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Deliverable 17. Country specific empirical analysis of labour market consequences of competitive pressure

Competitive pressure, labour demand and wage formation in the Bulgarian corporate sector

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1. Introduction

During the course of economic transformation there were major adjustments in the Bulgarian labor market partly reflecting the uneven course of market reforms in Bulgaria. Until 1997 the economy was in disarray: the transformational recession was coupled with macroeconomic and financial instability, industrial decay, massive layoffs and a debt crisis. The need for a massive reallocation of resources and the hardship this entailed for the population were persistent and severe constraints on the degrees of freedom open to policy makers. In 1996-1997, the deepening macroeconomic imbalances escalated into a severe financial crisis combining a crash in public finances, run on the banks and a collapse of the currency, all of which gave rise to a hyperinflationary hike in early 1997. However, the crisis was a turning point in Bulgaria's transition and since that time the situation has changed radically. In terms of economic policy, the emphasis was placed on fast macroeconomic stabilization (based on a currency board arrangement) and acceleration of structural reforms. There was a remarkable turnaround in economic performance: inflation rapidly fell to low single digits, public finances were brought under firm control and the economy grew steadily at a relatively high pace which allowed for the recovery of real incomes and private consumption. However, despite these positive changes, the gains in employment were marginal, reflecting the ongoing process of labor adjustment.

This turbulent period was also one of important changes in the firms' competitive environment. While the opening up and liberalization of domestic markets started already in the early 1990s, coherent competition policies were only implemented after 1997, with the acceleration of the pre-accession process.[1] At the same time there were also significant improvement in the investment climate and business environment. Some important reforms such as privatization, financial reform and the reforms of the main institutional systems advanced fast and, reflecting all these positive changes, FDI finally started flowing into Bulgaria.

This paper seeks to generate some more in-depth insights into the labor adjustment in Bulgaria in the period after 1995, by analyzing some aspects of the adjustment of employment at the firm level. The paper focuses on two important microeconomic aspects of labor adjustment: the changing patterns of firms' labor demand and wage determination at the firm level. The main focus of the paper is empirical, the main research goal being to come up

[1] For details see "Competition Policy in Bulgaria" in WP1-DP (2003)

with some quantitative estimates of the process of labor adjustment in Bulgarian firms in this period. One important aspect of this empirical research is to analyze the role of competitive pressure for the process of labor adjustment in Bulgarian firms during this turbulent transitional period.

The empirical analysis is based on some well established theoretical models relating to labor demand and wage formation at the firm level. The standard theoretical models are then extended to incorporate the effect of different factors of competitive pressure. The equations are estimated using annual data for Bulgarian firms for the period 1997-2001. The empirical results serve as a basis to draw some policy related conclusions about the role of competitive pressure in the ongoing process of labor adjustment.

2. Labor adjustment in the context of economic transformation in Bulgaria

The uneven course and piecemeal nature of Bulgarian reforms in the early phases of transition are reflected in the country's dismal economic performance in this period. With a cumulative GDP decline of some 27% through 1993, Bulgaria experienced one of the most severe transformational recessions among all central and eastern European countries. Only during the first two years of transition (1990-1991) Bulgaria's GDP dropped by almost 20% while gross industrial output fell by 35% (figure 1). Although there were no massive policy-driven layoffs, the output collapse had grave labor market implications, and the first years of transition were marked by an unprecedented deterioration of the situation in the labor market. Thus only between 1989 and 1992 the net job losses in the economy amounted to more than 1 million people, some 23% of the total employment before transition and around 12% of the population. The pool of unemployed (non-existent in the past) was rapidly expanding (figure 2). The most affected segment of the labor market was industrial employment: apart from the open job cuts, many manufacturing firms facing financial difficulties stopped paying wages or paid reduced wages, with considerable delays. Despite the extensive labor shedding, the fall in industrial employment lagged behind that in the industrial output. However, the unemployment statistics for this period may not be quite accurate, as many firms forced part of their workforce to take extended involuntary unpaid leave. Although such persons did not formally qualify as unemployed, de facto they were without a gainful job.

Due to the delays in implementing important reforms, enterprise restructuring in Bulgaria in general was rather slow: the privatization of SOEs started on a larger scale only after 1995 (thanks to the implementation of a mass privatization scheme); the business and

investment climate was not conducive to FDI; there were numerous barriers to firm exit which allowed inefficient, chronic loss-making firms to continue operating as going concerns. This resulted in widespread distorted incentives in the corporate sector (Dobrinsky et al., 2001). In fact, it has been argued (Avramov and Sgard, 1996; Dobrinsky, 2000) that although the transition crisis in Bulgaria resulted in a macroeconomic collapse, its basic roots were microeconomic in nature, resulting from financial indiscipline and the escalation of bad debts and other quasi-fiscal deficits tolerated by the authorities.

In 1997 Bulgaria established a currency board arrangement (CBA) as a "policy of last resort" with the aim to restore macroeconomic stability and impose fiscal and financial discipline (Dobrinsky, 2000). The change in the monetary regime was accompanied by a number of additional measures affecting not only macroeconomic policy but also the institutional environment and the functioning of the financial system. All in all this amounted to a major policy regime change, the most important policy shift during this stage of transition. Indeed, Bulgaria's macroeconomic performance has changed dramatically since 1997. The introduction of the currency board helped to restore macroeconomic and financial stability and economic activity started to recover. There was a sustained recovery in output and a marked upturn in fixed investment reflecting rising investor confidence (figure 1), reversing the trend of previous years. Since 1998 Bulgaria has experienced a period of uninterrupted positive GDP growth, inflation was brought down to low single-digit numbers, real incomes have been rising and the chronic fiscal gap has been closed. The economic upturn was at first mostly driven by the recovery in services while the manufacturing industry was adversely by the ongoing restructuring of loss-making SOEs: the recession in the manufacturing industry continued until 1999. However, thanks to the acceleration of new investment in the manufacturing industry (including a rapid upturn in FDI), manufacturing output also started to recover after 2000.

However, despite the growth of GDP after 1997, employment not only did not start to recover but even continued to decline until 2001 (figure 2). From an aggregated, macroeconomic perspective, there were two main reasons for this. In the first place, despite the dramatic shrinking of employment during the initial years of transition, labor hoarding still was endemic, especially in the remaining SOEs. The acceleration of the process of enterprise restructuring in recent years led to a new wave of labor shedding which by and large offset the modest creation of new jobs. Secondly, the rationalization and modernization of manufacturing and the introduction of new technologies, although modest in scope,

brought about significant productivity gains which, however, implies relatively low labor demand elasticity of output.

In the second half of the 1990s the ownership structure of the Bulgarian corporate sector started to changed rapidly. Between 1995 and 1999 around three quarters of the inherited from the past SOEs were privatized using various schemes (sales to strategic investors, including foreign ones, employee-management buy-outs and voucher privatization). The new entry to the market was also very intensive: tens of thousand of *de novo* firms (mostly small private businesses) came in to existence in this period. A number of previous barriers to firm exit were removed and bankruptcy procedures and liquidations became a normal practice. In particular, a number of unviable SOEs were li1iquidated or restructured after 1997 in the context of an IMF/World Bank-supported program.

During the period of transition, the newly emerging small private sector was the most dynamic part of the economy. This is partly due to legacies of the past but also to some important features of the process of transition from plan to market. First of all, this segment of the business spectrum was virtually non-existent in most centrally planned economies and the filling of this lacuna was a natural supply side response to the opening of market entry. Secondly, the mushrooming of the small private sector was part of the major restructuring and adjustment effort. With the downsizing or closure of inefficient and unviable SOEs, opening a small business was also a survival strategy for many of those that lost their previous jobs.

The small business sector has also been identified as one of the main sources of economic dynamism and new jobs in the transition economies. EBRD (1995) emphasizes the positive spillover effects (or externalities) generated by SMEs: they invigorate markets, encourage product and process innovation and stimulate competition in local markets. On the one hand, the opening up of the local markets for the entry of small private firms provided opportunities for many skilled people to find alternative application of their skills, to improve their career prospects and, ultimately, to increase the return on their human capital. On the other hand, the liberalization of market entry allowed many people who lost their previous jobs to start their own business and thus to take their fate in their own hands. While in this case some of the new entrepreneurs tried to enter a business with a similar profile to what they were doing in the past, mainly relying of accumulated knowledge and skills, others entered totally new business areas, seeking to expand and/or diversify their skills. Many of these firms, especially in the services sectors, are family businesses which provide labour opportunities mainly to the members of the owners' family.

3. Analyzing labor adjustment at the firm level: methodological approaches

In this paper we focus on three main aspects of labor adjustment at the firm level: quantitative assessment of the job flows in the corporate sector; estimation of the firms demand for labor and analysis of wage formation at the firm level.

Analysis of job flows

The quantitative assessment of changes in employment in the Bulgarian corporate sector is based on some commonly used measures of job flows (see e.g. Davis, Haltiwanger and Schuh, 1996 and Davis and Haltiwanger, 1998). Thus *gross job creation* within a group of firms (industry) denotes the total jobs created in firms with growing employment. In turn, *gross job destruction* within the same group is total number of lost jobs in firms with declining employment. From these one can derive *net job creation* (as the difference of the two) and *job reallocation* (which is their sum). Finally, *excess job reallocation* denotes the difference between *job reallocation* and *net job creation*.

The intensity of all these flows is measured by taking their ratio to the level of employment in corresponding groups or categories of firms.

Labor demand models

Conventional models of labor demand treat labor as one of (possibly multiple) factor inputs and relate the quantity of demanded labor input to the desired level of output by the firm. The derivation presumes certain a priori assumptions about the firm's production technology and the cost structure of the factor inputs. For example, under a cost maximizing behavior and if total costs are additively separable in the multiples of cost-minimizing input demands and factor prices, the cost function of the representative firm (throughout this section, firm and time subscripts are omitted in the specification of the corresponding equations) takes the form:

(1) $C = f(c_1, c_2, \ldots, c_n, Q)$

where c_i is the factor price for factor input i and Q is the level of output.

As shown by Konings and Lehmann (2002), in this case the cost-minimizing demand for each of the factor inputs D_i is identical with the partial derivatives f'_i of the cost function with respect to the corresponding factor inputs:

(2) $D_i = f'_i\,(c_1, c_2, \ldots, c_n, Q)$

The log-linear extension of equation (2) provides an expression which is convenient for estimations:

(3) $\log D_i = \alpha_0 + \alpha_1 \log c_1 + \alpha_2 \log c_2 + \ldots + \alpha_n \log c_n + \alpha_{n+1} \log Q + \varepsilon.$

In the case of a conventional two-factor production function with capital and labor as factor inputs, the expression for labor demand of the representative will take the form:

(4) $\log L = \alpha_0 + \alpha_1 \log w + \alpha_2 \log c + \alpha_3 \log Q + \varepsilon,$

where L is labour demand, w is the real cost of unit labor (real wage), c is the real unit (user) cost capital, and Q is real output (value added). To eliminate the possible inference of unobservable idiosyncratic but time invariant factors equation (4) can be estimated in difference form.

