

1 Introduction

This thesis consists of four self-contained papers, which can be separated into two different parts. The first part of the thesis (papers [I] and [II]) deals with the functioning of the industrial structure in the Swedish manufacturing sector and focuses on two major issues. First, what factors influence the reallocation of jobs, and the research and development (R&D) intensity of an industry? In particular, what role does exposure to international trade play? Second, how do the above mentioned factors affect technological change? Paper [I] analyzes the determinants of the rate of structural change, defined as the rate of job turnover between and within industries. The objective of paper [II] is to study factors influencing technological change as measured by total factor productivity (TFP) growth.

The second part (papers [III] and [IV]) deals with state-local public finance. Paper [III] considers vertical external effects, which may arise as a by-product when different levels of government share a common tax base. The intuition is as follows. As one level of government decides upon its income tax rate, it may fail to recognize that its choice of tax rate is likely to reduce the income tax base of the other levels of government. As such, there will be a tendency to underestimate the marginal cost of public funds. This means that, to implement a socially optimal resource allocation, the central government may have to correct the incentive structure facing the subnational authorities. The purpose of paper [III] is to design and implement a test of whether the external effect from tax base sharing among local and regional governments in Sweden is internalized via the intergovernmental transfer system. The objective of paper [IV] is to analyze the extent of risk-sharing that takes place among municipalities in Sweden in terms of how the central government smooths personal income via the tax and transfer systems. The ability of the national fiscal systems to provide risk-sharing is important in order to secure economic stability and economic standards.

The remaining part of this introductory chapter is devoted to an overview, and is organized as follows. Section 2 presents a general survey of previous

literature on the issues of job turnover and productivity related to papers [I] and [II]. The two papers are also summarized in Section 2. Section 3 contains an overview of the previous literature on fiscal externalities and also the literature on fiscal flows as a means of risk-sharing. The section includes a summary of papers [III] and [IV].

2 Job turnover, productivity and openness

2.1 Job turnover and competition

The term structural change is traditionally referred to in the context of economic growth and development. Structural change also affects the labor market by changing the relative demand and relative wages for various labor groups. The ability to adjust to such changes is important for growth. In this thesis, structural change is measured in terms of the rate of job turnover. Davis et al. (1996) define the rate of job turnover as the changes in employment shares that occur due to job creation and destruction. Job creation includes both the employment changes that arise from the expansion of continuing firms and from the entry of new firms. Job destruction includes employment changes due to contraction of continuing firms and to exits.

The topic of job turnover connects several fields of economics, including labor economics, macroeconomics, industrial organization and international trade. Papers [I] and [II] of this thesis draw from all of these fields, although they have a special focus on the industrial organization and international trade literature.

As Caves (1998) points out, research on job turnover has been driven to a larger extent by empirical findings than by theoretical work. Evidence from time-series data at the macro level shows that the reallocation of jobs seems to be closely connected to the business cycle. A common feature of the empirical findings is that the rate of job turnover appears to be counter-cyclical. Moreover, job destruction is more volatile and responds quickly to

a recession, whereas the reaction of job creation is slower.¹ The theoretical literature offers several explanations to this pattern. The broad message is that it is less costly to restructure in downturns.²

Another empirical finding that seems robust across studies is that most of the reallocation activity takes place between plants within the same industry.³ A domestically competitive market structure reflected by the presence of many small firms and low profit margins, encourages this flow of jobs among firms. These explanatory factors are basic in the literature, whether one looks at job turnover from a labor economics point of view (see the survey by Davis and Haltiwanger 1999) or from that of industrial organization (see the review by Caves 1998).

Deregulation of trade barriers and opening up to international trade involve a freer mobility of resources, whether it be the mobility of goods and services or factors of production. An economy or sector that participates in the globalization process will also be affected by the decision of other countries and foreign sectors, and the economic climate that prevails. This triggers the following question: what role does exposure to international trade play in the reallocation of jobs? The empirical results do not suggest a unanimous answer to this question. Work on U.S. data by Davis et al. (1996) shows that the relationship between international trade and job turnover is at most only weak. Using data for Ireland and focusing on the dynamic nature of job turnover, Brühlhart et al. (1998) find a small and positive effect from intra-industry trade.

