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Net Taxes, Income Stabilization and Regional Job Flows in Sweden*

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Abstract

The objective of this paper is to empirically analyze the relationship between job flows and regional income stabilization provided by the national tax and transfer systems. The analysis is based on an administrative panel data set containing all sectors in 20 Swedish regions for the time period 1989-2000. Controlling for unobserved regional effects we find that a high net tax-income ratio tends to decrease the rate of jobs that are created and increase the rate of job destruction, increasing the overall rate of job reallocation in the regions. In an attempt to separate out the part of the national tax-transfer system that is aimed at stabilizing the income path over time we find that only job creation is affected, i.e., regions where the income path is more stable tend to have a lower rate of intra-industry job creation.

JEL classification: H24, J63, J68

Keywords: income stabilization, taxes, transfers, job flows

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1 Introduction

This paper analyzes labor market effects of insurance against large variations in disposable income over the business cycle provided by the fiscal system. A sufficient degree of mobility of factors of production between firms, industries and lines of businesses is often seen as a precondition for the economy to adapt to permanent or temporary shocks and to maintain an efficient allocation of resources. In the labor market, these changes are reflected as reallocation of jobs between firms and industries. However, firms and individuals may take action in order to reduce the uncertainty regarding future incomes induced by economic changes. This is accomplished through the private insurance market and by other types of preventive actions. For instance, an individual may invest in higher education in order to reduce her risk of being unemployed and to increase her ability to adjust to new conditions. Firms may obtain regular insurance or insurance via forward markets where agents act in order to buy and sell commodities at a fixed price for future delivery.

Due to obvious problems of moral hazard and adverse selection, the national government's control system is sometimes better suited to monitor risk among citizens and the government can therefore act as a complement to the private insurance market. For instance, the national tax and transfer systems provide insurance against variation in personal income (hence, stabilizing income) since those unemployed often pay less income taxes while in many cases receive unemployment benefit funds. There are a number of studies that have empirically analyzed labor market effects of unemployment benefits and labor market regulations. Using European cross-country data, Gómez-Salvador et al. (2004) find that generous unemployment benefits decrease job turnover. Obstfeld and Peri (2000) find similar results for labor mobility and they also find that generous welfare systems tend to reduce labor market efficiency.

This paper contributes to the literature in at least two aspects. Firstly, in addition to studying the effect of overall net taxes on job flows, we specifically attempt to separate out the effect of the stabilization (risk sharing) mechanism of the fiscal system. Note that the stabilization mechanism refers to not only unemployment benefits but also other aspects of the fiscal system that are relevant to workers and firms, such as taxes, sickness benefits, social allowances etc. Secondly, by focusing on the case of Sweden, we have access to very detailed data on both national tax and tranfser payments at the local level and plant level employment data, where the latter allows us to calculate regional job flows within industries. Even though the structure of the national fiscal system in Sweden is equal for all regions, Andersson (2004) finds evidence of regional differences in the actual extent of smoothing provided by the fiscal system. Consequently, even if this is not the objective, the tax and transfer systems tend to redistribute individual income risks across regions. Thus, this paper contributes to the literature by highlighting potential benefits and drawbacks of the design of the tax and transfer systems

with respect to stabilization. This is of importance from a policy perspective since it can answer the question of whether the fiscal system affects the economy's ability to adjust to new conditions.

The analysis in this paper is based on an administrative panel data set covering all sectors in 20 Swedish regions during the period 1989-2000. According to the main results, a high net tax-income ratio tends to decrease the rate of jobs that are created and increase the rate of job destruction, increasing the overall rate of intra-industry job reallocation in the Swedish regions. Separating out the income stabilizing part of the tax-transfer system we find that only job creation is affected. It turns out that regions where the income path is more stable over time tend to have a lower rate of intra-industry job creation.

The paper proceeds as follows. The next section contains a discussion of the mechanisms behind job flows and how this relates to policy. Section 3 presents a way to empirically measure stabilization, while Section 4 describes the empirical specification for job flows. Data are described in Section 5. The empirical results are discussed in Section 6 and the paper concludes with Section 7.

2 Shocks, stabilization and job flows

Davis et al. (1996) define job creation and job destruction as changes in employment between two years due to expansion and contraction of firms, respectively. The rate of gross job reallocation is the sum of job creation and job destruction. Theoretical work regarding the importance of idiosyncratic shocks in explaining the cyclical behavior of job creation and job destruction found in data is often based on a general equilibrium matching model; see e.g. Mortensen and Pissarides (1994, 2001) and Pissarides (2000).[1] Matching between posted vacancies and the labor force is given by a matching function, which means that the labor market is imperfect, giving rise to unemployment. Thus, only a proportion of the total number of individuals in the labor force will be employed and market tightness, measured by the vacancy-unemployment ratio, will affect the successfulness of the matching process, i.e. job creation. It is important to note that job creation takes place when a vacant job is filled by a worker, i.e., when there is a successful match between a job and a worker. Thus, a vacancy per se is not sufficient for job creation.

Ex ante, firms decide upon location and technology. Output is produced with productivity equal to px, where p is aggregate productivity in the locality and x is an idiosyncratic job-specific shock, which can be persistent. When a shock arrives the firm can either decide to continue production with the existing job or close the job down if the shock reveals that productivity falls below a critical value, $px < R$, where R is the reservation productivity.

[1] For a discussion about dismissal delays and severance payments through wage contracts as a means of income insurance against risk, see e.g. Pissarides (2002).

Andersson et al. (2000) provide a theoretical discussion on the relationship between the rate of job reallocation within industries and job-specific (firm-specific) shocks. They consider a monopolistic competition setting with labor as the only mobile factor in the short run. The shocks are related to both demand and supply and the firm will adjust employment and output to fulfill the profit maximization condition. The size of the adjustments depends on the slopes of marginal revenue and marginal product of labor. The elasticity of demand for labor will be higher, the higher the elasticity of demand for the firm's output and the lower the elasticity of marginal product of labor. If we assume that industries face job-specific shocks with the same variance, it is reasonable to expect a positive relationship between intra-industry job reallocation and the elasticities of marginal revenue and marginal product of labor.

Next, let us say something about the aggregate productivity component, p. This component is here assumed to be locality-specific, where all jobs within the same local jurisdiction are affected by the same amount and in the same direction. Thus, p is an aggregate price component and is equally distributed for local jurisdictions within a region, i.e., a risk-sharing group k, but is assumed to be idiosyncratic across localities.[2] The locality-specific and job-specific shocks are assumed to be independent.