While the conventional static labor demand models have a number of attractive features due to their relative simplicity, they fail to take into account the specificity of labour as factor input, the most important of which is its low degree of flexibility. Thus static labor demand models assume instantaneous adjustment of labor with respect to changes in the expected level of output or to changes in relative costs which may not be a realistic assumption. The specificity of labor is that changes in the level of employed labor may involve significant adjustment costs such as severance payments related to separation, recruitment costs, training costs for new employees, etc. Various dynamic labor demand models have been developed to take into account the existence of adjustment costs (Nickell, 1986). For example (see Bresson, Kramarz and Sevestre and Kőrösi, 2001, 2003) propose a specification of the dynamic labor demand model which accounts for dynamic adjustment costs in the form (where subscript t denotes time):

$$(5) \quad \log L_t = \mu \log L_{t-1} + \alpha_0 \log Q_t + \alpha_1 \log Q_{t-1} + \beta_0 \log w_t + \beta_1 \log w_{t-1} + \gamma_0 \log c_t + \\ + \gamma_1 \log c_{t-1} + b + \varepsilon_t$$

where L_t is the labor demand (expressed as number of employees); Q_t is expected output; w_t is the real labor cost and c_t is the real unit capital cost.

In this study we also seek to identify the importance of competitive pressure for the ongoing labor adjustment, hence demand for employed labor, in the corporate sector. For this purpose we augment the standard specification of the dynamic labor demand model (5) with variables characterizing competitive pressure, as well as governance variables with possible competition-related effects, as formulated within the COMPPRESS project, namely:

MS_{it} – the market share of the firm its own market i (e.g. the firm's share in total sales in the corresponding NACE sector, including imports). Market share is in principle an indicator of market power and intended to capture its effect on firms' demand for employed labor. At the same time, market share is also a measure of size and in this sense may capture the effect of other factors, not necessarily related to market power. In addition, it should be born in mind that in a transitional environment, the pure effect of market power (or size) may be distorted due to the effect of transition-specific factors (such as the ongoing enterprise restructuring).

E_t – measure of the export activity of the firm (the share of exports in the firm's total sales or, alternatively, dummy for "actively exporting" firms). Exporting firms are exposed to higher competitive pressure on the international markets which forces them to restructure. At the same time, they can be expected to be more responsive (including in shaping their demand for labor) to changes in their business environment.

F_t – measure of foreign presence in the firm (the share of foreign-controlled firms in the sector's total sales, or a dummy for foreign controlled firms). Foreign presence is assumed to be associated with difference in corporate governance that might have an effect on labour demand.

CO_{it} – measure of the concentration of firms in sector i (in this case defined as the relative standards deviation of firms' sales in the sector). The core strand in the competition literature would suggest higher concentration measure reflects the incidence of monopolistic market power, which might have an effect on the demand for firms' labor.

MP_{it} – the import penetration ratio in sector i (defined over NACE 2- or 3-digit sectors). Higher level of import penetration is usually interpreted as higher level of import competition leading to restructuring. However, an excessive level of import competition may have negative spillovers on firm performance.

Models of wage formation

Similarly to Basu, Estrin and Svejnar (1997, 2004, 2005) our main hypothesis is that firm wages depend on key enterprise characteristics as well as on some structural factors. Our benchmark model of wage formation (excluding structural factors) assumes that wages are primarily driven by productivity in the presence of non-negligible dynamic adjustment effects. It is also assumed that the size of the firm can also have an effect on the process of wage formation.

(6) $$log\ w_t = \alpha_0 + \alpha_1 log\ w_{t-1} + \alpha_2 log\ L_t + \alpha_3 log\ (Q_t / L_t) + \alpha_4 log\ (Q_{t-1} / L_{t-1}) + \varepsilon_t,$$

where the number of employees L_t is taken as a measure of firm size.

This model of wage formation in fact reflects different strands in the related literature such as, on the one hand, the efficiency wage hypothesis claiming that firms pay higher wages in order to attract more productive workers (Akerlof and Yellen, 1986) and, on the other hand, the profit sharing hypothesis assuming that more profitable share some of their profits with workers (Nickell and Wadhwani, 1990). These two models imply different direction of causality; however, in our case we are not interested in the direction of causality but in the association between productivity and wage levels.

In order to take account of structural factors, we augment the benchmark specification with variables characterizing competitive pressure and ownership/governance as defined above, as well as with appropriate additional variables such as:

U_{kt} – rate of unemployment in region k. In the presence of significant heterogeneity in regional unemployment, high levels of the latter can have a strong negative effect on wage demand (see Shapiro and Stiglitz, 1984).

4. Empirical analysis of labor adjustment in the Bulgarian corporate sector

The analysis of labor adjustment in the Bulgarian corporate sector is based on a large economywide sample of firms. The dataset in principle covers all Bulgarian enterprises that report to the National Statistical Institute in accordance with the "double entry" accounting method.[2] However, the analysis of dynamic characteristics requires that firms be traced at least in two adjacent years which is not always possible; due to this a number of entities had to be excluded in the analysis of labor adjustment. The dataset consists of annual balance sheet data for individual enterprises and the time period covered is from 1994/95 to 2001. The full dataset is an unbalanced panel as different number of enterprises have reported in different years. The main components of the individual enterprise records are the annual balance sheets and profit-and-loss accounts of the enterprises. In addition to that the individual enterprise records contain are some supplementary documents with additional annual data, in particular information sheets reporting the employment dynamics.

Tables 1 to 3 present an overview of the actual dataset used for the analysis of labor adjustment. For the purpose of this study the sample was broken down in three types of categories:

1) By broad sectors of economic activity (with manufacturing additionally broken down into five sub-sectors).

2) By size. Three size categories were defined: "small firms" (firms with less than 20 employees); "medium-sized firms" (firms with more than 20 but less than 200 employees) and "large firms" (firms with more than 200 employees).

3) By ownership/governance. Four such categories were defined, as shown in the bottom panels of tables 1 to 3. Firms privatized in the mass privatization were taken as a separate category due to the peculiar governance structure that emerged, in which in most cases investment funds became the dominant owners of these firms. Foreign controlled firms are firms in which foreign owners hold a majority stake and hence they impose their governance method and style. All other private firms are lumped together in the category "Other private domestic".[3]

The figures in these tables demonstrate the significant changes in the ownership structure of the Bulgarian corporate sector in this period, in particular, the declining share of

[2] What is missing in this dataset are individual entrepreneurs and partnerships which are not required to maintain their books in accordance with the double-entry accounting method.

[3] Some of the firms pritavized through mass privatization schemes were subsequently reorganized and are impossible to trace. Such firms then also join the category "Other private domestic".

SOEs and the increasing importance of the de novo private sector (reflected in the last two categories).

Job flows in the Bulgarian corporate sector

Tables 4 and 5 present the main quantitative results characterizing job flows in the Bulgarian corporate sector in the period 1995-2001. The intensities (rates) of different types of job flows introduced in the previous sections were calculated for the three types of firm categories: by sector, by size and by ownership, as well for the whole sample of firms.

The magnitude of the different rates of job creation and destruction as well as of job reallocation presented in table 4 indicates of the considerable volatility of the Bulgarian job market and at the same time suggests significant heterogeneity of the labor adjustment across economic sectors and categories of firms. For the corporate sector as a whole, and for most of the disaggregated categories of firms, both gross job creation and gross job destruction intensified during the period 1995-2001. According to our results, foreign controlled and other domestically owned private firms have contributed the most to gross job creation in this period. Overall, judging from the values of net job creation in the corporate sector as a whole (the third panel of table 4), throughout the period 1995-2001 job destruction prevailed resulting in declining total employment.

Among size categories, net job destruction was the most intensive in small firms, although they also were characterized by the highest gross job creation. These two results reflect, on the one hand, the high intensity of market entry by small firms and, on the other hand, the low survival rate of newly established firms.

The performance differences across ownership categories are indicative of the main direction of the process of labor adjustment and restructuring during the transition. Not surprisingly, the intensity of net job destruction was the highest in SOEs which, being generally inefficient and overstaffed, were subject to a lasting process of downsizing and restructuring. Job destruction in SOEs soared especially after 1997 with the advance of some special restructuring and reorganization programs launched in this period. Net job destruction was also high in mass-privatized firms, partly reflecting a selection bias: The firms that were allotted for mass privatization were often firms that were considered to be difficult to privatize through commercial sales due to inherited inefficiencies. However, the figures for this category may be somewhat distorted by the discontinuities in this sub-sample. The

category of other domestically owned private firms were on the verge of bottoming up in terms of their aggregate level of employment by 2000-2001.

By contrast, (positive) net job creation was the most intensive in the category of foreign controlled firms, which were identified as the most dynamic segment of the corporate sector. However, this outcome was the result of very intensive job reallocation (the fourth panel of table 4), reflecting the high intensity of both gross job creation and gross job destruction in this category). In fact foreign controlled firms together with other private domestically controlled firms, were the ownership categories with most intensive job reallocation.

Net job destruction prevailed in all sectors of economic activity until 2001 when employment started to recover in some industries. The sector of trade was the first to report (positive) net job creation already in 2000.

Table 5 presents some further indicators of the volatility of the process of labour adjustment. The persistence coefficients (of job creation and destruction) presented there reflect the likelihood that once a job is created (destroyed) in one year, it will still exist (be missing) in the following year. The coefficients presented in the table are computed as the shares of jobs created (destroyed) the previous year which still existed (were missing) in the current year, within each category of firms.

The persistence coefficients suggest that on average job creation was much more volatile than job destruction, especially in the immediate aftermath of the 1996-1997 crisis. Thus between 1997 and 1999 only between 50% and 60% of the newly created jobs existed for more than one year. After 2000 job creation has gained in stability with the persistence coefficient for the corporate sector as a whole rising to around 70%. On average the newly created jobs in large firms (among the size categories) and in foreign controlled firms (among the ownership categories, with the exception of the year 1998) were relatively more stable than those in other categories of firms.

By contrast, job destruction is characterized by much higher persistence, both for the corporate sector as a whole and for all categories of firms. That is, once a job is destroyed, it is usually gone for ever. In the period 1999-2001 the average persistence coefficient of job destruction in the corporate sector as a whole was remarkably stable, at slightly above 86%.

The relative positioning of ownership categories in terms of the persistence of job destruction is exactly the opposite to that in terms of the persistence of job creation: the persistence of job destruction in SOEs (as well as of mass privatized firms) is much higher than that in foreign controlled firms. This outcome reflects the fact that the first two

categories of firms were undergoing a process of restructuring and reorganization, often accompanied by downsizing. However, there was no particular difference in the persistence of job destruction across size categories.

Firms' demand for labor: estimation results

We performed a series of estimations of the labour demand model specified in section 3. As the period of estimation was characterized by turbulent structural change (precluding the existence of a stable equilibrium path that could be identified via a panel estimation), the labor demand equation was only estimated for each year of the period 1997-2001 separately. Both the benchmark specification (5) and its augmented version of the equation were estimated; however, for space considerations, in this paper we only present the results for the augmented version of the equation.[4]

In this series of estimations the firms' output Q is defined as real sales. The labour input is defined as the average annual number of employees in each firm. The real labor cost w is the nominal wage deflated by the consumer price index. The cost of capital (used in defining the real unit capital cost c) is taken as the sum of financial costs (mostly interest payments) and the depreciation allowances. However, due to unreliability of the data on the firms' cost of capital, this variable was omitted in most estimations. The competition variables were as defined in section 3.

All variables in the model were treated as endogenous. In view of this and in due to the presence of a lagged dependent variable among the regressors the labor demand equations were estimated using Arellano and Bond GMM estimator via user-written STATA command xtabond2 in levels. The set of instruments includes the lagged values of the model variables (due to this we lose one observation in the estimations which start in 1997). We performed the Hansen's test of overidentifying restrictions to test the validity of the instruments. The significance levels concerning this test are reported in the tables with the estimation results. We report the significance levels corresponding to the test of overidentifying restrictions. Thus "***" signifies that the null hypothesis of the validity of the instruments can be rejected at the 1% significance level; "**" – at the 5% level and "*" – at the 10% level.