¹See Andersson (1999) on Swedish data, Broersma and Gautier (1997) on Dutch data, Davis et al. (1996) on U.S. data, just to mention a few studies; for an international comparison across eight countries (Canada, Columbia, Denmark, Germany, the Netherlands, Norway, U.K. and U.S.A.), see Davis and Haltiwanger (1999).

²Davis and Haltiwanger (1990) and Saint-Paul (1993) discuss opportunity costs of foregone production, Mortensen and Pissarides (1994) base their explanation on search costs and hiring and firing costs, and Blanchard and Diamond (1990) say that firms restructure in downturns since the fear of bankruptcy is more real in such a context (the so-called lame duck effect).

³See e.g. Broersma and Gautier (1997) and Davis and Haltiwanger (1999).

2.2 Total factor productivity

Since the breakthrough of endogenous growth theory, research has put forward the importance of technological improvements to obtain economic growth. Researchers no longer assume technology to be once and for all given or something that falls down on us like manna. Instead they seek to explore what drives technological progress. With new and better technology, the producer will be able to get more output for any given amount of input factors, that is, total factor productivity (TFP) will increase. This can be restated in the words of Jorgenson and Griliches (1967, p. 249):

”The rate of growth of total factor productivity is the difference between the rate of growth of real product and the rate of growth of real factor input.”

Scientific progress and technology improvements are things that producers work actively on by diverting resources to R&D. In the process they build up what we may call a knowledge stock. According to the theory of creative destruction, first introduced by Schumpeter (1942) and formalized by Aghion and Howitt (1992), the innovator must be guaranteed some monopoly power to invest in R&D. Appropriability, technological opportunity and demand are factors that guide firms in their decision to engage in innovative activity (Cohen 1995).

Most R&D takes place in the manufacturing industry. Swedish R&D expenditure as a share of value added in manufacturing was 10.4 percent in 1994 while the OECD equivalent was 6.7 percent (OECD 1996, 1997). According to Badulescu (1992) and Papachristodoulou (1991) the participation of Swedish manufacturing industry in R&D has accounted for a significant part of the development of total factor productivity.⁴ Case studies of other countries have generated similar results (see the survey by Griliches 1995).

Improving technology is a dynamic process where access to the latest technology vintage is vital for firm survival. Competition will make the

⁴Together, the two studies cover the period 1963-83.

low-productivity firms unviable and they will instead be displaced by high-productivity firms. This implies that the industry's average productivity will increase. Thus, a certain reallocation of resources will enhance technological development. Empirical findings reviewed in Caves (1998) and Davis and Haltiwanger (1999) support the importance of job reallocation for productivity growth.

A body of literature has emerged on the link between international trade, endogenous growth and technological progress in the global economy (see, e.g., Grossman and Helpman 1991 and Rivera-Batiz and Romer 1991). The integrated market creates a forum where the domestic agent can interact with his or her foreign counterpart and exchange goods as well as ideas. To the extent that the degree of openness reflects a higher probability of enjoying the benefits of new and more advanced technology, a positive effect on the TFP growth rate is to be expected. Cross-country studies by Coe and Helpman (1995), Keller (1998, 2000) and Braconier and Sjöholm (1998) report results that are in concordance with this hypothesis.

2.2.1 The measurement of total factor productivity

Grosskopf (1993) provides an easily accessible overview of different ways of accounting for total factor productivity. Depending on access to data and the assumptions of the model, the researcher may choose between several approaches. I will discuss two such approaches below, both of which are nonparametric.

One approach to measuring productivity is the frequently used Malmquist indices, which were first brought to our attention by Caves et al. (1982). This approach allows the user to separate between technical change and inefficiency by the use of distance functions. The indices are, however, computationally demanding.