The procedure of creating a vacancy is costly for the firm. Hiring costs are often assumed to be proportional to productivity (Pissarides, 2000). When a position is filled it generates value to the firm. Job destruction depends both on the quit rate of workers and on the profit of firms. The worker's decision to accept a job offer or to opt for unemployment depends on the expected value of search for a new job, i.e. the wage offered by the employer plus the value of unemployment. The worker pays income tax to the central government and an unemployed individual receives some unemployment income. The individual is also eligible for other transfers, e.g., sickness benefits, child allowances and supplementary allowances, which will affect disposable income and therefore also the individual's decision to work.

Pissarides (2000) shows that unemployment benefits and employment taxes decrease job creation and increase job destruction by increasing the cost of labor for firms. Here we are interested in the case where tax-transfer policies are used in order to insure against income risk. Thus, we are interested in separating out the stabilization part of the fiscal system from other factors such as redistribution. Hence, stabilization involves pooling the risk of locality-specific shocks between asymmetrically affected localities, with the intention to decrease the impact of the shock. The more diverse the localities within each region are, the larger will be the effect of risk sharing, which in turn means that the region as a whole will be less sensitive to such shocks. For a given pattern of job-specific shocks in the region we would therefore expect risk sharing

[2] In Sweden functional labor markets consist of groups of municipalities. The counties are often larger than a single labor market region and, except for the case of Stockholm, do rarely contain municipalities belonging to a different county. It is therefore reasonable to assume that the localities within a county form a risk sharing group.

to reduce the rate of job reallocation in the economy as long as policy is directed towards firms. However, if risk sharing is directed towards individuals, such as unemployment benefits, sickness benefits, and supplementary allowances, then it is reasonable to believe that the stabilization mechanism augments the cost of labor for firms, as previously shown by Pissarides (2000).

As Pissarides (2000) points out, policy directed towards other goals than to internalize externalities, e.g., redistribution and stabilization, should be designed so that it does not influence the equilibrium outcome (at least not in the long run). The motivation for stabilization policy is to insure against large variations in disposable income and to smooth the income path over the business cycle. In this sense, it is therefore possible to allow policy, e.g., unemployment benefits and taxes, to affect the equilibrium outcome in the short and medium run. However, it is not desirable for stabilization policy to have long-run affects and distort labor market efficiency.

3 Measuring stabilization

Assume the economy consists of a number of risk averse agents. Further, the localities in which the agents reside are affected by idiosyncratic shocks which means that there is room for sharing the risk among a group of localities (risk-sharing group) in order to stabilize income; in other words, there is room for some sort of insurance to smooth the short-run variation in income. The firm may handle risk by varying its composition of factors of production or by turning to the private insurance market. The individual, on the other hand, may handle risk by investing in human capital, which improves her ability to adopt to new technology. Due to, e.g., information asymmetries, the central government can step in and act as an insurer, by pooling the risk via the national tax and transfer systems.

Let us formalize the discussion by considering the following general relationship[3]

$$\Delta \ln \left(\frac{Y_{kjt}}{Y_t} \right) = \delta_i + \gamma \Delta \ln \left(\frac{X_{kjt}}{X_t} \right) + \eta_{kjt} \tag{1}$$

where X_{kjt} is gross personal income in municipality j located in region k at time t and Y_{kjt} is the disposable value of X_{kjt} obtained after deducting net national tax payments (national tax payments minus national transfer payments),[4] and δ_i is a regional term, which captures possible drift elements of the disturbance term (Mélitz and Zumer, 2002). To eliminate the effects of shocks that are common to all localities in all regions,[5] we relate all variables to their national counterpart.[6]

[3] This approach was originally put forward by Asdrubali et al. (1996).

[4] The resident also pays local and regional taxes and receives transfer payments distributed by the local government. However, here we focus on stabilization via the national budget and since the budget of the local government is not designed to stabilize income across localities, we disregard the local budget parameters.

[5] Such common shocks may be present even in the case of full risk sharing.

[6] An alternative approach that also has been used in the literature is to introduce time fixed effects.

Let us take a closer look at the interpretation of the parameter γ. A value of $\gamma = 0$ indicates full risk sharing, since the variation in income is not at all reflected in Y. This means that a change in income is fully absorbed by fiscal institutions, which leaves income after risk sharing (disposable income) unaffected. However, if $\gamma = 1$, there is full pass-through in the system, i.e., the variation in income is fully reflected in disposable income, which suggests that there is no risk sharing. In other words, $1 - \gamma(= \beta)$ indicates the extent of risk sharing that is provided in the economy.

By realizing that personal income (X) minus disposable income (Y) is net taxes (T), the slope of the regression of net taxes on the variation in personal income, β, indicates the amount of risk sharing that is provided by the fiscal system. We control for national shocks by dividing each variable by its respective aggregate (national) value; $X_t = \sum_i X_{it}$ and $T_t = \sum_i T_{it}$. More formally, estimates of β are obtained by estimating the following equation separately for each region k containing municipality j in time t, which henceforth will be at the center of our attention,

$$\Delta \ln \left(\frac{T_{kjt}}{T_t} \right) = d_{kj} + \beta \Delta \ln \left(\frac{X_{kjt}}{X_t} \right) + \upsilon_{kjt} \tag{2}$$

where β is interpreted as the incremental smoothing obtained via fiscal flows. Note that we also allow for regional fixed effects in equation (2). Unfortunately estimating (2) leaves us with a time-invariant measure of stabilization. As an alternative we will therefore also evaluate stabilization at each time period for each region by using the prediction of (2), rendering also variation over time.

4 Measuring job flows

Intra-industry gross reallocation of jobs, JR, is measured as

$$JR_{ikt} = \sum_{a=1}^{n_i} \frac{|L_{aikt} - L_{aikt-1}|}{0.5(L_{ikt} + L_{ikt-1})} \tag{3}$$

where L_{aikt} denotes employment in plant a in industry i located in region k at time t, and L_{ikt} denotes employment in industry i located in region k at time t. For each industry and year we observe employment for each plant in that industry and calculate the change in employment share from one year to the next according to equation (3). The plants are followed over time and a plant with data for employment up to and including year t, where data are missing from year $t + 1$ and after, is classified as an exit. A plant with positive employment from $t + 1$, but where previous data are missing, is classified as an entry. Intra-industry gross reallocation of jobs consists of reallocation that takes place due to expansion of existing plants or entry of new plants in industry i located in region k at time t, JC_{ikt} (job creation), and reallocation that

takes place due to downsizing of existing plants or exits of plants, JD_{ikt} (job destruction), i.e., $JR_{ikt} = JC_{ikt} + JD_{ikt}$. Since we cannot fully distinguish whether the entries and exits that we observe are true entries or exits or rather arise from activities such as mergers and acquisitions, we will only include continuing plants, i.e., existing plants that grow or shrink. Results including entries and exits can be found in Table A1.