A concise summary of the main estimation results for the augmented dynamic labor demand model (by economic sectors and categories of firms) are presented in tables 6 to 10

[4] The estimation results for the benchmark equation are available from the authors upon request.

(for each year between 1997 and 2001). Although the annual estimation results are qualitatively similar, there are also important differences among them (discussed below) which is further evidence of importance structural change in this period. Note that in most cases the results of the overidentification tests tend to reject the validity of the instruments in all estimations for the full sample of firms, as well as those for some categories of firms. This outcome likely reflects the impact of technological heterogeneity among firms from different sectors. An indirect piece of evidence of this is the fact that the model is not rejected in the prevailing number of estimations by sectors of economic activity.

We first review the estimation results in terms of the underlying benchmark model of labour demand (5). In general, these results are in conformity with the main priors of this model. The main explanatory variables (output and labor costs) are in most cases estimated with the correct signs for their current and lagged values (positive for current output and negative for its lagged value; negative for current labour costs and positive for its lagged value). In the prevailing number of cases the corresponding coefficients are estimated as statistically significant.

Notably, the estimation results indicate the incidence of strong dynamics adjustment effects: the coefficient of lagged employment is high in absolute value and was always estimated as statistically significant (in a few cases though it is beyond the plausible range of 1.0). In turn, the changes in some of the estimated coefficients during the estimation period are indicative of the changing firm behavior with respect to labor demand. Thus the coefficients of current and lagged output generally increase in absolute value over time. In the first year (1997) the coefficient of lagged output is statistically insignificant for a number of sectors and firm categories; in the last year (2001) it is statistically significant in all cases. The results for 1997 likely reflect the impact of the significant economic turbulence during the economic crisis which had a highly distorting effect on firm behavior. With the general improvement in the macroeconomic and institutional environment, things were getting back to normal in later years.

Next we look at the effects of competitive pressure on firm's labor demand. As a general observation, the estimation results are somewhat ambiguous and do not point to clear-cut direction of impact. Judging from the estimation results for the full sample of all firms, firms' demand for labor is in general negatively associated with market share and market concentration and positively associated with the intensity of firms' exports, and the corresponding coefficients are in most cases statistically significant. However, when estimating the labor demand equation for sectors and categories of firms, the results often

vary considerably across different groups of firm (as well as over time). This is especially the case with respect to the coefficient of the export variable and, to a lesser extent, that of market concentration. As to the market share variable, the estimation for individual sectors and categories of firms in most cases point to the same negative direction of the effect but the coefficients are not always statistically significant.

Our interpretation of the captured effect of market share on employment demand is that in the estimations when the groups of firms are not sampled by size, this is more likely to be a size-related effect than effect related to market power.[5] It is interesting to point out that in the estimations by size categories this coefficient is in some years positive and statistically significant for the category of large firms. That is, while across all firms the adjustment in employment is likely negatively associated with size, within the category of large firms, relative size has a positive effect on the adjustment of employment.

As to exports, the results provide more evidence in support of the conjecture that exporting firms are more responsive to changing conditions in terms of adjusting the level of employment although there are some categories of firms in which this is not the case. Notably, positive and statistically significant association can be observed in foreign controlled firms for the years after 1999.

The indicator of market concentration is the one that should most closely reflect the incidence of monopolistic (or oligopolistic) market power within segments of the market. The prevailing negative signs of the estimated coefficient can thus be interpreted as a negative effect of monopolistic or oligopolistic market power on labor demand. That is, the incidence of such power makes firms less likely to adjust labor to changing market conditions. It should again be pointed out that the estimation results for some sectors suggest the opposite direction of this effect.

Wage formation in the Bulgarian corporate sector: estimation results

In a similar fashion, we performed a series of annual estimations of the wage equation specified in section 3 estimating both the benchmark specification (5) and various augmented versions.[6]

[5] These can be possible size-specific particularities of the production technology (e.g. firm productivity can differ significantly with size, affecting labor demand) as well as different patterns of labor adjustment to shock in output (e.g. labor adjustment to changing output may be slower in larger than in smaller firms).

[6] In the paper we only present the results for the augmented version of the equation but other estimation results are available from the authors upon request.

Similarly to the labour demand model, we treat all variables in the wage formation model as endogenous and use the Arellano and Bond GMM estimator with lagged values of the model variables used as instruments. Apart from the Hansen's test of overidentifying restrictions we performed the Wald test of joint significance of the coefficients of the augmenting competitive pressure variables (H0:= the coefficients jointly equal 0) in the wage formation model. Similarly to the test of overidentifying restrictions we report the significance levels corresponding to the test of joint significance: "***" signifies that the null hypothesis that the coefficients jointly equal 0 can be rejected at the 1% significance level; "**" – at the 5% level and "*" – at the 10% level.

Tables 11 to 15 contain a concise summary of the main estimation results for the augmented wage formation equation by economic sectors and categories of firms. The test results provide mixed evidence on the validity of the wage formation model. Similarly to the labour demand model the overidentification tests tend to reject the validity of the instruments when the model is estimated for the full sample of firms, as well as those for firm categories; it does not reject only for some economic sectors. By contrast the joint significance test is more often rejected in estimations by sectors whereas it usually not rejected for the sample as a whole and for most ownership categories.

The estimated coefficients of the main explanatory variables in the wage formation variable – the current and lagged values of labor productivity – are always estimated with the correct sign (positive for the current value and negative for the lagged one) and in the prevailing number of cases are statistically significant. It should be noted, however, that the model we use does not allow to analyze in more detail the nature of this association: whether it reflects profit sharing by the firms with their workers, or whether it supports the efficiency wage hypothesis (i.e., is that firms pay higher wages in order to attract more productive workers).

Similarly to the labor demand equation, the estimated coefficients of the lagged wage variable suggest very pronounced dynamic adjustment effects. Notably the estimated coefficients for the years 1997 (abnormally high, and sometimes above the plausible level of 1.0) and 1998 (abnormally low) were probably distorted by the overall economic turbulence during the crisis and its aftermath. In the years after 1999 the values of the estimated coefficients tend to stabilize and these values are probably more reliable estimates of the strength of the dynamic adjustment effect.

We now turn to the effects of competitive pressure on wage formation in the corporate sector. In the specification of the wage formation equation we have the possibility to

differentiate between the effect of size proper (through the absolute level of employment L_t) and relative size, or market power, (through the market share variable MS_{it}). According to the annual estimation results, there is no clearcut evidence about the direction of the effect of size proper on wage formation. The results for both for the full sample of all firms, and the results for different sectors and categories of firms are unstable over time, not only in terms of their value but also in terms of the signs of the estimated coefficients. Most of the estimated coefficients are not statistically significant.

As to the effect of market power, the estimation results (especially the results for the sample as a whole but also those for the prevailing number of sectors and categories of firms) tend to hint at a positive direction of this effect. This outcome suggests that firms with strong market positions are more likely to pay higher wages to their employees. Again it is difficult to make definitive conclusions about the nature of this association (profit sharing or efficiency wages), however it is more likely that profit sharing may prevail in firms where workers have stronger bargaining power (e.g. SOEs) or in firms where profit sharing incentives are inherent feature of the governance structure (such as small family-owned private firms). By contrast, efficiency wages are more likely in firms with rigorous corporate governance (such as foreign controlled firms).

Similarly to market share, the estimation results suggest positive association between the intensity of export activity and the firms' wage levels. In this case, given the fact that exporting firms are exposed to stronger competitive pressure than non-exporting ones, forcing them to rationalize their cost structure, this positive association is more likely to reflect wage behavior which is consistent with the efficiency wage hypothesis. The fact that the estimated coefficient of the export variable for the ownership categories SOEs and mass privatized firms (the firms with weakest corporate governance) are statistically significant, and even negative in some cases provide indirect evidence in support of this conjecture.

Similarly to the outcome concerning size, the estimation results do not provide clear evidence about the direction of the effect of market concentration on wage formation. The results are unstable over time both in terms of their value and in terms of the signs of the estimated coefficients and many of the estimated coefficients are not statistically significant. The same outcome holds for the dummy denoting foreign control.

The most unexpected and counterintuitive outcome in the estimation of the wage equation are the estimated coefficients of the regional unemployment variable. The rationale for its inclusion in the augmented wage equation was the assumption that high levels of regional unemployment may have a depressing effect on wage demand by workers in firms

located in the corresponding regions. What is surprising is that while there is a significant degree of heterogeneity in the estimated coefficients, in many cases (including the estimated coefficients for the full sample of firms) tend to suggest exactly the opposite association: high levels of regional unemployment tend to be associated with higher wages. We have no logical interpretation of this outcome and obviously this is an issue that merits further research.

6. Concluding remarks

In this paper we analyze some aspects of the process of labor adjustment, including the effects of competitive pressure, in the Bulgarian corporate sector in the period 1996-2001. This assessment presented in the paper includes: 1) quantitative assessment of the main trends in the job flows in different sectors of economic activity and categories of firms; 2) econometric analysis of firms' labor demand behavior; 3) econometric analysis of firms' wage formation behavior.

The quantitative assessment of the different types of job flows tend to provide strong evidence in support of the conjecture that the private sector was the main source of job creation in during the period we analyze. More specifically, among the various categories of private firms, it is the foreign controlled firms that clearly emerge as the leading category in terms of net job creation. As to the other categories of private firms, they are characterized by significant volatility in their job flows: while they do create (on a gross basis) many new jobs, at the same time they also destroy many jobs, partly due to low survival rates of the firms (and hence of the jobs), especially what concerns start-up businesses. In contrast, what is specific about job creation in foreign controlled firms is the fact that these jobs are featured by higher survival rates. SOEs are on the other end of the spectrum: throughout the analyzed time period they were characterized by intensive net job destruction. These outcomes are in conformity with the expectations about the nature of the ongoing process of economic restructuring and labor adjustment during the transition from plan to market.

Overall, the econometric analysis of some feature of labor adjustment in the Bulgarian corporate sector suggests that Bulgarian firms in this period increasingly displayed features of market oriented behavior, especially after the 1996-1997 economic crisis. In general, judging from the results concerning the underlying theoretical models of labor demand and wage formation, the estimated behavioral characteristics of Bulgarian firms with respect to labor adjustment are consistent with the behavior of profit maximizing firms in a market

environment. As a word of caution, the tests of the econometric models that we performed suggest a high degree of instability of the estimation results.

The empirical results of our econometric analysis suggest that both labor demand and wage formation in Bulgarian firms are consistent with some standard theoretical models of firm behavior. Notably, the estimation highlights the importance of dynamic adjustment in shaping firms behavior both with respect to labor demand and with respect to wage formation. At the same time, the annual estimation of the model parameters reveals considerable instability in the firms' behavioral pattern, especially during and in the immediate aftermath of the 1996-1997 economic crisis. Towards the end of the estimation period (in 2000 and 2001) the distorting effect of the crisis appears to have diminished considerably.

One particular aspect of our empirical exercise is devoted to the analysis of the effect of competitive pressure on the process of labour adjustment in Bulgarian firms. In this part of our study we pay special attention to the heterogeneity of our sample of firms which includes firms from different sectors of economic activity and different ownership categories; size is another factor that affects firm behavior. Indeed, the econometric results provide comprehensive and convincing evidence that the effects of competitive pressure on the process of labor adjustment can vary substantially across different categories of firms.