The second paper of this thesis uses another approach. In this case, production is assumed to take place on the production frontier, that is, there is technical efficiency. Using discrete data one can measure total factor

productivity growth as a Törnqvist index⁵:

$$TFP \text{ growth} = (\ln Y_t - \ln Y_{t-1}) - \sum_k \frac{1}{2}(s_{kt} + s_{kt-1})(\ln x_{kt} - \ln x_{kt-1})$$

where Y is output, s_k the cost share of input factor k , and x_k measures input factor k as a share of output at time t . If technology can be represented by a translog production function, then it is possible to show that this approximation is exact (Diewert 1976). This is an attractive property of the Törnqvist index and an important reason for choosing to work with it in this thesis. Other reasons for choosing the Törnqvist index are its computational ease and familiarity in the literature mentioned above.

2.3 Summary of papers [I] and [II]

Paper [I]: Structural Change, Competition and Job Turnover in Swedish Manufacturing, 1964-96

The scope of this paper is to study the determinants of the rate of structural change, defined as the rate of job turnover, i.e. the rate of change in the number of employed among industries as well as among plants within the same industry. In particular, the paper focuses on the role of competition - both national and international - as a driving force behind structural adjustment.

The study is separated into two parts due to data limitations. The first concerns inter-industry job turnover. The specific factors model gives us a theoretical framework to discuss job flows between industries. In this model, labor is assumed to be a fully mobile factor of production while physical capital is immobile across sectors in the short-run. The labor demand depends on the product price, the wage rate and technology. Since we do not have data for world prices or technology parameters, we derive the linkage between these two measures and gross profit margins, which we do have data on. We then obtain an expression where the rate of inter-industry job

⁵This is the discrete approximation of the Divisia indices used for continuous time.

turnover is proportional to a weighted measure of the dispersion of changes in gross profit margins among industries.

The empirical analysis shows that there is an upward trend in inter-industry job turnover. There has been an annual rate of job reallocation of 2.7 percent on average between 1964 and 1996. We find that the dispersion of profits among industries seems to be a driving factor behind the reallocation of jobs and that international competitiveness plays a very important role in this.

In the analysis of the reallocation of jobs within industries, we need a different theoretical base model, since heterogeneity among firms (plants) is now a crucial assumption. Assume an industry with monopolistic competition. The firms therein produce differentiated products, while they are otherwise identical in the long-run. The representative firm faces demand and supply shocks and will adjust employment and output so that profit maximization is satisfied. Since we do not have data on these shocks, and since we cannot measure them indirectly by looking at the effects of gross profit margin, we explore the relationship between the rate of intra-industry job turnover and a set of industry characteristics, indicating the structure of the industry, expected to be related to the elasticities of marginal revenue and marginal cost.

Our data consist of two partly overlapping panels for the periods 1986-93 and 1990-96. On average 13 percent of the jobs have been reallocated annually among plants within the same industry. More than half of this reallocation took place within existing plants while entry and exit of plants contributed about one fifth each. The rate of intra-industry job turnover was higher in industries with many small plants, with low profit margins and high import penetration.

Paper [II]: Openness and Total Factor Productivity in Swedish Manufacturing, 1980-1995

Technological progress plays a central role for a country striving for economic growth. Understanding the driving forces behind technological progress is therefore of major importance. Many researchers are currently analyzing the pattern and determinants of technological progress in terms of total factor productivity (TFP) growth (see, for example, the collection of articles in Stoneman 1995 and the references therein).

The present study draws on research that has emerged on the impact of openness on TFP growth. Its purpose is to explore three different ways in which openness can affect the TFP growth rate. First, according to theoretical discussions (see, for example Grossman and Helpman 1991) it is reasonable to assume that a country that is open to the international market by being engaged in international trade and/or being the host of foreign-owned firms will have a higher probability of meeting new and more advanced technology which can be adopted to its own production function.

Second, the study also considers openness as a source of competition or competitiveness which affects market power and market share. Firms engage in innovative activity to improve the production process or their products. The incentives to do research are dependent on potential profits that the firm can reap. A larger market would therefore offer higher potential profits while the probability to win the patent race would be smaller the more participating firms there are in the race.⁶ In order to at least hold the present market position it is plausible to expect the firms to innovate at a greater rate and stay in the race.

Third, competition, which will be tighter in industries that are open to the international arena, will encourage the entry and exit activity of firms in the industry. Given that the least efficient firms exit the market while entering firms are more efficient, it is reasonable to expect that the degree

⁶Beath et al. (1995) identify the two incentives as the 'profit incentive', and the 'competitive threat' or the 'replacement effect'.

of openness will affect productivity through industry evolution in the form of entry and exit.