As discussed in Section 2, the rate of job flows within industries is related to the slopes of the firm's marginal revenue and marginal product of labor. In the empirical analysis it is not possible to measure these slopes directly. Instead, it is common in the literature to consider various characteristics that are expected to be related to the slopes. According to Davis et al. (1996), firms and industries tend to restructure counter-cyclically. General changes in the labor market for each region and industry are captured by the growth in employment. Further, Antelius and Lundberg (2003) find that the Swedish rate of intra-industry job turnover is lower in concentrated industries with limited competition. Here we use a Herfindahl index to capture concentration.

We also include a variable describing the educational attainment. According to human capital theory (Becker, 1964), we would expect individuals to acquire training at an early stage in order to maximize returns to education. In addition, training may improve the matching and, therefore, reduce the incentives for firms to fire workers and for workers to seek other employment. This suggests that there is a negative relationship between the rate of job reallocation and the skill intensity in the region.

Based on the discussion above, the estimating equation is given by

$$J_{kt} = \alpha + \delta_S S_k + \delta_H \ln H_{kt-1} + \delta_G \ln G_{kt-1} + \delta_E E_{kt-1} + \epsilon_{kt} \tag{4}$$

where $J_{kt} = JR_{kt}, JC_{kt}, JD_{kt}$, i.e., the average regional job reallocation, $JR_{kt} = \sum_i^{n_R} JR_{ikt}/n_R$, job creation, $JC_{kt} = \sum_i^{n_C} JC_{ikt}/n_C$, and job destruction, $JD_{kt} = \sum_i^{n_D} JD_{ikt}/n_D$, respectively, and the δ's are parameters to be estimated. S_k is the extent of stabilization among municipalities within region k, H_{kt-1} is the average Herfindahl index in region k, G_{kt-1} is average employment growth, E_{kt-1} is the share of inhabitants with higher education, and ϵ_{kt} is an error component. The independent variables are given by their initial values at time $t-1$.

5 The data

The empirical analysis is based on a data set covering 20 Swedish regions (counties) during the period 1989-2000. Due to changes in the industrial classification system in 1993 and in 2001, it is not possible to link disaggregated data neither prior to 1989 nor after 2000 with data for the period 1989-2000. When estimating the degree of stabilization of income shocks via the national tax and transfer systems in Sweden we will use a longer time period, 1983-2001. Since data for

transfers are incomplete prior to 1983, the estimation period for stabilization will be restricted to the period after 1983.

Stabilization: The Swedish municipalities are divided into risk-sharing groups, where the risk-sharing groups and counties coincide.[7] Since the county and municipality of Gotland (an island in the Baltic Sea) coincide, it is not possible to obtain estimates for stabilization for Gotland. Therefore, Gotland is dropped from the analysis. Data originate from the income-tax returns filed by individuals and are aggregated to municipality level in each region (county). All monetary values have been deflated by the consumer price index (1980 = 100), and are divided by population to calculate per capita values. Further, each variable is divided by the overall Swedish real per capita income, tax payments and transfer payments, respectively, to obtain the relative values as motivated in Section 2.

The income variable, X, used in the estimation of equation (2) is the average real income among municipal residents assessable for national tax measured as total personal income (employment income and income of business) minus general deductions and deductions for loss. Net taxes, T, consist of tax payments minus transfer payments. Tax payments are measured as the real per capita tax payment to the national government by residents in the municipality. Tax payments include both payments due to employment income and income of capital.

The central government distributes transfers to the households. National transfers to the households made up about 20 percent of the national budget in the beginning of the 1980s and about 30 percent at the end of the 1990s. Transfers are here measured as the real per capita pure transfer payments, i.e. transfers that are not eligible for taxation, distributed by the central government to the households. These transfers consist of child allowances, housing allowances, pension, sickness benefits, study allowances, supplementary benefits, and unemployment benefits. Our data set differs in one important aspect with the one used by Andersson (2004). In the present study we are able to separate out the full set of national transfer payments that are eligible for taxation from the gross income for individuals residing in each municipality. This facilitates a more accurate estimation of stabilization via net taxes.

Job flows: Data for employment by plant and industry have been obtained from the administrative Regional Labor Market Statistics (RAMS) database, compiled by Statistics Sweden. Plants are classified by 5-digit industry code according to SNI92, which is based on NACE. The plants are also classified according to county location. The data set contains employment data

[7] The Swedish public sector is structured into three levels of government: local governments (municipalities); regional governments (counties); and the central or national government. Municipalities provide a variety of services such as child care, education and care for the elderly, while the counties are mainly responsible for health care. The main source of income for municipalities and counties is local and regional income taxes, respectively. Central government's main responsibility is the provision of national public goods, such as defence and redistribution. The latter involves both distributional policy towards the private sector and redistribution within the public sector in the form of intergovernmental transfers.

for all sectors of the economy; L_{aikt} is employment in plant a in industry i located in region k at time t. This leaves us with 744 industries across all sectors of the economy that are used to calculate the average job flows in each region. Further, in the RAMS database we can observe the number of plants in each industry which is used to calculated the Herfindahl index measured as $\sum_{a=1}^{n_i}(SH_{aikt})^2$, where SH_{aikt} is the share of plant a in industry i.

Education is measured as the share of inhabitants with a post-secondary education in the region. Data originate from the Swedish Register of Education compiled by Statistics Sweden.

6 Empirical results

6.1 Stabilization

Table 1 gives the descriptives of personal income, national tax payments and national transfer payments to individuals residing in municipalities located in different regions in Sweden. It is clear that the income of an average individual residing in the region of Stockholm (the capital area) is much higher than for the average individual in any other region in Sweden. The average tax payments are on average much higher in this area as well. However, there is much variation in both these variables for the Stockholm region, which indicates large disparaties between individuals. The lowest average income is found in the region of Jämtland, which is located in the north of Sweden. Interestingly, national transfer payments received by individuals residing in northern Sweden[8] is lower than national transfer payments received by individuals residing in the south of Sweden.