Judging from the results concerning both labor demand and wage formation, the process of labor adjustment in firms that survive and prosper under intensive competitive pressure (such as exporting firms) and in firms where corporate governance is more rigorous (such as foreign controlled firms) is consistent with the behavior of firms maximizing profit under market conditions. Thus exporting firms are more responsive in adjusting the level of their employment to change in market conditions. Wage formation in both exporting firms and foreign controlled firm seems to be consistent with the efficiency wage hypothesis, namely that that these firms may be willing to pay higher wages in order to attract more productive workers.

According to our results, market power has a distorting effect of on firm behavior both with respect to wage formation and with respect to labor demand. On the one hand, the incidence of such power makes firms less likely to adjust labor to changing market conditions. On the other hand, firms with strong market positions are more likely to pay higher wages to their employees, and in some cases (e.g. SOEs) this likely reflects profit sharing driven by strong bargaining power of the workers.

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Table 1. Number of firms by sectors of economic activity and type of firms

Sector/type firms	1995	1996	1997	1998	1999	2000	2001
All firms	9004	16079	20825	25506	23348	27641	31141
Agriculture	2407	2655	2923	1963	1584	1767	1864
Mining, Energy	107	98	124	144	139	197	203
Manufacturing	2596	4298	5210	5994	5864	6476	6948
- Engineering	537	968	1123	1295	1228	1323	1433
- Chemical Industry	198	403	510	558	536	615	621
- Food Industry	741	1121	1387	1573	1500	1567	1589
- TCF	465	748	907	1027	1067	1210	1346
- Other Industries	115	111	142	159	154	212	215
Construction	711	1318	1768	2346	2149	2337	2575
Trade	2217	5686	7974	10845	9490	11222	12618
Other services	966	2024	2826	4214	4122	5642	6933
Small	4048	10105	14265	18534	16383	19684	22635
Medium	4272	5228	5821	6285	6295	7155	7663
Large	684	746	739	687	670	802	843
SOE	1782	1688	1505	1361	929	1219	1303
Mass privatized domestic	779	761	782	757	818	732	633
Other private domestic	6240	13002	17658	22163	20338	24166	27447
Foreign controlled	203	628	880	1225	1263	1524	1758

Table 2. Breakdown of sales by sectors of economic activity and type of firms (% of total)

Sector/type firms	1995	1996	1997	1998	1999	2000	2001
All firms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	5.3	4.3	4.7	4.3	3.7	2.5	2.2
Mining, Energy	7.8	9.0	10.4	3.9	2.7	11.0	12.1
Manufacturing	55.2	43.7	42.2	34.6	30.4	32.2	24.7
- Engineering	10.3	8.0	6.6	7.7	6.4	4.7	3.8
- Chemical Industry	12.0	9.3	7.5	4.8	4.5	4.7	3.2
- Food Industry	15.1	11.5	10.5	13.1	12.3	7.5	5.2
- TCF	6.3	4.7	4.1	4.4	3.9	2.7	2.2
- Other Industries	11.6	10.3	13.5	4.6	3.3	12.5	10.2
Construction	3.6	3.0	3.6	5.8	6.0	4.6	5.1
Trade	18.1	30.2	31.0	41.2	44.1	39.2	42.3
Other services	10.1	9.7	8.1	10.2	13.1	10.5	13.7
Small	8.2	14.1	14.0	23.9	25.7	19.3	20.5
Medium	25.3	28.8	29.8	38.4	40.5	29.8	32.4
Large	66.5	57.1	56.1	37.7	33.7	51.0	47.1
SOE	36.0	34.0	28.1	19.0	13.8	19.1	21.8
Mass privatized domestic	11.7	9.6	7.5	8.5	8.3	4.9	4.2
Other private domestic	43.7	42.1	50.8	58.1	61.2	58.9	54.1
Foreign controlled	8.7	14.3	13.6	14.3	16.7	17.1	19.8

Table 3. Breakdown of employment by sectors of economic activity and type of firms (% of total)

Sector/type firms	1995	1996	1997	1998	1999	2000	2001
All firms	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	9.9	9.0	9.6	7.8	7.4	5.8	4.8
Mining, Energy	7.0	7.2	8.8	4.7	3.9	9.9	8.6
Manufacturing	51.1	53.1	47.6	48.5	47.5	41.9	40.2
- Engineering	15.9	17.0	12.8	14.2	12.9	9.1	9.0
- Chemical Industry	6.5	6.4	5.4	5.2	5.2	4.6	4.1
- Food Industry	8.5	8.8	8.1	9.8	10.1	6.8	6.3
- TCF	11.9	12.5	11.6	13.7	14.7	11.3	12.0
- Other Industries	8.3	8.3	9.7	5.6	4.6	10.1	8.8
Construction	7.5	6.6	7.6	8.8	9.1	7.5	7.6
Trade	7.6	10.4	11.3	14.2	15.0	14.4	15.8
Other services	16.9	13.6	15.2	15.9	17.1	20.6	23.0
Small	7.9	11.3	13.5	15.9	15.9	14.4	14.4
Medium	36.4	36.8	35.9	41.7	42.5	38.2	38.5
Large	55.7	51.9	50.6	42.3	41.6	47.4	47.2
SOE	40.4	33.6	30.3	22.4	18.9	23.9	23.4
Mass privatized domestic	14.6	13.5	12.3	13.8	14.1	9.7	8.1
Other private domestic	39.8	45.7	50.8	55.7	58.1	56.9	57.4
Foreign controlled	5.2	7.2	6.5	8.2	9.0	9.5	11.0

Table 4. Rates of job creation and destruction by sector and type of firms (%)

Sector/type firms	1995	1996	1997	1998	1999	2000	2001
Job creation							
All firms	4.0	6.1	5.7	8.9	9.1	11.1	10.7
Agriculture	11.9	12.2	12.5	10.4	19.0	8.8	8.4
Mining, Energy	1.8	6.5	1.1	1.9	1.9	4.3	6.4
Manufacturing	3.5	4.4	4.4	8.7	6.8	7.8	9.1
- Engineering	3.3	5.1	2.0	8.8	5.7	6.9	6.2
- Chemical Industry	2.3	2.7	3.5	3.5	4.3	6.5	7.9
- Food Industry	5.9	5.9	8.0	10.7	10.2	8.9	12.1
- TCF	3.9	3.6	7.8	9.4	7.6	8.5	12.2
- Other Industries	1.8	6.5	1.1	1.8	1.9	4.2	6.4
Construction	4.7	6.2	5.7	11.4	11.4	10.1	13.8
Trade	3.8	8.5	6.2	11.1	13.4	17.2	18.3
Other services	1.9	7.0	8.4	7.9	8.8	17.1	9.8
Small	6.6	10.1	14.3	12.9	15.4	17.2	13.5
Medium	5.0	7.1	7.2	11.2	10.4	13.1	13.2
Large	3.1	4.9	2.9	5.7	5.5	7.0	8.1
SOE	2.6	5.0	2.8	3.3	4.5	3.8	5.6
Mass privatized domestic	4.1	3.2	3.0	10.0	3.5	3.5	4.6
Other private domestic	5.5	8.2	8.9	10.4	11.7	14.3	12.1
Foreign controlled	3.3	5.7	2.9	12.9	12.2	16.5	20.4
Job destruction							
All firms	7.6	7.5	11.6	14.0	15.1	13.3	11.1
Agriculture	21.6	12.9	14.9	14.8	14.1	20.3	14.9
Mining, Energy	2.9	0.7	3.9	5.8	4.3	9.4	11.7
Manufacturing	5.0	5.6	10.9	9.6	14.4	12.9	8.7
- Engineering	6.4	6.1	13.9	12.5	18.8	15.9	12.0
- Chemical Industry	2.1	2.2	4.8	5.3	9.3	13.8	7.6
- Food Industry	7.7	7.4	13.4	13.4	14.3	15.7	11.3
- TCF	4.1	6.8	10.4	8.1	11.1	11.3	5.5
- Other Industries	3.0	0.8	4.0	5.9	4.6	9.4	11.8
Construction	11.4	19.6	17.4	28.1	16.4	14.8	13.3
Trade	13.2	13.9	15.8	19.5	18.1	13.7	11.0
Other services	6.5	6.4	10.6	17.8	16.8	11.5	14.2
Small	21.3	21.3	23.3	32.1	27.5	22.2	21.5
Medium	11.9	10.2	15.0	14.5	16.6	13.3	12.7
Large	3.7	3.9	6.7	7.9	9.3	10.2	7.2
SOE	7.3	6.1	7.3	10.3	10.2	11.2	11.2
Mass privatized domestic	6.1	6.0	15.2	8.0	17.2	14.7	9.3
Other private domestic	9.3	10.0	13.6	17.9	16.5	14.2	12.2
Foreign controlled	2.7	3.2	9.0	9.1	13.0	9.0	7.6
Net job creation							
All firms	-3.7	-1.5	-5.8	-5.1	-6.1	-2.1	-0.4
Agriculture	-9.7	-0.6	-2.4	-4.4	4.9	-11.6	-6.5
Mining, Energy	-1.1	5.8	-2.8	-3.9	-2.4	-5.1	-5.3
Manufacturing	-1.5	-1.2	-6.4	-0.9	-7.7	-5.1	0.4
- Engineering	-3.1	-1.0	-11.9	-3.8	-13.1	-9.0	-5.8
- Chemical Industry	0.2	0.5	-1.2	-1.8	-5.0	-7.4	0.3
- Food Industry	-1.8	-1.5	-5.4	-2.6	-4.1	-6.8	0.8
- TCF	-0.2	-3.1	-2.7	1.3	-3.6	-2.8	6.7
- Other Industries	-1.1	5.7	-2.9	-4.1	-2.6	-5.1	-5.3
Construction	-6.7	-13.4	-11.7	-16.7	-5.0	-4.7	0.5
Trade	-9.5	-5.4	-9.6	-8.4	-4.8	3.5	7.3
Other services	-4.6	0.6	-2.2	-9.9	-8.0	5.6	-4.4
Small	-14.8	-11.3	-8.9	-19.3	-12.1	-5.0	-8.0
Medium	-6.9	-3.0	-7.8	-3.3	-6.2	-0.1	0.4
Large	-0.6	0.9	-3.9	-2.2	-3.8	-3.2	0.9
SOE	-4.7	-1.1	-4.5	-7.0	-5.7	-7.5	-5.6
Mass privatized domestic	-2.0	-2.8	-12.2	2.0	-13.7	-11.2	-4.7
Other private domestic	-3.8	-1.8	-4.7	-7.5	-4.7	0.1	-0.1
Foreign controlled	0.6	2.5	-6.0	3.8	-0.9	7.5	12.9