Industry-level data for the Swedish manufacturing sector between 1980 and 1995 are used in the empirical analysis. The results show that competition in the international market encourages the industries to engage in R&D. The entry and exit activity, measured as the rate of intra-industry job turnover due to exit and entry, has also been higher in economically integrated industries. Contrary to many other studies, the results presented in paper [II] do not support the argument that a higher domestic R&D intensity improves productivity. Instead, it seems as if the degree of openness as a means of providing a basis for technology spillovers is a more significant determinant of the growth rate of total factor productivity. There is also some evidence that plants exiting the market are less productive, implying that such exits will increase the average productivity of the industry.

3 State-local finance

The term fiscal federalism is often used in the theory of state-local finance, where we lend the economic definition of the term federalism from Oates (1972, p. 17):

”A public sector with both centralized and decentralized levels of decision-making in which choices made at each level concerning the provision of public services are determined largely by the demands for these services of the residents of (and perhaps others who carry on activities in) the respective jurisdiction.”

Most modern economies are organized in such a way, that there is more than one level of government. The public sector can play a more or less complex role in society. Musgrave (1959) assigns the public sector three main functions in order for society to obtain a level of welfare that is socially optimal. First, the allocation function of the public sector includes working

towards an efficient use of resources by, for instance, providing public goods, taking actions towards internalizing external effects, and dealing with other market imperfections. Second, in a society with markets operating competitively, the distribution of income will be made according to the possession of factors of production. Introducing value judgements, this distribution will not necessarily be fair. The public sector has a distribution function in which it can redistribute income via the tax and transfer systems. Third, the stabilization function of the public sector deals with both expected and unexpected macroeconomic events, such as business cycle effects, in order to achieve the economy's macroeconomic goals, e.g., a high employment rate, price stability, a high level of income, and economic growth. Paper [III] deals with the first function of the public sector, while paper [IV] touches upon the latter two functions.

3.1 Fiscal externalities

It has been recognized that interactions between governments may give rise to externalities. The provision of public goods in a certain locality may spill over to neighboring localities, giving rise to what is known as a horizontal external effect. The classic reference is Oates (1972). Another example of a horizontal externality is when the tax base is mobile across jurisdictions, which puts a constraint on the extent to which the public sector can finance its expenditures on public goods (see, for instance, Wildasin 1988, 1989, 1991). In both these cases, the central government has a role to play to internalize the horizontal external effect (see the references mentioned above); the allocation function of the public sector.

Governments often use distortionary taxes to finance their expenditures. It was first recognized by Hansson and Stuart (1987) and Johnson (1988) that when two levels of government share a common tax base, the decisions made by one level of government will have an unintended effect on the other level. This situation arises if, say, the local governments do not recognize that their choices of local income tax rates reduce the tax base of the central

government. The literature proposes several ways to resolve the problem. Boadway and Keen (1996) and Boadway et al. (1998) suggest that the central government can internalize the externality by leaving all distortionary income taxation to the local governments, provided that the central government can transfer resources lump-sum between the levels of the public sector. On the other hand, by using an intergovernmental transfer scheme that induces the correct incentives, Aronsson and Wikström (2001) show that it is possible for all levels of government to have a positive income tax rate and still internalize the external effect.⁷ Dahlby (1996) analyzes how to internalize vertical external effects by using commodity taxation. For a general survey of the literature on fiscal external effects, see Keen (1998).

The empirical literature on vertical fiscal interactions and externalities is very limited. Using a panel of OECD countries, Goodspeed (2000a, 2000b) finds that there is a negative relationship between the income tax rates chosen by the local and central governments, also when controlling for horizontal externalities. Besley and Rosen (1998) work with a U.S. data set with information on cigarette and gasoline taxes. Their results show that an increase in federal taxes will induce an increase in the taxes set by the states as well. Thus, the studies show different signs on the relationship between the tax rates of different levels of government. The review by Keen (1998) reports that this contrast is also documented in theoretical studies. More empirical work is therefore important in order to reach a better understanding of vertical external effects.