TABLE 1 ABOUT HERE

Equation (2) is estimated with municipality specific fixed effects. Some of the series show evidence of first order autocorrelation. We therefore also allow for an AR1 process that is common for all panels (municipalities) in each regression. Both set of results are presented in Table 2. Pooling all municipalities of Sweden, and thereby restricting stabilization to be equal for all regions, we find that approximately 16 percent of a shock to income is stabilized via the national tax and transfer systems in Sweden. This means that when income falls by one krona, net tax payments adjust and absorb part of the change such that disposable income falls by only 0.84 krona, on average.

Let us next look at the regional structure of income shocks absorbed via the fiscal system. The point estimates in Table 2 vary between 0.103 for Kronoberg (the point estimate 0.012 for Västerbotten is not statistically significant) and 0.546 for Jönköping. This means that between 10 and 55 percent of a change in income is smoothed among the municipalities through the

[8] Dalarna, Gävleborg, Västernorrland, Jämtland, Västerbotten and Norrbotten.

fiscal system. The estimate for Jönköping is extremely high and we have therefore checked for outliers. A closer look at the data does however not reveal any particular pattern that would raise our suspicions. In line with previous results by Andersson (2004), based on similar data, we find that there are regional differences between the extent of stabilization provided by the Swedish fiscal system.[9] However, the results presented in Table 2 generally indicate a higher degree of stabilization than previously reported by Andersson (2004). As mentioned above in the data section, we are in the present study able to more fully account for national transfer payments and separate them out from gross income eligible for taxation. In addition, here we also control for autocorrelation.

TABLE 2 ABOUT HERE

6.2 Job flows, net taxes and stabilization

Summary statistics for the right-hand side variables in (4) are presented in Table 1. Approximately 50 percent of the reallocation of jobs took place between continuing plants, while reallocation due to entry and exit represents approximately 25 percent each. Focusing on job flows for continuing plants, the interpretation of the mean value of job reallocation, 0.154, is that, on an annual basis, approximately one out of 13 jobs was reallocated due to job destruction and job creation in the representative industry and county. Including entries and exits we find that the corresponding number is one out of seven jobs that are reallocated in Sweden. Though this latter is a rather high number in an international comparison, it is in line with those reported by e.g. Antelius and Lundberg (2003) who also use Swedish data. Most of the variation of job reallocation, creation and destruction takes place over time (the 'within' component) while there is much less variation among counties (the 'between' component).

TABLE 3 ABOUT HERE

Figure 1 depicts the average regional job flows between 1989 and 2000. In the beginning of the 1990s, Sweden found itself in a deep recession which is also reflected in a high rate of job reallocation. There is a large gap between destruction and creation of jobs at this time, and it

[9] One tentative explanation may be found by looking at the case of unemployment compensation. The national government sets the basic principles for whether a person is entitled to unemployment compensation and for what length of time. There are 21 regional social insurance officies in Sweden, one in each county, with local agencies. The individual case of entitlement is therefore decided upon by the the local employment agencies and case studies by, e.g., Lundin (2000) have found signs of regional differences in the interpretation of the basic principles. An interesting study by Riksförsäkringsverket (2003) [The National Social Insurance Board] has looked at various parts of the social insurance system to see whether for instance early retirement, sickness benefits and unemployment compensation are used interchangebly (and hence, not quite consistently with the rules of each benefit program) and at a different extent in regions.

is the rate of destruction that pushes the gross reallocation rate up since the rate of creation decreased. At around 1993/94 we see an upturn in the economy which is also reflected in Figure 1 where the rate of creation and destruction intersect, eventually leading to more jobs being created than destroyed. This general pattern of a negative correlation between job creation and destruction is similar for all counties, and in line with previous empirical results (see, e.g., Davis and Haltiwanger, 1999). However, there are some regional differences in variability over the business cycle.

FIGURE 1 ABOUT HERE

Table 4 presents the results of estimating equation (4).[10] The first column of each job flow category ($J_{kt} = JR_{kt}, JC_{kt}, JD_{kt}$) refers to estimates of a fully pooled regression containing a common intercept. Note that the variable of interest, i.e., stabilization, is time-invariant which precludes us from including region specific effects. We therefore cluster standard errors at the regional level. The second column of each dependent variable tabulates results when using a time-variant measure of stabilization obtained by the prediction of equation (2).[11] In this case we include region specific effects to control for unobserved characteristics such as labor market conditions. As an alternative we will also present results when using the observed net tax-income ratio, without any attempt to distinguish between whether taxes and transfers are payed with the aim to stabilize economic shocks or to redistribute income across individuals. These latter results are presented in the third columns.

The results show a positive and significant correlation between the degree of stabilization and the rate of job creation. This suggests that when the tax and transfer systems provide a high degree of stabilization of a shock to income, more jobs are created. However, it does not appear as if the degree of stabilization has any effect on job destruction and does not affect the overall regional job flow activity.[12] Bear in mind that the degree of stabilization is time invariant and it is possible that the stabilization parameter picks up regional unobserved differences rather than effects due to fiscal policies aimed at absorbing income shocks. We therefore in a next step evaluate the extension of regional stabilization of income variation by using the prediction of (2) for each region; see column two of each specification of J_{kt} in Table 2. According to the results, income stabilization in the Swedish regions tends to decrease the amount of intra-industry job

[10] Augmented Dickey-Fuller tests of the time series indicate that we cannot reject the null hypothesis of no serial correlation.

[11] Murphy and Topel (1985) suggest that the covariance matrix of the second-step estimation, i.e., the estimation of equation (4) including the time-variant prediction of stabilization, should be corrected to account for the uncertainty in the parameter estimates from the first step regression of equation (2). In practise we cannot proceed with this correction due to non-conformity of the dimension of the matrices. Therefore, we have to rely on the White (1980) correction of the covariance matrix and be careful with the inference from these estimations.

[12] When also including job flows that arise due to entry and exit, the significant effect of the degree of stabilization on job creation disappears while we find a negative and significant effect on job destruction; see Table A1.

creation. The effect on intra-industry job destruction and overall job reallocation is positive, but not statistically significant.