Table 4. Rates of job creation and destruction, continued

Sector/type firms	1995	1996	1997	1998	1999	2000	2001
Job reallocation							
All firms	11.6	13.6	17.3	22.9	24.2	24.4	21.9
Agriculture	33.5	25.1	27.3	25.1	33.1	29.1	23.3
Mining, Energy	4.8	7.1	5.1	7.7	6.2	13.7	18.2
Manufacturing	8.5	10.0	15.3	18.3	21.2	20.7	17.8
- Engineering	9.7	11.3	15.9	21.3	24.5	22.9	18.2
- Chemical Industry	4.4	4.8	8.3	8.8	13.6	20.3	15.5
- Food Industry	13.6	13.4	21.4	24.1	24.5	24.7	23.4
- TCF	8.0	10.4	18.2	17.5	18.7	19.8	17.8
- Other Industries	4.8	7.3	5.1	7.8	6.5	13.6	18.2
Construction	16.1	25.8	23.1	39.5	27.8	24.9	27.1
Trade	17.0	22.4	22.1	30.6	31.5	30.9	29.4
Other services	8.3	13.4	19.0	25.7	25.6	28.6	24.1
Small	27.9	31.4	37.6	45.0	42.9	39.3	35.0
Medium	17.0	17.3	22.2	25.7	27.0	26.4	25.9
Large	6.8	8.8	9.6	13.6	14.8	17.2	15.3
SOE	10.0	11.1	10.1	13.6	14.7	15.0	16.7
Mass privatized domestic	10.2	9.2	18.1	17.9	20.7	18.1	13.8
Other private domestic	14.8	18.2	22.4	28.4	28.2	28.4	24.3
Foreign controlled	5.9	8.9	11.9	21.9	25.2	25.5	28.0
Excess job reallocation							
All firms	7.9	12.2	11.5	17.9	18.1	22.3	21.5
Agriculture	23.9	24.5	24.9	20.7	28.2	17.5	16.8
Mining, Energy	3.6	1.3	2.2	3.8	3.8	8.6	12.9
Manufacturing	7.0	8.8	8.9	17.4	13.6	15.6	17.4
- Engineering	6.6	10.3	4.1	17.5	11.4	13.9	12.4
- Chemical Industry	4.2	4.3	7.1	6.9	8.6	12.9	15.2
- Food Industry	11.9	11.9	16.0	21.5	20.4	17.9	22.6
- TCF	7.8	7.3	15.6	16.2	15.1	17.0	11.1
- Other Industries	3.7	1.6	2.2	3.7	3.9	8.5	12.8
Construction	9.4	12.3	11.4	22.9	22.9	20.2	26.6
Trade	7.5	17.0	12.5	22.2	26.7	27.5	22.1
Other services	3.7	12.9	16.8	15.8	17.6	23.0	19.7
Small	13.1	20.1	28.7	25.7	30.8	34.3	26.9
Medium	10.1	14.3	14.5	22.4	20.8	26.2	25.5
Large	6.1	7.8	5.8	11.4	11.0	14.0	14.3
SOE	5.3	10.0	5.6	6.6	9.0	7.5	11.1
Mass privatized domestic	8.2	6.3	5.9	15.9	7.0	6.9	9.1
Other private domestic	11.0	16.4	17.7	20.9	23.5	28.3	24.2
Foreign controlled	5.3	6.4	5.8	18.1	24.4	18.0	15.1

Table 5. Persistence of job creation and destruction by sector and type of firms (%)

Sector/type firms	1996	1997	1998	1999	2000	2001
Job creation						
All firms	66.4	61.1	53.0	59.3	67.9	69.4
Agriculture	67.2	55.4	43.1	50.8	51.8	51.1
Mining, Energy	89.6	51.9	67.1	77.0	69.1	82.3
Manufacturing	67.7	62.8	70.1	60.8	68.5	79.2
- Engineering	52.9	65.3	50.7	55.2	53.2	77.9
- Chemical Industry	61.5	72.1	73.8	64.2	79.9	74.1
- Food Industry	66.7	57.6	55.6	68.5	66.6	79.6
- TCF	72.1	66.6	80.5	66.7	75.8	83.4
- Other Industries	87.9	52.7	66.9	77.0	68.9	82.2
Construction	43.3	50.1	48.3	57.4	65.6	63.5
Trade	67.9	67.1	53.6	62.3	75.9	71.7
Other services	59.2	70.5	27.2	52.8	67.0	59.1
Small	53.9	45.4	26.8	50.4	61.6	53.9
Medium	68.0	55.5	55.2	59.7	67.2	70.1
Large	67.5	70.9	76.2	64.7	75.2	80.7
SOE	70.0	62.6	64.7	50.6	60.5	76.8
Mass privatized domestic	71.9	54.6	67.7	54.1	61.7	62.3
Other private domestic	61.5	60.7	48.3	62.8	68.3	67.9
Foreign controlled	81.2	69.1	74.0	54.5	73.7	76.8
Job destruction						
All firms	82.3	83.8	75.3	86.5	86.2	86.9
Agriculture	82.9	76.3	81.0	83.7	83.3	83.9
Mining, Energy	60.0	77.8	91.7	91.9	85.0	94.8
Manufacturing	83.8	83.0	64.8	83.2	91.0	88.9
- Engineering	80.6	93.6	61.0	76.8	92.3	94.0
- Chemical Industry	75.5	85.5	92.1	88.7	88.6	93.2
- Food Industry	81.9	86.3	73.4	80.8	92.3	86.0
- TCF	89.6	65.2	56.8	91.4	90.6	84.7
- Other Industries	61.2	81.5	91.8	91.4	86.3	94.9
Construction	84.4	91.9	78.1	89.2	88.6	81.7
Trade	91.7	91.6	90.2	90.0	82.4	84.0
Other services	68.7	79.8	86.7	86.8	78.6	87.3
Small	88.7	87.0	88.3	90.6	84.5	86.2
Medium	86.4	84.4	77.5	85.1	82.9	84.8
Large	70.1	80.9	62.3	82.2	93.4	89.7
SOE	76.8	82.5	91.9	90.7	89.9	93.7
Mass privatized domestic	85.2	84.1	56.0	82.8	93.4	91.5
Other private domestic	84.6	84.2	81.3	86.8	83.0	84.8
Foreign controlled	81.5	83.1	52.7	82.0	85.6	79.7

Table 6. Augmented labor demand equation, estimation results for 1997

Dependent variable: number of employees (in log)

Sector/type firms	Constant	Log lagged employment	Log production	Log lagged production	Log labor cost	Log lagged labor cost	Market share	Export share	Market concentration (rel. std. deviation of sales)	Overidentif. test	No. obs.
All firms	-1.992 ***	0.654 ***	0.307 ***	-0.071 ***	-0.054 ***	0.266 ***	-0.051	0.165 ***	-0.013 ***	13.010 ***	12234
Agriculture	-1.434 ***	0.608 ***	0.412 ***	-0.145 ***	-0.298 ***	0.342 ***	0.896 **	0.244	-0.004	12.138 ***	2284
Mining, Energy	-0.669	1.325 ***	0.180	-0.092	-0.593 ***	0.178	-0.780	1.104	-0.054	2.925	88
Manufacturing	-2.088 ***	0.612 ***	0.350 ***	-0.022	-0.131 ***	0.182 ***	-0.241 *	0.474 ***	0.023 *	11.742 ***	3250
- Engineering	-1.510 **	0.732 ***	0.342 ***	-0.084	-0.202 ***	0.198 ***	-0.184	-0.140	-0.018	5.791	585
- Chemical Industry	-2.233	0.688 ***	0.342 **	0.000	-0.135	0.108	-0.646	0.008	0.042	1.605	271
- Food Industry	-2.793 ***	0.437 ***	0.420 ***	0.028	-0.203 ***	0.191 ***	-0.173	0.184	0.118 *	2.730	745
- TCF	-0.600	0.883 ***	0.332 ***	-0.243 **	-0.161 ***	0.166 *	-0.075	0.192 *	0.099 *	2.577	514
- Other Industries	-0.827	1.128 ***	0.386 **	-0.173	-0.777 ***	0.348	-0.692	0.754	-0.171	2.955	85
Construction	-0.962	0.880 ***	0.272 ***	-0.136	-0.156 ***	0.153 **	0.155	-0.277	-0.006	1.741	926
Trade	-1.731 ***	0.656 ***	0.223 ***	-0.103 ***	0.088 **	0.305 ***	-0.129	-0.039	-0.002	2.249	4463
Other services	-2.122 ***	0.637 ***	0.352 ***	-0.072	-0.072 **	0.257 ***	-0.384	-0.300 *	0.010	3.726	1223
Small	-1.405 ***	0.558 ***	0.242 ***	-0.049 *	-0.029	0.191 ***	-0.248	-0.028	-0.016 ***	6.844 *	6803
Medium	0.666 *	0.403 ***	0.214 ***	-0.109 ***	-0.089 ***	0.234 ***	0.286	0.319 ***	0.006	14.107 ***	4682
Large	2.215	0.356	0.337 ***	-0.135	-0.371 ***	0.184 *	0.421	0.238 **	0.002	3.131	749
SOE	-0.658 ***	0.654 ***	0.529 ***	-0.285 ***	-0.584 ***	0.493 ***	0.096	0.068	-0.010 ***	7.322 *	1785
Mass privatized domestic	-0.830	0.583 ***	0.534 ***	-0.180 **	-0.442 ***	0.188 ***	0.053	0.313 ***	0.002	9.328 **	615
Other private domestic	-2.166 ***	0.632 ***	0.309 ***	-0.042	-0.050 ***	0.249 ***	-0.239	0.175 ***	-0.015 ***	7.388 *	9423
Foreign controlled	0.818	1.083 ***	0.078	-0.308 ***	0.140	0.212 **	-0.028	-0.224	-0.023	0.503	411

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 7. Augmented labor demand equation, estimation results for 1998

Dependent variable: number of employees (in log)

Sector/type firms	Constant	Log lagged employment	Log production	Log lagged production	Log labor cost	Log lagged labor cost	Market share	Export share	Market concentration (rel. std. deviation of sales)	Overidentif. test	No. obs.
All firms	-2.509 ***	0.626 ***	0.382 ***	-0.126 ***	0.101 ***	0.209 ***	-0.046	-0.083 **	-0.010 ***	86.048 ***	14786
Agriculture	-1.767 ***	0.627 ***	0.511 ***	-0.128 ***	-0.314 ***	0.215 ***	-0.165	-0.357 **	-0.132 **	2.519	1537
Mining, Energy	-2.575 ***	0.455 ***	0.706 ***	-0.310 **	-0.224 **	0.435 ***	-0.300	-0.128	0.016	8.929	100
Manufacturing	-2.584 ***	0.551 ***	0.439 ***	-0.196 ***	0.187 **	0.254 ***	-0.061	0.207 ***	0.023	21.059 ***	3838
- Engineering	-3.390 ***	0.630 ***	0.648 ***	-0.269 ***	-0.055	0.326 ***	-0.769	-0.093	0.004	25.418 ***	641
- Chemical Industry	-2.832	0.686 ***	0.836 ***	-0.168	-0.744 ***	0.146 ***	-1.634 *	-0.567	-0.020	9.310	313
- Food Industry	-2.023 ***	0.585 ***	0.474 ***	-0.083	-0.298 ***	0.152 ***	-0.477	-0.116	0.086 ***	2.890	937
- TCF	-1.120 *	0.723 ***	0.631 ***	-0.317 ***	-0.524 ***	0.296 ***	-0.410	0.044	0.125 ***	12.015 *	572
- Other Industries	-2.653 ***	0.458 ***	0.696 ***	-0.299 **	-0.226 **	0.447 ***	-0.240	-0.520 *	0.014	8.649	99
Construction	-2.885 ***	0.581 ***	0.554 ***	-0.205 ***	-0.005	0.277 ***	-2.572 ***	-0.228	-0.007	1.928	1371
Trade	-1.427 ***	0.692 ***	0.252 ***	-0.147 ***	0.140 ***	0.161 ***	-0.026	-0.219 ***	-0.007 *	54.088 ***	6153
Other services	-2.212 ***	0.613 ***	0.548 ***	-0.230 ***	-0.076	0.241 ***	-0.474	-0.469 ***	-0.015 *	11.770 *	1787
Small	-0.855 ***	0.478 ***	0.231 ***	-0.124 ***	0.075 **	0.159 ***	0.329	-0.161 ***	-0.003	33.891 ***	9426
Medium	-0.035	0.333 ***	0.326 ***	-0.120 ***	-0.058	0.203 ***	-0.002	0.097 **	-0.001	24.965 ***	4690
Large	1.707 ***	0.634 ***	0.352 ***	-0.283 ***	-0.357 ***	0.279 ***	0.304 **	0.204 ***	0.001	13.697 **	670
SOE	-0.405	0.486 ***	0.537 ***	-0.158 ***	-0.662 ***	0.386 ***	0.415 ***	-0.006	-0.010 *	13.896 **	1464
Mass privatized domestic	-1.535 ***	0.583 ***	0.635 ***	-0.247 ***	-0.519 ***	0.378 ***	-0.303	0.183 *	0.005	21.361 ***	626
Other private domestic	-2.283 ***	0.623 ***	0.381 ***	-0.123 ***	0.049	0.196 ***	-0.012	-0.126 ***	-0.011 ***	58.490 ***	12098
Foreign controlled	-2.955 ***	0.705 ***	0.356 ***	-0.067	0.140	0.119 **	-0.887	0.071	-0.031 **	4.325	598

