variation in population flows over the business cycle to discriminate between alternative explanations for empirical links between mobility and local fiscal variables. The correlation between the state of the national economy and migration from rural to urban areas allows computation of good instruments for population flows and suggests that there are systematic differences between municipalities in incentives to smooth population flows. Panel-data evidence suggests that municipalities indeed attempt to influence population flows: the sensitivity of municipal spending and revenue decisions to migration varies between municipalities in a way that is consistent with the municipalities' incentives to influence location decisions of households.

**Acknowledgements** Helpful comments from Jim Alt, Bob Inman, Jørn Rattsø and seminar participants in Bonn and Lund are gratefully acknowledged. The usual caveats apply.

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**Table 1.** Migration flows in Norway

| | Average 1987-2004 | Booms | Recessions |
|---|---|---|---|
| Average annual net out-migration rate (percentage) | | | |
| Urban areas | -0.35 | -0.44 | -0.20 |
| Rural areas | 0.25 | 0.32 | 0.15 |
| | change in national unemploym. rate | national employm. growth | change in regional unemploym. rate |
| Correlation between net out-migration rate and | | | |
| Urban areas | 0.41 | -0.58 | 0.41 |
| Rural areas | -0.61 | 0.55 | -0.60 |

*Notes:* All regional variables are computed at the regional level (the variables are not averages across municipalities). Net out-migration rates are computed as net out-migration scaled by beginning of year population. Boom (recession): Years with positive (negative or zero) national employment growth.

**Table 2.** Variable definitions and summary statistics

| Variable | Definition | Municipalities (Years) | Mean (St.dev.) |
|---|---|---|---|
| *Dependent variables:* | | | |
| DAYCARE | End-of-year day care slots per child 0-6 (1997- : 0-5) (percentage) | 409 (1987-2004) | 49.6 (14.5) |
| SCHOOL | Teacher years scaled by beginning -of-year population 7-15 (1997- : 6-15) (percentage | 409 (1993-2004) | 11.2 (2.9) |
| CULTURE | Annual spending ($10^3$ NKR) on culture scaled by beginning-of-year population | 401-409 (1987-2004) | 1.10 (0.63) |
| HEALTH | End-of-year physicians per $10^3$ capita | 409 (1987-2004) | 1.02 (0.39) |
| OLDCARE | Person years in care for the elderly scaled by beginning-of-year population above 66 (percentage) | 400-409 (1994-2003) | 15.7 (7.0) |
| FEE-INFRA | Annual municipal fees ($10^3$ NKR) paid by owner of a standardized apartment | 72-111 (1991-2004) | 4.07 (1.11) |
| PROPTAX | Total municipal property tax revenues ($10^3$ NKR) scaled by beginning-of-year population | 111-114 (1991-2004) | 0.27 (1.23) |
| *Explanatory variables:* (Mean and st.dev. for 409 municipalities, 1987-2004) | | | |
| MIGRA | Annual net out-migration scaled by beginning-of-year population (percentage) | | 0.17 (1.21) |
| GRANTS | Municipal block grants and exogenous tax revenues scaled by beginning-of-year population ($10^3$ NKR) | | 15.7 (5.0) |

**Table 2.** (cont'd)

| Variable | Definition | Mean (St.dev.) |
|---|---|---|
| CHILD | Population share of children 0-6 (1997- : 0-5) (percentage) | 8.5 (1.4) |
| YOUNG | Population share of persons 7-15 (1997-: 6-15) (percentage) | 12.8 (1.7) |
| OLD | Population share of persons above 66 (percentage) | 15.7 (3.8) |
| HERF | Herfindahl index, party fragmentation of municipal council | 0.28 (0.09) |
| LEFT | Percentage of representatives from socialist parties in municipal council | 40.0 (15.2) |