In the third colums of Table 4 we report results where we include the net tax-income ratio in each region, without any attempt to separate out the stabilizing part of the tax-transfer systems. Now comparing the results in columns two and three we find similar effects of the net tax-income ratio and predicted stabilization of income shocks, with the only difference being that all effects now are significant (the negative coefficient on job creation is much larger - in absolute terms - in column two than column three). Thus, the overall net tax-income ratio has a more extended effect on job flow activities in the Swedish regions than the part of the fiscal system which explicitly is aimed at absorbing income variation due to asymmetric shocks within the region. What is the rationale for these results? As described in the data section, net taxes consist of tax payments by individuals to the central government and transfers to the households in terms of child allowances, housing allowances, pension, sickness benefits, study allowances, supplementary benefits, and unemployment benefits. The fiscal system can be used to redistribute income between individuals, stabilize income shocks, and/or internalize market imperfections.

In column two we try to separate out the part of the systems that aims at absorbing income variation for individuals over time, while we in column three capture the overall effect of fiscal policies. According to the results in Table 4 it appears as if the cushioning of income shocks only slows down the job creation in regions, while an overall higher rate of net taxes will also increase the rate of intra-industry job destruction and job reallocation. In regions where the outside option of, e.g. unemployment benefits are more readily available, the rate of successfully creating new jobs will be slower. Thus, these results are in line with expectations put forward in Section 2, i.e., that stabilization policy directed towards workers tends to increase hiring costs for the firm and thereby gives rise to less jobs being created.

Let us next look at the other results in Table 4. There is a negatively significant correlation between the rate of job flows and employment growth which suggests a counter-cyclical pattern of the gross rate of job reallocation. As previously reported by e.g. Davis et al. (1996) and Antelius and Lundberg (2003), job creation is counter-cyclical while job destruction is pro-cyclical. Further, there is less job creation among plants located in regions with concentrated industries, measured by the Herfindahl index, (the coefficient is only significant in the fixed effects estimations), which is in line with our expectations. However, it appears as if rate of job destruction within industries is high in regions with a low degree of competition. In sum it appears as if the overall regional intra-industry job reallocation is not affected by the average degree of concentration in the regional economy.

The results in Table 4 also suggest that there is less intra-industry job creation, on average, in regions where the population is well educated. If hiring costs are proportional to productivity

and productivity is related to education, then it is reasonable that there will be a negative effect of education on job creation. This negative effect is however outweighted by a positive effect on job destruction leaving job reallocation unaffected by education. These results are in contrast to what would be expected according to the traditional human capital model (Becker, 1964), where education presumably increases the chances of a good match between employer and employees and thereby decreases job turnover.

TABLE 4 ABOUT HERE

Since our data set contains the whole economy, it is possible that the characterization varies between different sectors. We therefore divide the data set according to four major industries and re-run equation (4) separately for these following industries: 1. Agriculture, hunting, fishing and minerals; 2. Manufacturing; 3. Services; 4. Public sector, education and health care.[13] The results are presented in Tables A2-A5 and show that job flows in the public sector (sector 4) are unsensitive to the mechanisms of the fiscal system in Sweden as measured here, while the net tax-income ratio is positively related to job destruction in the other sectors. Further, there is a negative effect of the net tax-income ratio on job creation only in the service sector. When trying to separate out the stabilizing mechanism of the tax-transfer systems we find that there is a higher rate of contraction between continuing plants in manufacturing and less expansion within the agricultural sector in regions where the system absorbs a large part of the variation to income. Thus, the character of the different sectors make them more or less susceptible to the mechanisms of the fiscal system as measured here.

7 Concluding remarks

The objective of this study is to analyze how job flows are affected by a mitigation of the influence of shocks to income within Swedish regions. By using the approach suggested by Asdrubali et al. (1996) we find that national tax and transfer payments absorb approximately 16 percent of a shock to personal income, on average in Sweden. There are however regional differencens where the degree of stabilization varies between 10 and 55 percent depending on in which region the individual resides.

Next, based on an administrative panel data set covering all sectors in 20 Swedish regions, 1989-2000, we calculate regional job flows and separate between expansion and contraction of continuing plants in the regional economy. Controlling for unobserved regional effects find that a high net tax-income ratio tends to decrease the rate of jobs that are created and increase the rate of job destruction, increasing the overall rate of job reallocation in the regions. In an

[13] The average rate of job reallocation among continuing plants is 0.127 (0.032) in sector 1, 0.138 (0.018) in sector 2, 0.165 (0.011) in sector 3, and 0.166 (0.020) in sector 4. Standard deviations are given within parentheses.

attempt to separate out the part of the national tax-transfer system that is aimed at stabilizing the income path over time we find that only job creation is affected, i.e., regions where the income path is more stable tend to have a lower rate of intra-industry job creation.

Other results confirm the counter-cyclical pattern in job flows that has previously been found in the literature. Though, it appears as if the overall regional job reallocation within industries is not affected by the average degree of concentration in the regional economy. The results also indicate that there is a negative relationship between education and job creation which may be explained by higher hiring costs for more productive workers. On the other hand we find that the average level of education is positively related to job destruction, leaving overall job reallocation unaffected.