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 8. Augmented labor demand equation, estimation results for 1999

Dependent variable: number of employees (in log)

Sector/type firms	Constant	Log lagged employment	Log production	Log lagged production	Log labor cost	Log lagged labor cost	Market share	Export share	Market concentration (rel. std. deviation of sales)	Overidentif. test	No. obs.
All firms	-1.747 ***	0.713 ***	0.390 ***	-0.161 ***	-0.301 ***	0.420 ***	-0.366 ***	0.041 *	-0.013 ***	34.674 ***	16517
Agriculture	-1.259 **	0.804 ***	0.543 ***	-0.232 ***	-0.700 ***	0.520 ***	-0.866 **	0.380	-0.287 ***	12.692	1055
Mining, Energy	-1.830 ***	0.664 ***	0.483 ***	-0.270 ***	0.094	0.203 ***	-0.263	-0.291	-0.230 **	16.794 *	110
Manufacturing	-1.695 ***	0.671 ***	0.462 ***	-0.139 ***	-0.453 ***	0.387 ***	-0.571 ***	0.163 ***	0.018	12.171	4323
- Engineering	-2.071 **	0.697 ***	0.420 ***	-0.145 *	-0.226	0.340 ***	-0.193	-0.101	-0.022	24.827 ***	753
- Chemical Industry	1.481	1.031 ***	0.264 *	-0.488 *	-0.275	0.416 ***	0.911	0.479	-0.010	5.197	353
- Food Industry	-1.426 ***	0.637 ***	0.523 ***	-0.237 ***	-0.527 ***	0.458 ***	0.133	-0.245 **	0.075 ***	3.264	970
- TCF	-0.539	0.804 ***	0.482 ***	-0.342 ***	-0.338 ***	0.324 ***	-0.364	0.149 **	0.077 *	13.190	686
- Other Industries	-1.129 **	0.818 ***	0.490 ***	-0.422 ***	-0.113	0.409 ***	-0.092	-0.211	-0.123	14.562	106
Construction	-2.154 ***	0.684 ***	0.467 ***	-0.161 ***	-0.243 **	0.332 ***	-1.387 **	0.179	-0.036	6.602	1617
Trade	-1.845 ***	0.695 ***	0.312 ***	-0.125 ***	-0.182 ***	0.404 ***	-1.185 ***	-0.292 ***	-0.011 ***	24.101 ***	6902
Other services	-2.649 ***	0.608 ***	0.536 ***	-0.158 ***	-0.339 ***	0.459 ***	-1.189 ***	-0.416 ***	-0.010	6.595	2510
Small	-1.328 ***	0.617 ***	0.334 ***	-0.143 ***	-0.274 ***	0.394 ***	-0.759 ***	-0.201 ***	-0.007 **	24.062 ***	11157
Medium	-0.082	0.498 ***	0.316 ***	-0.161 ***	-0.172 ***	0.284 ***	-0.104	0.259 ***	-0.011 **	12.126	4779
Large	1.391	0.247 *	0.251 **	-0.046	-0.231	0.356 ***	-0.009	0.261 ***	-0.022	10.139	581
SOE	-0.998 ***	0.700 ***	0.590 ***	-0.283 ***	-0.698 ***	0.550 ***	-0.388 ***	-0.301 ***	-0.057 ***	27.430 ***	1014
Mass privatized domestic	-1.102 ***	0.814 ***	0.504 ***	-0.334 ***	-0.501 ***	0.512 ***	-0.151	0.188 ***	-0.009	13.132	739
Other private domestic	-1.615 ***	0.699 ***	0.382 ***	-0.149 ***	-0.320 ***	0.403 ***	-0.364 **	0.006	-0.014 ***	30.860 ***	13919
Foreign controlled	-1.181 *	0.772 ***	0.380 ***	-0.240 ***	-0.322 **	0.422 ***	-0.188	0.295 ***	0.011	13.802	845

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 9. Augmented labor demand equation, estimation results for 2000

Dependent variable: number of employees (in log)

Sector/type firms	Constant	Log lagged employment	Log production	Log lagged production	Log labor cost	Log lagged labor cost	Market share	Export share	Market concentration (rel. std. deviation of sales)	Overidentif. test	No. obs.
All firms	-1.982 ***	0.731 ***	0.437 ***	-0.198 ***	-0.336 ***	0.456 ***	-0.512 ***	0.077 ***	-0.012 ***	65.719 ***	18356
Agriculture	-3.453 ***	0.671 ***	0.500 ***	-0.037	-0.513 ***	0.481 ***	-0.986 ***	-0.263	0.043 **	4.658	1057
Mining, Energy	0.553	1.053 ***	0.339 ***	-0.482 ***	-0.148	0.310 ***	0.287	-0.326	-0.068	19.084 *	118
Manufacturing	-1.476 ***	0.701 ***	0.523 ***	-0.251 ***	-0.419 ***	0.388 ***	-0.603 ***	0.167 ***	-0.012	9.888	4683
- Engineering	-1.584 ***	0.778 ***	0.470 ***	-0.250 ***	-0.229 ***	0.270 ***	-0.508 *	-0.064	0.022	19.420 *	816
- Chemical Industry	-2.053 ***	0.685 ***	0.429 ***	-0.071	-0.523 ***	0.433 ***	-0.604	-0.140	-0.029	5.605	392
- Food Industry	-1.732 ***	0.615 ***	0.511 ***	-0.217 ***	-0.354 ***	0.335 ***	-0.489	-0.074	0.063 ***	14.988	985
- TCF	-0.786	0.698 ***	0.697 ***	-0.223 **	-0.815 ***	0.223 **	-2.616 ***	0.081	-0.066	9.189	795
- Other Industries	-0.318	0.959 ***	0.476 ***	-0.524 ***	-0.187	0.387 ***	0.059	-0.410 *	0.007	21.273 **	112
Construction	-2.181 ***	0.730 ***	0.433 ***	-0.091 ***	-0.390 ***	0.335 ***	-1.609 ***	-0.266	-0.027 ***	6.631	1626
Trade	-2.183 ***	0.813 ***	0.351 ***	-0.148 ***	-0.271 ***	0.452 ***	-1.900 ***	-0.150 ***	-0.009 ***	44.309 ***	7721
Other services	-2.307 ***	0.561 ***	0.572 ***	-0.144 ***	-0.453 ***	0.411 ***	-0.966 ***	-0.303 ***	-0.030 ***	13.585	3151
Small	-1.671 ***	0.651 ***	0.376 ***	-0.144 ***	-0.293 ***	0.370 ***	-1.094 ***	-0.140 ***	-0.009 ***	49.770 ***	12480
Medium	0.047	0.540 ***	0.358 ***	-0.218 ***	-0.308 ***	0.381 ***	-0.066	0.216 ***	-0.011 ***	32.499 ***	5276
Large	1.265 **	0.587 ***	0.503 ***	-0.424 ***	-0.575 ***	0.601 ***	0.122	0.096 **	0.006	12.389	600
SOE	-0.592 **	0.773 ***	0.592 ***	-0.414 ***	-0.602 ***	0.535 ***	0.022	-0.079	-0.009	36.909 ***	772
Mass privatized domestic	-0.542	0.922 ***	0.562 ***	-0.525 ***	-0.394 ***	0.474 ***	-0.077	0.052	-0.007	12.443	732
Other private domestic	-2.077 ***	0.721 ***	0.430 ***	-0.180 ***	-0.327 ***	0.452 ***	-0.490 ***	0.024	-0.012 ***	52.388 ***	15831
Foreign controlled	-0.971 ***	0.745 ***	0.442 ***	-0.250 ***	-0.463 ***	0.426 ***	-0.160	0.303 ***	-0.020 **	21.464 **	1021

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 10. Augmented labor demand equation, estimation results for 2001

Dependent variable: number of employees (in log)

Sector/type firms	Constant	Log lagged employment	Log production	Log lagged production	Log labor cost	Log lagged labor cost	Market share	Export share	Market concentration (rel. std. deviation of sales)	Overidentif. test	No. obs.
All firms	-1.533 ***	0.774 ***	0.415 ***	-0.205 ***	-0.377 ***	0.432 ***	-0.391 ***	0.082 ***	-0.015 ***	179.531 ***	21820
Agriculture	-2.173 ***	0.760 ***	0.421 ***	-0.156 ***	-0.427 ***	0.491 ***	-0.418	-0.275	0.023	20.874	1211
Mining, Energy	0.098	0.823 ***	0.571 ***	-0.389 ***	-0.399 **	0.105	-0.040	-0.055	0.088	27.190 **	163
Manufacturing	-1.101 ***	0.760 ***	0.483 ***	-0.225 ***	-0.450 ***	0.308 ***	-0.506 ***	0.144 ***	0.008	62.243 ***	5271
- Engineering	-1.135 ***	0.830 ***	0.475 ***	-0.245 ***	-0.526 ***	0.396 ***	-0.426 *	-0.040	0.013	12.117	995
- Chemical Industry	-1.866 ***	0.713 ***	0.515 ***	-0.198 ***	-0.349 ***	0.305 ***	-0.796 ***	0.100	-0.025	19.005	469
- Food Industry	-1.518 ***	0.695 ***	0.449 ***	-0.182 ***	-0.294 ***	0.181 ***	0.155	-0.051	0.119 ***	34.325 ***	1103
- TCF	-0.341	0.872 ***	0.479 ***	-0.311 ***	-0.684 ***	0.505 ***	-0.876 ***	0.043	0.003	23.050 *	976
- Other Industries	0.317	0.869 ***	0.576 ***	-0.439 ***	-0.430 ***	0.120	0.050	-0.081	0.173	11.858	162
Construction	-1.707 ***	0.712 ***	0.525 ***	-0.222 ***	-0.407 ***	0.356 ***	-3.251 ***	-0.142	-0.035 ***	37.156 ***	1857
Trade	-1.607 ***	0.817 ***	0.323 ***	-0.172 ***	-0.300 ***	0.453 ***	-0.736 ***	-0.075 **	-0.003	93.708 ***	9066
Other services	-1.623 ***	0.674 ***	0.473 ***	-0.145 ***	-0.486 ***	0.420 ***	-0.695 ***	-0.275 ***	-0.030 ***	11.132	4252
Small	-1.422 ***	0.662 ***	0.341 ***	-0.137 ***	-0.296 ***	0.370 ***	-0.698 ***	-0.100 ***	-0.011 ***	108.281 ***	14939
Medium	0.424 **	0.612 ***	0.383 ***	-0.277 ***	-0.374 ***	0.382 ***	0.014	0.155 ***	-0.014 ***	69.629 ***	6161
Large	2.024 ***	0.622 ***	0.429 ***	-0.424 ***	-0.469 ***	0.478 ***	0.445 **	0.044	0.024 *	10.921	720
SOE	-0.523 **	1.040 ***	0.731 ***	-0.720 ***	-0.759 ***	0.814 ***	-0.452 ***	-0.036	-0.017 *	26.227 **	900
Mass privatized domestic	-0.509	1.059 ***	0.440 ***	-0.395 ***	-0.462 ***	0.383 ***	-0.393 *	-0.003	0.016 *	87.191 ***	633
Other private domestic	-1.649 ***	0.759 ***	0.394 ***	-0.178 ***	-0.351 ***	0.430 ***	-0.382 ***	0.054 **	-0.015 ***	152.179 ***	19080
Foreign controlled	-1.059 ***	0.774 ***	0.460 ***	-0.292 ***	-0.528 ***	0.534 ***	0.082	0.290 ***	-0.007	20.151	1207