3.2 Fiscal flows as a means of income risk-sharing

Most economic activities involve risk. One way of dealing with risk is to share it between subjects. It has been recognized that the fiscal system can act as a risk absorber in this sense and provide insurance for those affected.

⁷This is based on the assumption that all governments act as Nash competitors. If, on the other hand, some authority acts as a Stackelberg leader, the socially optimal resource allocation can be sustained by restricting taxation in combination with an intergovernmental transfer system that induces the entities to solve the social optimization problem.

The topic of risk-sharing has been subject to both theoretical and empirical analyses. Lee (1998) poses the question of which level of government should play the role of redistributing income when individuals in a federal system are exposed to random shocks. He finds that the central government may or may not dominate the local government in efficiency of redistribution, depending on mobility. According to Persson and Tabellini (1996a), under certain assumptions about institutional setting, tasks and power should be centralized from the local to the federal government to improve efficiency when there is a trade off between risk-sharing and moral hazard. Institutions are also important when looking at risk-sharing and redistribution. These two are difficult to separate and, as Persson and Tabellini (1996b) point out, when the policy instruments are subject to constraints, there is a trade off between risk-sharing and redistribution. The authors broaden our understanding of how the intergovernmental transfer system works and find that there is a tendency to over- or undersupply risk-sharing among regions, depending on the prevailing institutions.

Lockwood (1999) analyzes risk-sharing arrangements to insure regional governments against shocks to either income, demand for, or cost of a public good. He finds that there is a trade off between risk-sharing and an efficient provision of public goods when there are horizontal external effects. In addition, in the absence of the external effect, it is important to know the origin of the shock in order to be able to implement optimal transfers. In contrast to Lockwood, Aronsson and Wikström (2000) offer a theoretical view of risk-sharing in the presence of vertical external effects. The contribution of their paper is to derive the properties of an intergovernmental transfer system that simultaneously internalizes the vertical external effect and provides risk-sharing among local governments. They find that the degree of risk-sharing will depend on how similar the localities are prior to exposure to productivity shocks.

When studying risk-sharing empirically, there is, as mentioned above, difficulties in distinguishing between risk-sharing and redistribution. Nevertheless, there is an increasing literature on risk-sharing and redistribution.

Researchers have approached the topic by analyzing income and output with the purpose of estimating the extent to which the public sector is involved in providing risk-sharing facilities. The public sector may intervene with the purpose of maintaining economic stability and a certain economic standard; the distribution and the stabilization functions of the public sector.⁸ According to Sala-i-Martin and Sachs (1992) and Bayoumi and Masson (1995) the tax and transfer systems play an important role in income risk-sharing in the U.S. and Canada.⁹ Using a different data set and different estimation methods, von Hagen (1992) reaches the conclusion that the role of the U.S. federal government regarding risk-sharing is more limited than the other two studies claim. It appears as if the extent of risk-sharing that the central government is involved in is an empirical question to settle. In line with the aforementioned theoretical work, Bayoumi and Masson (1995) point out that institutional structure seems to be important here. A more diverse body of case studies does therefore appear as a welcome contribution to the literature.

3.3 Summary of papers [III] and [IV]

Paper [III]: Testing for Vertical Fiscal Externalities

The purpose of this paper is to design and implement a test of whether the vertical external effect associated with tax base sharing among local and regional governments is internalized via the intergovernmental transfer system. The paper contributes to the literature in at least two ways. First, we make a clear distinction between vertical fiscal interactions and vertical fiscal externalities. The former will be present whenever two or more levels

⁸Bayoumi and Masson (1998) analyze the question of which level of government is most effective at providing means of stabilization. Their results, based on Canadian data, show that fiscal stabilizers are more effective at a federal level as opposed to the local level.

⁹Asdrubali et al. (1996) and Mélitz and Zumer (1999) decompose shocks in output and analyze three risk absorbers: the capital market, credit market and tax-transfer system. The results show that the tax-transfer system absorbs approximately 13 percent of the risk.

of government share the same tax base, while the latter arises when one level of government does not internalize the welfare effects it causes the other level when deciding upon the tax rate. Second, by using the theory of optimal taxation we are able to derive empirically testable hypotheses of whether the intergovernmental transfer system, designed by the central government, in fact has served the purpose of inducing the correct incentives for the lower levels of government and thereby internalizing the externalities.