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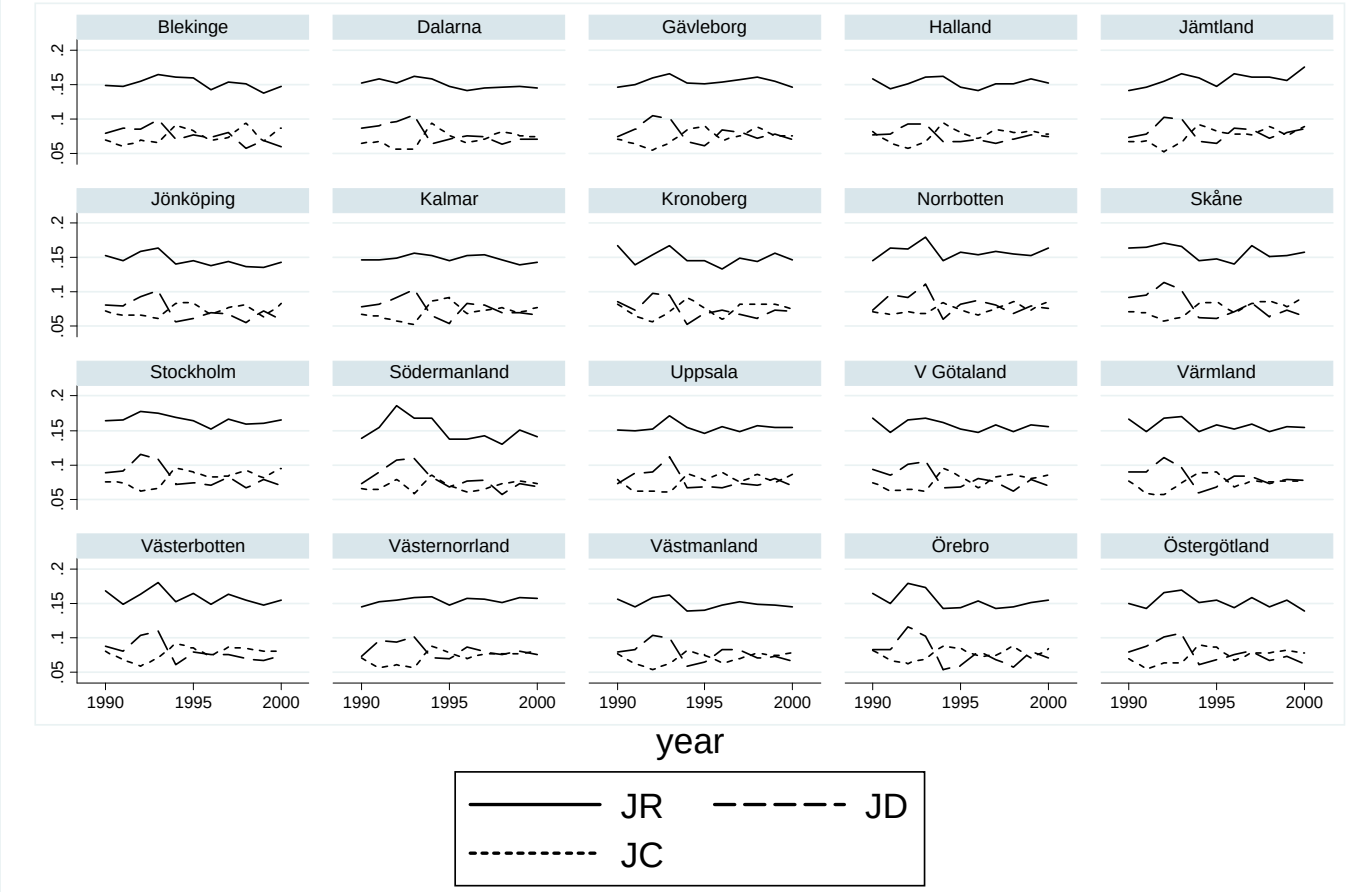

Figure 1: Mean job reallocation (JR), job creation (JC) and job destruction (JD) by county, 1989-2000

Table 1: Summary statistics of personal income, national tax payments and national transfer payments in SEK by region in Sweden, 1983-2001

Region	Income		Taxes		Transfers	
	Mean	Std.dev.	Mean	Std.dev.	Mean	Std.dev
Stockholm	50345.6	11305.5	4706.1	3332.9	1851.2	667.6
Uppsala	41899.0	6472.2	2509.2	1082.1	1818.0	750.8
Södermanland	42769.8	6161.7	2392.6	993.6	1882.3	646.1
Östergötland	39253.7	5787.4	2160.9	861.4	1760.9	691.6
Jönköping	39903.6	5783.5	2422.9	1100.5	1671.9	598.3
Kronoberg	39474.9	5572.3	2196.4	781.7	1655.1	616.4
Kalmar	38662.5	5734.5	2035.2	757.2	1652.3	614.0
Blekinge	41082.0	5830.6	2219.7	861.2	1718.7	646.1
Skåne	40738.2	6409.8	2589.6	1127.7	1827.9	750.9
Halland	39908.4	6229.7	2511.8	1015.0	1728.7	650.0
Västra Götaland	40007.2	6281.4	2248.6	948.5	1684.1	615.1
Värmland	40495.2	5498.4	2075.3	947.4	1616.3	611.5
Örebro	41779.5	5376.2	2146.7	968.3	1697.6	642.9
Västmanland	41610.9	5845.2	2174.3	1012.5	1743.4	630.5
Dalarna	40204.8	5442.8	2063.1	894.5	1623.0	573.6
Gävleborg	40914.5	5771.6	2059.3	962.2	1648.2	585.2
Västernorrland	42105.7	5725.5	2215.1	971.9	1598.4	604.0
Jämtland	38263.7	5298.5	1784.0	773.4	1633.5	590.3
Västerbotten	39024.1	5134.2	1869.3	831.5	1638.0	650.6
Norrbotten	41304.6	6037.3	2017.0	993.5	1568.2	553.3
Sweden	41228.1	7202.4	2430.8	1532.7	1709.9	647.1

Note: Per capita values in fixed prices (1980=100). Taxes and transfers refer to national tax payments and national transfer payments by/to individuals residing in municipalities located in each region. Unweighted averages.

Table 2: Regional stabilization of personal income in Sweden, 1983-2001

Region	FE, excl. AR structure			FE, incl. AR structure						
	Coeff.	t-value	R^2	Coeff.	t-value	R^2	ρ	AR-test		No. of obs.
Stockholm	0.033	3.28	0.023	0.176	7.93	0.225	-0.361	30.39	***	450
Uppsala	0.173	4.88	0.174	0.156	4.56	0.198	-0.141	1.56		108
Södermanland	0.058	5.35	0.167	0.056	5.24	0.167	-0.190	0.00		142
Östergötland	0.162	5.21	0.109	0.158	4.92	0.110	-0.155	4.44	*	234
Jönköping	0.546	3.51	0.058	0.620	3.68	0.058	-0.478	2.66		198
Kronoberg	0.123	2.52	0.044	0.103	2.05	0.043	-0.244	14.65	***	144
Kalmar	0.161	4.99	0.108	0.146	4.49	0.111	-0.110	2.26		216
Blekinge	0.236	4.04	0.157	0.226	3.37	0.165	-0.353	5.41	*	90
Skåne	0.190	8.60	0.118	0.194	8.38	0.123	-0.286	20.11	***	594
Halland	0.086	1.47	0.024	0.043	0.68	0.022	-0.355	2.58		108
Västra Götaland	0.103	8.04	0.067	0.138	8.75	0.101	-0.248	11.68	***	904
Värmland	0.274	16.64	0.481	0.274	16.42	0.488	-0.239	7.01	**	288
Örebro	0.163	6.55	0.181	0.146	5.58	0.198	-0.254	5.06	**	203
Västmanland	0.174	6.03	0.155	0.157	5.04	0.159	-0.288	6.48	**	198
Dalarna	0.227	7.18	0.160	0.192	5.93	0.147	-0.194	0.29		270
Gävleborg	0.215	6.97	0.218	0.184	5.50	0.219	-0.272	13.35	***	180
Västernorrland	0.252	6.64	0.249	0.248	6.24	0.299	-0.171	3.42		126
Jämtland	0.304	20.78	0.444	0.282	10.02	0.454	-0.095	0.53		144
Västerbotten	0.012	1.21	0.006	0.216	7.73	0.196	-0.022	1.88		268
Norrbotten	0.172	8.89	0.239	0.145	7.04	0.250	-0.220	2.64		252
Sweden	0.062	13.43	0.034	0.161	21.10	0.115	-0.338	7.32	***	5135