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 11. Augmented wage determination equation, estimation results for 1997

Dependent variable: total labor costs per one employee (in log)

Sector/type firms	Constant	Log lagged labor cost	Log employment	Log productivity	Log lagged productivity	Market share	Export share	Market concentr. (rel. std. deviation of sales)	Regional unempl.	Dummy for foreign controlled firms	Overidentif. test	Joint signif. test for competitive pressure variables	No. obs.
All firms	-5.963 ***	0.976 ***	-0.349 ***	0.657 ***	-0.293 ***	2.356 ***	0.489	0.010	0.327 ***	3.717	9.579 ***	4.155 ***	12234
Agriculture	0.181	0.264 *	0.098	0.650 ***	-0.106	-2.853	-0.281	0.014	-0.068	28.250	13.619 ***	0.278	2284
Mining, Energy	-0.185	1.075 ***	0.022	0.496 ***	-0.575 ***	0.414	0.128	-0.069	0.009	-0.334	0.242	0.521	88
Manufacturing	-8.375 *	0.625 *	-0.314	1.002 ***	0.156	2.173	3.393	0.050	0.266	-8.797	0.613	0.789	3250
- Engineering	0.301	0.654	0.234	0.489	-0.722	-1.987	-2.742	-0.073	0.113	10.465	1.161	0.682	585
- Chemical Industry	-5.337	1.180	0.103	1.115 **	-0.432	-2.306	0.303	0.014	-0.006	3.855	0.508	0.324	271
- Food Industry	-3.010	1.027 ***	-0.128	0.877 ***	-0.307	1.118	0.081	0.155	-0.055	-3.155	1.074	0.692	745
- TCF	0.089	1.004 ***	-0.013	0.605 **	-0.688 ***	0.244	0.323	0.040	0.020	-0.720	0.295	0.170	514
- Other Industries	-0.145	0.914 ***	0.103	0.522 ***	-0.553 ***	0.164	-0.399	-0.105	0.014	0.385	0.727	0.366	85
Construction	1.912	0.400	0.210	0.156	-0.487 **	4.064	1.820	0.000	0.091	-16.812	0.574	1.086	926
Trade	-5.313 **	1.005 ***	-0.181	0.621 ***	-0.292 **	0.383	-0.037	-0.028	0.249 ***	4.953	7.859 **	0.726	4463
Other services	-4.626	1.207 ***	-0.128	0.894	-0.651 *	0.036	-1.724	-0.060	0.219	13.703	3.056	0.674	1223
Small	-8.524 ***	1.084 ***	-0.718 **	0.861 ***	-0.280	2.121	-2.397	-0.023	0.393 ***	17.288	0.388	1.932	6803
Medium	1.299	1.101 ***	-1.045	0.567 ***	-0.629 ***	2.724 *	0.804 *	0.038	0.175 **	0.575	16.836 ***	1.123	4682
Large	5.185 *	0.328	-1.032 **	0.778 ***	-0.291	1.334	0.834 *	0.022	0.050	-1.230	0.915	1.402	749
SOE	-0.365	0.577 ***	-0.095 *	0.598 ***	-0.396 ***	0.748 ***	0.122	-0.012 *	0.089 ***		1.154	5.295 ***	1785
Mass privatized domestic	-1.370	0.564 ***	-0.039	0.602 ***	-0.270 **	0.389	0.334	0.018	0.078 **		2.342	1.249	615
Other private domestic	-5.154 ***	0.878 ***	-0.278 ***	0.682 ***	-0.221 **	2.030 ***	1.046 ***	-0.013	0.234 ***		32.055 ***	8.517 ***	9423
Foreign controlled	-2.348	0.294	0.262	0.665 **	-0.063	-0.358	0.537	-0.040	-0.013		2.586	0.824	411

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 12. Augmented wage determination equation, estimation results for 1998

Dependent variable: total labor costs per one employee (in log)

Sector/type firms	Constant	Log lagged labor cost	Log employment	Log productivity	Log lagged productivity	Market share	Export share	Market concentr. (rel. std. deviation of sales)	Regional unempl.	Dummy for foreign controlled firms	Overidentif. test	Joint signif. test for competitive pressure variables	No. obs.
All firms	2.307 **	0.299 ***	0.058	0.302 ***	-0.290 ***	1.615 ***	1.292 ***	-0.010	0.022	-7.078 ***	13.417 **	15.764 ***	14568
Agriculture	-0.589	0.432 ***	0.078	0.720 ***	-0.139 *	-1.880	-0.900	-0.563 **	-0.008	12.256	16.952 ***	2.517 *	1534
Mining, Energy	3.261 **	0.577 ***	-0.028	0.213	-0.367 ***	0.435	1.368 ***	-0.136	-0.006	-1.834 ***	8.426	2.975 **	99
Manufacturing	0.705	0.364 ***	0.115	0.449 ***	-0.282 ***	0.602	0.907 ***	0.041	0.023	-4.222 ***	7.953	3.820 ***	3814
- Engineering	1.394	0.347 ***	0.045	0.436 ***	-0.367 ***	0.489	0.204	0.046	0.038	-0.356	20.664 ***	0.431	633
- Chemical Industry	1.337	0.367 ***	0.194	0.419	-0.347 ***	-0.509	-0.036	-0.031	0.012	-0.199	6.900	0.290	310
- Food Industry	3.042	0.642 ***	0.165	0.377 **	-0.227 **	0.728	-0.215	-0.165	-0.152	-2.562	2.996	1.177	935
- TCF	1.125	0.087	0.326 ***	0.396 ***	-0.172 ***	-0.868 **	0.237	0.038	-0.022	-1.223 ***	9.830 *	2.955 **	570
- Other Industries	2.313	0.465 ***	0.048	0.337	-0.396 **	0.624	0.707	-0.114	0.020	-1.414 **	10.005 *	1.050	98
Construction	2.752	0.493 ***	0.082	0.379 **	-0.383 ***	0.586	-0.374	-0.014	-0.059	-7.831	10.261 *	1.457	1342
Trade	4.666 ***	0.237 ***	0.012	0.034	-0.226 ***	5.473 ***	0.813 ***	0.026 **	-0.031	-4.300 **	12.336 **	11.508 ***	6028
Other services	-1.189	0.443 ***	0.013	0.781 ***	-0.437 ***	-0.350	0.033	-0.068 ***	0.122	-1.963	2.826	6.305 ***	1751
Small	2.664	0.272 ***	-0.012	0.238 **	-0.268 ***	2.134 ***	1.479 **	-0.009	0.031	-7.628 *	4.967	5.665 ***	9220
Medium	1.015	0.487 ***	-0.059	0.488 ***	-0.403 ***	1.109 **	0.744 ***	-0.003	0.053 *	-3.088 ***	35.663 ***	7.910 ***	4678
Large	0.367	0.662 ***	-0.022	0.881 ***	-0.549 ***	-0.097	0.435	-0.045	-0.036	-2.217 **	6.376	1.374	670
SOE	0.826 ***	0.388 ***	-0.036	0.590 ***	-0.210 ***	0.101	-0.049	-0.005	-0.019		44.296 ***	0.829	1464
Mass privatized domestic	1.764 ***	0.362 ***	0.070 *	0.484 ***	-0.235 ***	-0.268	-0.077	-0.009	-0.047 **		17.320 ***	0.939	626
Other private domestic	-0.770	0.361 ***	-0.149 ***	0.400 ***	-0.272 ***	2.039 ***	0.392 ***	-0.011 **	0.177 ***		53.724 ***	14.518 ***	11880
Foreign controlled	1.967	0.058	0.075	0.216	-0.065	1.366	0.190	0.017	0.021		7.371	1.035	598

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 13. Augmented wage determination equation, estimation results for 1999

Dependent variable: total labor costs per one employee (in log)

Sector/type firms	Constant	Log lagged labor cost	Log employment	Log productivity	Log lagged productivity	Market share	Export share	Market concentr. (rel. std. deviation of sales)	Regional unempl.	Dummy for foreign controlled firms	Overidentif. test	Joint signif. test for competitive pressure variables	No. obs.
All firms	1.451 ***	0.545 ***	-0.133 ***	0.373 ***	-0.398 ***	2.245 ***	0.793 ***	0.011 **	0.073 ***	-2.100 **	172.747 ***	28.300 ***	16097
Agriculture	1.647	0.796 ***	0.048	0.459 ***	-0.633 ***	0.133	0.274	0.313 *	-0.012	-10.544 ***	8.069	1.111	1044
Mining, Energy	1.343	0.584 ***	0.099 *	0.349 **	-0.425 ***	0.411	-0.236	0.122	0.025	-0.034	12.381	0.913	108
Manufacturing	2.953 **	0.565 ***	0.108	0.317 ***	-0.394 ***	0.386	1.300 ***	-0.039	-0.068	-4.417 ***	12.431	4.900 ***	4264
- Engineering	3.996 ***	0.213	0.063	0.235 ***	-0.408 ***	0.676	0.414	-0.051	0.008	-0.992	6.972	1.818	745
- Chemical Industry	5.128 **	0.989 ***	-0.196	0.105	-0.719 ***	1.467	0.427	-0.192 **	0.003	0.374	5.245	3.565 **	348
- Food Industry	0.524	0.906 ***	-0.045	0.392 ***	-0.355 ***	0.641	0.260 **	0.023	-0.013	-0.805	36.698 ***	2.200 *	963
- TCF	1.279 *	0.689 ***	0.071	0.184 ***	-0.216 ***	-0.196	0.149	-0.054	-0.006	-0.373	3.974	1.003	679
- Other Industries	2.048 ***	0.478 ***	0.124 **	0.337 ***	-0.420 ***	0.329	-0.042	0.149	0.000	-0.213	17.099 **	0.718	105
Construction	4.093 ***	0.347 **	0.151 *	0.106	-0.387 ***	1.898 *	1.080 ***	0.047	-0.028	-4.470	25.876 ***	4.926 ***	1580
Trade	-1.037	0.789 ***	-0.238 ***	0.347 ***	-0.303 ***	1.061	-0.099	0.004	0.163 ***	4.917 ***	22.190 ***	1.010	6662
Other services	1.594	0.249	-0.089	0.455 ***	-0.355 ***	2.276 ***	0.680 *	-0.070 **	0.116 **	-0.653	20.728 ***	8.833 ***	2439
Small	-0.177	0.442 ***	-0.578 ***	0.456 ***	-0.281 ***	2.705 ***	0.133	-0.009	0.177 ***	2.285	51.020 ***	10.951 ***	10742
Medium	1.250 ***	0.546 ***	0.285 *	0.313 ***	-0.357 ***	0.363	0.236	0.013 *	-0.014	-1.298 **	39.561 ***	2.136 *	4774
Large	1.979	0.643 ***	-0.223	0.453 ***	-0.286 ***	0.201	0.322	0.005	-0.007	-1.102	5.392	0.471	581
SOE	0.901 ***	0.578 ***	-0.065 ***	0.437 ***	-0.250 ***	0.229 *	0.086	-0.024 ***	0.017 **		31.513 ***	5.519 ***	1014
Mass privatized domestic	1.273 **	0.689 ***	-0.008	0.315 ***	-0.348 ***	0.246 *	0.041	-0.008	0.019		41.418 ***	1.508	739
Other private domestic	0.952 *	0.527 ***	-0.219 ***	0.370 ***	-0.380 ***	2.955 ***	0.333 ***	0.009	0.118 ***		132.983 ***	26.525 ***	13506
Foreign controlled	-1.422	1.026 ***	-0.132 ***	0.424 ***	-0.218 ***	0.270	0.250 **	0.019	0.039 *		14.000	2.345 *	838