When studying changes in tax rates we need to control for potential horizontal interactions which arise when local public goods spill over to other localities or when the tax base is mobile across jurisdictions. Due to difficulties in empirically accounting for spillover effects we focus on mobility as the source of horizontal interaction. When designing the test, we show that it is important to distinguish between inter-regional and intra-regional mobility.

By solving the social welfare problem, the central government can design an intergovernmental transfer scheme that internalizes the vertical fiscal externalities. In case of inter-regional migration, the use of the transfer scheme induces the local government to respond to an increase in the regional government's tax rate, τ_r , by decreasing its own tax rate, τ_l , in the same proportion, i.e. the slope of the reaction function for the local income tax rate is equal to one; $H_0 : \partial\tau_l/\partial\tau_r = -1$. In case of intra-regional migration, the relation between the two tax rates will be more complicated and in an efficient solution $H_0 : \partial\tau_l/\partial\tau_r = -1 + \Omega$, where Ω can be either positive or negative. The intuition behind the results is that when migration takes place between regions, the regional and local tax rates affect the decision to move in the same way and will therefore cancel out. However, when the tax base is mobile within the same region, the regional tax rate will have no effect on the decision to move, while the local tax rate will induce mobility and therefore also influence the relationship between τ_r and τ_l . In the empirical part of the paper we control for intra-regional migration in order to capture Ω , which means that the null hypothesis simplifies to $H_0 : \partial\tau_l/\partial\tau_r = -1$, which should be tested against an unrestricted alternative.

By using data for the Swedish local and regional public sectors for the period 1981-1990, we estimate the reaction function for the local income tax rate. The results suggest that an increase in the regional income tax rate induces the municipalities in the region to decrease their income tax rates. This is in line with the findings by Goodspeed (2000a, 2000b). Applying the aforementioned test to the data, we find evidence that there are vertical fiscal externalities present between the regional and local governments in their choices of tax rates. We are able to reject the null hypothesis, meaning that the intergovernmental transfer system does not internalize the external effect.

Paper [IV]: Fiscal Flows and Income Risk-Sharing in Sweden

The objective of this paper is to analyze risk-sharing among municipalities in Sweden in terms of how the central government smooths personal income via the tax and transfer systems. The ability of the fiscal flows to insure against different municipal shocks is important in order to secure economic stability and economic standards. The literature emphasizes that institutional structure plays an important role when determining the extent of risk-sharing that the national government is involved in. Most previous empirical studies have used U.S. and Canadian data. So far, there is very limited work done on European countries, where von Hagen and Hepp (2001) is one exception. Therefore, this paper contributes to the literature by extending the country case studies to include Sweden, where the institutional structure, with an outspoken ambition to equalize income and costs across regions, is different from the one in the U.S.

The scope is to estimate the elasticities of the national tax and transfer payments, respectively, with respect to a change in the average personal income among the municipal residents. In a second step, these elasticities are used to estimate the impact on a generalized measure of disposable income of a shock to personal income, where the taxes and transfers are components in the smoothing process. Using a panel of Swedish municipalities for the period 1981-1996, the results show that a one-krona fall in personal income

is mitigated by the fiscal flows so that disposable income decreases by only 67 öre, on average. This is within the range of results on U.S. data by Sala-i-Martin and Sachs (1992) and Bayoumi and Masson (1995); the latter study also includes data on Canada. There are, however, large regional differences, where the effect on disposable income varies between 32 öre in Uppsala county and 78 öre in the county of Kalmar. This means that the national fiscal flows absorb between 22 and 68 percent of an initial shock to personal income. According to the results, the transfer system plays a more important role in the smoothing process than the tax system.

During the 1990s the Swedish national tax and transfer systems have been subject to major reforms. In an attempt to analyze the stability of our estimates with respect to the reforms, a sensitivity analysis is conducted. The results indicate that the reform of the transfer system in 1993 implies more risk-sharing among municipalities, while the results are less conclusive with respect to the tax reform in 1991.

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