Note: Results are based on estimations of equation (2) and include regional fixed effects. In the first set of results any AR structure is excluded, while in the second set of results we allow for a common AR1 process for all panels. The AR-test refers to a Woolridge test (F-test) for autocorrelation in panel data, with H_0: no first-order autocorrelation. *, **, *** indicates significance on the 10-, 5-, and 1-percent level.

Table 3: Summary statistics, 1989-2000

	Mean	Standard deviation		
		Overall	Between	Within
Job reallocation	0.306	0.025	0.011	0.022
Job creation	0.150	0.014	0.005	0.013
Job destruction	0.155	0.026	0.007	0.025
Job reallocation, only continuing plants	0.154	0.010	0.004	0.009
Job creation, only continuing plants	0.075	0.010	0.003	0.010
Job destruction, only continuing plants	0.079	0.014	0.003	0.014
Predicted change in relative net taxes	2.3E-5	1.5E-3	2.1E-4	1.5E-3
Net tax-income ratio	0.111	0.055	0.040	0.038
Herfindahl index	0.022	0.002	0.006	0.006
Employment growth	-0.014	0.031	0.005	0.031
Education	0.058	0.012	0.015	0.008

Note: Variables are given in levels and not in logs, except for the variable Predicted change in relative net taxes. This latter variable is reported in logs.

Table 4: Determinants of regional job reallocation, job creation and job destruction, 1989-2000, including only job flows in continuing plants

	Job reallocation			Job creation			Job destruction		
	OLS	FE	FE	OLS	FE	FE	OLS	FE	FE
Deg. of stabilization	0.163			0.435			-0.136		
	(1.65)			(3.91)			(-0.81)		
Stabilization pred.		0.403			-9.393			7.523	
		(0.18)			(-2.26)			(1.33)	
Net tax-income ratio			0.238			-0.573			1.073
			(1.93)			(-4.39)			(4.67)
Herfindahl	-0.392	-0.087	0.726	-3.084	-8.496	-6.727	2.148	8.177	5.142
	(-1.08)	(-0.13)	(1.01)	(-5.28)	(-4.30)	(-3.68)	(2.93)	(4.52)	(3.56)
Empl. growth	-0.985	-0.815	-0.882	2.444	2.509	2.734	-3.930	-3.689	-4.033
	(-10.06)	(-7.62)	(7.03)	(14.17)	(12.95)	(14.69)	(-19.56)	(-16.19)	(-15.48)
Education	0.054	-0.048	-0.088	-0.018	-0.559	-0.416	0.125	0.469	0.258
	(1.66)	(-0.61)	(-1.05)	(-0.68)	(-3.37)	(-2.80)	(2.08)	(2.53)	(1.54)
Constant	-1.742	-2.024	-2.151	-2.603	-3.986	-3.550	-2.279	-1.439	-2.101
	(-17.33)	(-9.25)	(-9.20)	(-30.08)	(-8.90)	(-8.73)	(-12.41)	(-2.83)	(-4.59)
Adjusted R^2	0.271	0.322	0.343	0.448	0.460	0.474	0.522	0.558	0.608
F-test $(4, 19)$	28.71	23.58	22.87	149.94	120.53	121.39	117.55	106.90	102.76
No. of obs.	220	220	220	220	220	220	220	220	220

Notes: Heteroskedasticity corrected t-values in parenthesis. Standard errors are clustered at the regional level. The columns marked FE refer to within estimates including region specific effects. Critical value for $F_{0.05}(4, 19) = 2.90$.

Table A1: Determinants of regional job reallocation, job creation and job destruction, 1989-2000, including continuing plants as well as entries and exits

	Job reallocation			Job creation			Job destruction		
	OLS	FE	FE	OLS	FE	FE	OLS	FE	FE
Deg. of stabilization	-0.198			0.024			-0.435		
	(-1.27)			(0.17)			(-2.26)		
Stabilization pred.		-4.875			-12.371			2.513	
		(-1.82)			(-3.26)			(0.65)	
Net tax-income ratio			0.040			-0.274			0.471
			(0.46)			(-2.65)			(2.87)
Herfindahl	1.847	3.875	3.904	-0.126	-4.669	-3.604	3.724	12.342	11.032
	(3.19)	(7.43)	(7.94)	(-0.19)	(-2.75)	(-2.23)	(5.21)	(7.19)	(7.04)
Empl. growth	-1.235	-0.942	-0.915	0.723	1.137	1.306	-2.980	-2.835	-2.979
	(-10.67)	(-8.86)	(-8.06)	(6.35)	(6.60)	(10.01)	(-15.06)	(-15.68)	(-14.19)
Education	0.059	-0.037	-0.016	0.009	-0.744	-0.632	0.109	0.691	0.603
	(1.12)	(-0.53)	(0.25)	(0.15)	(-4.66)	(-4.33)	(1.84)	(3.61)	(3.34)
Constant	-1.053	-1.406	-1.351	-1.866	-3.942	-3.612	-1.631	-0.202	-0.480
	(-6.68)	(-7.13)	(-7.45)	(-10.91)	(-9.13)	(-9.03)	(-9.20)	(-0.38)	(-0.97)
Adjusted R^2	0.314	0.565	0.557	0.064	0.237	0.210	0.454	0.574	0.587
F-test $(4, 19)$	42.69	46.83	42.37	30.44	35.66	48.35	75.15	72.02	70.01
No. of obs.	220	220	220	220	220	220	220	220	220

Notes: Heteroskedasticity corrected t-values in parenthesis. Standard errors are clustered at the regional level. The columns marked FE refer to within estimates including region specific effects. Critical value for $F_{0.05}(4, 19) = 2.90$.