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 14. Augmented wage determination equation, estimation results for 2000

Dependent variable: total labor costs per one employee (in log)

Sector/type firms	Constant	Log lagged labor cost	Log employment	Log productivity	Log lagged productivity	Market share	Export share	Market concentr. (rel. std. deviation of sales)	Regional unempl.	Dummy for foreign controlled firms	Overidentif. test	Joint signif. test for competitive pressure variables	No. obs.
All firms	-1.570 ***	0.529 ***	-0.083 ***	0.341 ***	-0.064 **	1.826 ***	0.393 *	-0.020 ***	0.108 ***	-0.550	74.346 ***	30.684 ***	17944
Agriculture	0.996	0.727 ***	0.155 ***	0.332 ***	-0.448 ***	-0.158	-0.097	-0.014	0.018	4.582 ***	38.224 ***	0.186	1045
Mining, Energy	1.123 **	0.517 ***	0.090 *	0.388 ***	-0.286 ***	0.047	-0.058	0.126	-0.009	-1.060 ***	16.111	0.631	118
Manufacturing	0.244	0.607 ***	-0.002	0.244 ***	-0.170 ***	0.773 ***	0.136	-0.030 **	0.048 ***	-0.272	72.539 ***	10.805 ***	4628
- Engineering	1.050 *	0.596 ***	0.077 **	0.299 ***	-0.268 ***	0.414	0.105	0.029	0.000	-0.582	21.464 **	0.450	804
- Chemical Industry	1.537	0.606 ***	0.018	0.324 **	-0.305 ***	0.736	0.609	-0.035	-0.006	-2.006 *	9.242	1.433	386
- Food Industry	-0.778	0.611 ***	-0.008	0.189 ***	-0.065	0.665	-0.205	0.022	0.074 **	0.592	3.528	0.979	982
- TCF	1.563 ***	0.704 ***	-0.001	0.186 ***	-0.266 ***	0.811	0.247 **	-0.056 *	0.003	-0.429 *	11.599	2.681 **	789
- Other Industries	1.082 **	0.540 ***	0.093 **	0.407 ***	-0.283 ***	-0.031	-0.118	0.115	-0.019 *	-0.856 **	20.765 **	0.653	112
Construction	-1.189	0.511 ***	0.052	0.291 ***	-0.037	2.127 **	0.519 *	-0.050 ***	0.085 ***	1.169	21.030 **	5.715 ***	1597
Trade	0.935 **	0.551 ***	-0.038	0.226 ***	-0.174 ***	4.477 ***	0.307 ***	-0.008 *	0.032 *	-1.827 **	132.572 ***	21.892 ***	7483
Other services	-1.237	0.308 ***	-0.017	0.544 ***	-0.085	1.039 **	0.135	-0.083 ***	0.103 ***	-0.741	6.201	16.165 ***	3073
Small	-0.753 *	0.412 ***	-0.240 ***	0.278 ***	-0.021	1.641 ***	0.125	-0.019 ***	0.099 ***	0.597	59.032 ***	12.278 ***	12070
Medium	0.764	0.705 ***	-0.510 ***	0.370 ***	-0.214 ***	1.577 ***	0.452 *	0.003	0.078 ***	-0.422	45.632 ***	6.154 ***	5275
Large	1.723	0.779 ***	-0.230	0.741 ***	-0.626 ***	0.419	0.280 *	-0.008	-0.008	-0.946 ***	4.371	1.840	599
SOE	0.488 *	0.685 ***	0.003	0.534 ***	-0.372 ***	0.095	-0.139 **	-0.015 **	-0.004		43.734 ***	3.365 **	772
Mass privatized domestic	0.178	0.730 ***	0.048 **	0.281 ***	-0.229 ***	-0.024	-0.019	-0.008	0.019		13.838	0.608	731
Other private domestic	-1.810 ***	0.522 ***	-0.124 ***	0.306 ***	-0.032	2.113 ***	0.238 ***	-0.019 ***	0.127 ***		55.225 ***	25.681 ***	15429
Foreign controlled	0.669	0.579 ***	-0.017	0.349 ***	-0.215 ***	0.611 **	0.135 *	0.001	0.011		28.067 ***	2.321 *	1012

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Table 15. Augmented wage determination equation, estimation results for 2001

Dependent variable: total labor costs per one employee (in log)

Sector/type firms	Constant	Log lagged labor cost	Log employment	Log productivity	Log lagged productivity	Market share	Export share	Market concentr. (rel. std. deviation of sales)	Regional unempl.	Dummy for foreign controlled firms	Overidentif. test	Joint signif. test for competitive pressure variables	No. obs.
All firms	1.096 ***	0.515 ***	0.026 **	0.303 ***	-0.231 ***	1.150 ***	0.462 ***	-0.007 ***	0.013 **	-1.292 ***	580.627 ***	35.112 ***	21520
Agriculture	2.779 ***	0.635 ***	-0.020	0.190 ***	-0.330 ***	0.266	-0.195	-0.071 ***	-0.012	-4.297 ***	34.811 ***	4.664 ***	1197
Mining, Energy	0.589	0.729 ***	0.034	0.239 ***	-0.238 ***	0.134	-0.235	0.358 **	-0.006	0.185	13.138	2.725 **	162
Manufacturing	0.856 ***	0.668 ***	0.046 ***	0.247 ***	-0.228 ***	0.120	-0.189 *	0.000	0.006	0.474 *	222.593 ***	3.195 **	5234
- Engineering	1.800 ***	0.604 ***	0.113 ***	0.295 ***	-0.369 ***	-0.172	-0.031	0.023	-0.013	0.340	42.879 ***	0.681	987
- Chemical Industry	1.403 *	0.700 ***	0.082 *	0.136 *	-0.217 ***	-0.283	-0.707 **	0.018	-0.002	1.482 **	13.238	2.142 *	462
- Food Industry	0.812 ***	0.746 ***	0.052 **	0.202 ***	-0.166 ***	0.053	0.085	0.022	-0.018	-0.194	26.479 **	0.763	1099
- TCF	0.446	0.825 ***	0.036	0.302 ***	-0.230 ***	-0.381	-0.097	0.001	-0.018 *	0.220	48.233 ***	0.851	970
- Other Industries	0.297	0.830 ***	-0.009	0.272 ***	-0.254 ***	0.097	-0.136	0.290 **	-0.005	0.228	6.960	2.084	161
Construction	1.986 ***	0.387 ***	0.157 ***	0.259 ***	-0.197 ***	-3.173 **	0.352	-0.040 **	-0.029 *	7.155 **	23.423 *	4.054 ***	1830
Trade	0.975 ***	0.530 ***	-0.006	0.265 ***	-0.206 ***	2.377 ***	0.349 ***	0.001	0.022 ***	-0.826	296.616 ***	18.386 ***	8916
Other services	1.217 ***	0.664 ***	0.006	0.405 ***	-0.363 ***	1.120 ***	0.514 ***	-0.024 **	-0.004	-2.086 ***	103.915 ***	14.766 ***	4181
Small	1.708 ***	0.299 ***	-0.086 **	0.176 ***	-0.176 ***	0.529	-0.461 **	0.003	0.050 ***	4.605 ***	104.469 ***	4.685 ***	14642
Medium	0.096	0.705 ***	0.298 ***	0.407 ***	-0.353 ***	-0.040	0.331 ***	-0.005	-0.021 ***	-1.306 ***	114.415 ***	2.962 **	6158
Large	3.453 ***	0.887 ***	-0.544 ***	0.486 ***	-0.487 ***	0.953 ***	0.111	0.051 *	0.005	-0.398	10.999	4.233 ***	720
SOE	1.438 ***	0.764 ***	-0.014	0.587 ***	-0.588 ***	0.086	0.014	-0.023 **	-0.016 **		89.239 ***	3.231 **	900
Mass privatized domestic	1.009 ***	0.748 ***	0.029	0.181 ***	-0.156 ***	-0.029	0.003	-0.013 *	-0.013		22.748 *	1.164	633
Other private domestic	1.436 ***	0.464 ***	0.006	0.239 ***	-0.228 ***	1.019 ***	0.148 ***	0.000	0.026 ***		761.396 ***	34.970 ***	18788
Foreign controlled	-0.239	0.644 ***	-0.027	0.414 ***	-0.187 ***	0.258	0.236 ***	-0.002	0.013		37.877 ***	4.291 ***	1199

Notes: * significant at 10%;** significant at 5%;*** significant at 1%.

Figure 1. Indices of aggregate output and gross fixed investment (1989=100), 1989-2003

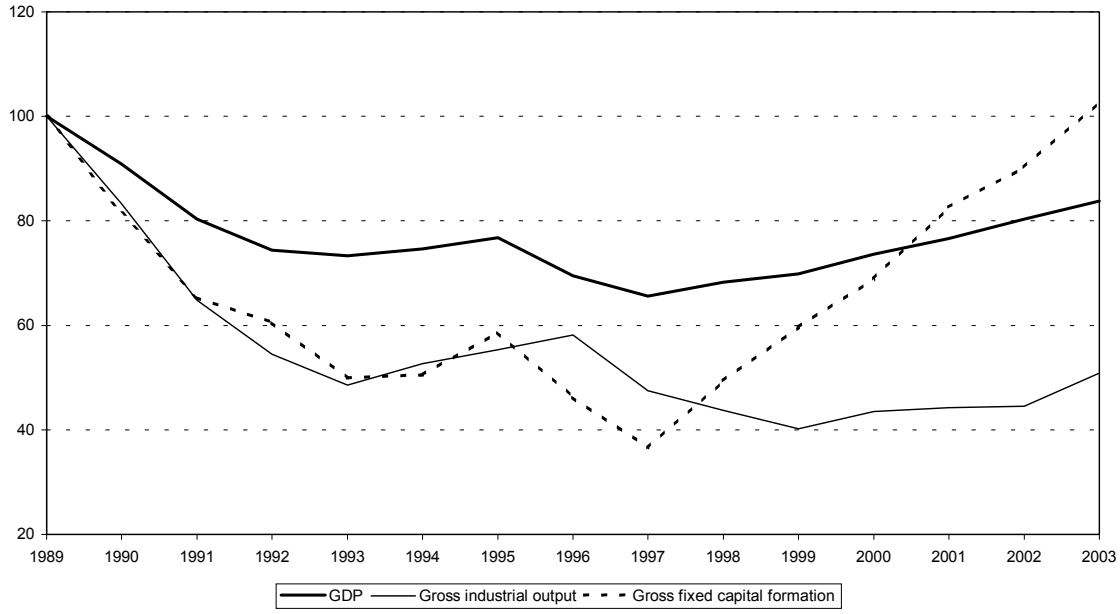

Figure 2. Employment and unemployment, 1989-2003