**Table 3.** Instrumental variable panel data regressions

| Dependent variable: | DAYCARE | | SCHOOL | | CULTURE | | HEALTH | |
|---|---|---|---|---|---|---|---|---|
| Explanatory variables: | | | | | | | | |
| MIGRA | -2.641 | -2.665 | -0.765 | -0.779 | -0.074 | -0.071 | 0.020 | 0.021 |
| | (-5.70) | (-5.75) | (-7.28) | (-7.40) | (-3.88) | (-3.74) | (1.51) | (1.65) |
| MIGRA*RURAL | 3.380 | 3.317 | 0.295 | 0.279 | -0.042 | -0.035 | -0.114 | -0.116 |
| | (4.93) | (4.84) | (1.98) | (1.82) | (-1.06) | (-0.94) | (-4.28) | (-4.32) |
| GRANTS | 0.156 | 0.156 | 0.031 | | -0.019 | | 0.001 | |
| | (2.18) | (2.18) | (1.44) | | (-1.06) | | (0.43) | |
| CHILD | 0.098 | | -0.170 | -0.178 | -0.065 | -0.065 | -0.016 | -0.015 |
| | (0.62) | | (-3.14) | (-3.25) | (-5.98) | (-5.91) | (-2.42) | (-2.26) |
| YOUNG | 0.522 | 0.501 | -0.545 | -0.548 | -0.030 | -0.026 | -0.007 | |
| | (4.38) | (4.39) | (-13.71) | (-13.72) | (-3.75) | (-3.75) | (-1.39) | |
| OLD | 0.680 | 0.674 | 0.074 | 0.079 | -0.047 | -0.054 | 0.005 | |
| | (5.48) | (5.46) | (1.91) | (2.04) | (-5.35) | (-4.42) | (1.08) | |
| HERF | -6.124 | -5.839 | -2.428 | -2.377 | 0.124 | | 0.132 | |
| | (-2.41) | (-2.36) | (-3.62) | (-3.54) | (1.19) | | (1.42) | |
| LEFT | 0.013 | | -0.0001 | | -0.002 | -0.002 | -0.001 | |
| | (0.79) | | (-0.03) | | (-2.51) | (-2.39) | (-1.58) | |
| Adjusted $R^2$ | 0.822 | 0.822 | 0.859 | 0.856 | 0.747 | 0.749 | 0.663 | 0.662 |
| Observations | 7362 | | 4906 | | 7350 | | 7362 | |

**Table 3.** (cont'd)

| Dependent variable: | OLDCARE | | FEE-INFRA | | PROPTAX | |
|---|---|---|---|---|---|---|
| Explanatory variables: | | | | | | |
| MIGRA | 0.187 | 0.236 | 0.122 | 0.166 | 0.108 | 0.102 |
| | (0.98) | (1.27) | (1.80) | (2.48) | (1.58) | (1.55) |
| MIGRA*RURAL | -0.274 | -0.417 | -0.210 | -0.243 | -0.185 | -0.153 |
| | (-1.16) | (-1.76) | (-2.08) | (-2.42) | (-1.76) | (-1.55) |
| GRANTS | 0.040 | | 0.003 | | -0.037 | |
| | (0.79) | | (0.11) | | (-1.68) | |
| CHILD | -0.156 | | -0.032 | | -0.091 | -0.096 |
| | (-1.73) | | (-0.82) | | (-2.02) | (-2.15) |
| YOUNG | -0.087 | | -0.111 | -0.121 | 0.0004 | |
| | (-1.22) | | (-3.85) | (-4.40) | (0.02) | |
| OLD | -0.779 | -0.724 | -0.054 | | -0.183 | -0.184 |
| | (-12.00) | (-10.99) | (-1.49) | | (-2.90) | (-2.99) |
| HERF | 0.733 | | -1.027 | -1.207 | 6.712 | 6.702 |
| | (0.64) | | (-1.91) | (-2.29) | (3.21) | (3.20) |
| LEFT | -0.003 | | -0.002 | | -0.023 | -0.023 |
| | (-0.42) | | (-0.06) | | (-2.66) | (-2.61) |
| Adjusted $R^2$ | 0.905 | 0.907 | 0.839 | 0.838 | 0.801 | 0.801 |
| Observations | 4061 | | 1446 | | 1578 | |

*Note:* t-statistics corrected for heteroscedasticity in parentheses. Municipal and year effects (not reported) are included in all regressions.