Table A2: Determinants of regional job reallocation, job creation and job destruction, 1989-2000, including only job flows in continuing plants, in sector 1: Agriculture, hunting, fishing and minerals

	Job reallocation		Job creation		Job destruction	
	FE	FE	FE	FE	FE	FE
Stabilization pred.	5.296		-22.604		29.627	
	(0.53)		(-1.74)		(1.58)	
Net tax-income ratio		0.681		-0.673		1.979
		(1.38)		(-0.86)		(2.29)
Herfindahl	0.035	0.406	1.861	1.430	-1.673	-0.542
	(0.06)	(0.74)	(2.37)	(1.67)	(-2.01)	(-1.03)
Empl. growth	0.353	0.274	0.725	0.803	0.187	-0.042
	(1.53)	(1.14)	(1.64)	(1.69)	(0.56)	(-0.13)
Education	0.174	0.341	1.073	0.961	-0.587	-0.146
	(0.75)	(1.46)	(2.55)	(2.21)	(-1.34)	(-0.56)
Constant	-1.572	-1.361	-0.667	-0.691	-3.586	-3.126
	(-2.77)	(-2.49)	(-0.63)	(-0.67)	(-3.60)	(-4.50)
Adjusted R^2	0.222	0.230	0.121	0.116	0.107	0.125
F-test $(4, 19)$	1.55	1.98	4.68	3.63	1.30	1.33
No. of obs.	220	220	220	220	220	220

Notes: Heteroskedasticity corrected t-values in parenthesis. The columns marked FE refer to within estimates including region specific effects and standard errors clustered at the regional level. Critical value for $F_{0.05}(4, 19) = 2.90$.

Table A3: Determinants of regional job reallocation, job creation and job destruction, 1989-2000, including only job flows in continuing plants, in sector 2: Manufacturing

	Job reallocation		Job creation		Job destruction	
	FE	FE	FE	FE	FE	FE
Stabilization pred.	3.818		-24.745		22.543	
	(1.03)		(-1.63)		(1.82)	
Net tax-income ratio		0.021		-0.499		0.981
		(0.09)		(-1.42)		(1.80)
Herfindahl	-8.733	-8.662	-21.893	-21.103	3.653	1.115
	(-1.35)	(-1.39)	(-1.94)	(-1.99)	(0.27)	(0.09)
Empl. growth	-0.470	-0.474	2.588	2.558	-3.180	-3.078
	(-3.80)	(-3.98)	(7.55)	(7.21)	(-8.07)	(-8.67)
Education	-0.289	-0.306	0.162	0.267	-0.448	-0.535
	(-2.29)	(-2.67)	(0.72)	(1.37)	(-1.72)	(-2.36)
Constant	-2.650	-2.703	-1.768	-1.433	-4.105	-4.404
	(-5.69)	(-6.36)	(-2.09)	(-1.95)	(-4.05)	(-4.94)
Adjusted R^2	0.109	0.107	0.308	0.295	0.597	0.434
F-test $(4, 19)$	6.22	5.76	36.95	29.57	60.06	25.41
No. of obs.	220	220	220	220	220	220

Notes: Heteroskedasticity corrected t-values in parenthesis. The columns marked FE refer to within estimates including region specific effects and standard errors clustered at the regional level. Critical value for $F_{0.05}(4, 19) = 2.90$.

Table A4: Determinants of regional job reallocation, job creation and job destruction, 1989-2000, including only job flows in continuing plants, in sector 3: Services

	Job reallocation		Job creation		Job destruction	
	FE	FE	FE	FE	FE	FE
Stabilization pred.	-0.331		3.731		-4.984	
	(-0.15)		(1.05)		(-0.93)	
Net tax-income ratio		0.113		-0.505		0690
		(1.20)		(-2.67)		(4.02)
Herfindahl	3.273	2.635	-39.236	-35.963	41.177	36.722
	(0.50)	(0.40)	(-2.41)	(-2.16)	(3.46)	(2.94)
Empl. growth	-0.439	-0.470	1.441	1.559	-2.141	-2.302
	(-4.84)	(-4.95)	(6.56)	(6.31)	(-9.46)	(-9.29)
Education	-0.002	0.001	0.046	0.031	-0.124	-0.104
	(-0.02)	(0.01)	(0.21)	(0.14)	(-0.77)	(-0.65)
Constant	-1.879	-1.871	-1.576	-1.627	-3.713	-3.643
	(-11.60)	(-11.41)	(-4.57)	(-4.98)	(-11.36)	(-11.68)
Adjusted R^2	0.390	0.394	0.546	0.564	0.597	0.620
F-test $(4, 19)$	7.67	7.98	49.48	54.52	60.06	56.67
No. of obs.	220	220	220	220	220	220

Notes: Heteroskedasticity corrected t-values in parenthesis. The columns marked FE refer to within estimates including region specific effects and standard errors clustered at the regional level. Critical value for $F_{0.05}(4, 19) = 2.90$.

Table A5: Determinants of regional job reallocation, job creation and job destruction, 1989-2000, including only job flows in continuing plants, in sector 4: Public sector, education and health care

	Job reallocation		Job creation		Job destruction	
	FE	FE	FE	FE	FE	FE
Stabilization pred.	-2.353		-5.561		0.158	
	(-0.35)		(-0.54)		(0.02)	
Net tax-income ratio		0.086		0.026		0148
		(0.39)		(0.08)		(0.61)
Herfindahl	-2.472	-2.638	1.168	0.442	-7.902	-7.602
	(-0.82)	(-083)	(0.23)	(0.09)	(-1.22)	(-1.21)
Empl. growth	-0.442	-0.464	1.133	1.139	-1.989	-2.038
	(-2.24)	(-2.56)	(3.19)	(3.00)	(-4.91)	(-5.06)
Education	0.179	0.190	0.121	0.140	0.197	0.203
	(1.66)	(1.90)	(0.84)	(0.95)	(1.25)	(1.32)
Constant	-1.168	-1.137	-2.222	-2.136	-1.553	-1.203
	(-3.73)	(-4.11)	(-7.84)	(-7.69)	(-2.95)	(-3.18)
Adjusted R^2	0.221	0.221	0.169	0.167	0.167	0.168
F-test $(4, 19)$	3.10	3.31	4.21	4.52	6.99	6.90
No. of obs.	220	220	220	220	220	220

Notes: Heteroskedasticity corrected t-values in parenthesis. The columns marked FE refer to within estimates including region specific effects and standard errors clustered at the regional level. Critical value for $F_{0.05}(4, 19) = 2.90$.