WTO Accession and the Labor Market: Estimations for Russia

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Abstract

The paper investigates potential impact of Russia's WTO accession on the labor market by estimating various labor market elasticities with respect to trade liberalization in Russia in the 90-ies. In particular, the influence of tariff reduction on demand for labor is estimated, intersectoral employment flows in recent years and their determinants are studied, as well as determinants of sectoral wage premiums and of wage differentials between skilled and unskilled labor. The estimated elasticities of labor demand and wages show to be of very moderate size implying that one need not expect a dramatic influence of Russia's WTO accession on the labor market provided the size of the shock is comparable to the one of the increased country openness during the 90-ies.

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Introduction

The consequences of the expected WTO accession on the Russian economy are being widely discussed. One of the most questionable aspect is the possible influence of the further trade liberalization connected to WTO accession on labor market. Trade reforms, including the liberalization related to WTO accession, having long-run benefits, will have at least short-run costs. In particular, the expected resource reallocation is not costless: some transitional unemployment and loss of output could be experienced when some inefficient enterprises are shut down. Moreover, the costs and benefits are unlikely to be uniformly distributed. Hence, in the short-run, there are going to be winners and losers. In the long-run there is evidence that countries which experienced trade-led growth also experienced income growth of the poor which was in line with the average income growth.

There are several potential channels of influence of trade shocks on the labor market. Free trade expects to change relative prices, and hence redistribution of resources to more efficient use. That would affect output composition, and in turn, demand for labor. Changes in demand for labor transmitted through labor market would shift employment and income distribution between sectors. In addition, changes in relative prices could affect employment and incomes directly: changes in relative prices of inputs would affect labor demand, while adjustment of relative prices of consumer goods are expected to affect labor supply. Being transmitted trough the labor market this direct effect will also change sectoral distribution of employment and incomes.

The total outcome of the resource reallocation depends both on the external shocks (imports flows, openness of the financial and other service sectors for foreign owned companies) and the internal factors (labor mobility – regional and sectoral, social policy).

The WTO agreements do not specify only the import tariffs reduction and unification but also include the agreements on services, intellectual property right, quality standards and other. Thus the trade liberalization in the frame of the WTO agreements create more channels for influence labor market than the trade reforms undertaken in the beginning of the transition. At the same time it is reasonable to use the experienced during the 90-ies trade liberalization shock to estimate labor market responsiveness with respect to international trade parameters. That would provide at least rough idea on the expected labor market consequences of WTO accession.

We try to look at several potential channels of expected WTO accession on the labor market by estimating labor market elasticities with respect to trade liberalization in Russia in the 90-ies. In particular, the influence of tariff reduction on demand for labor is estimated, intersectoral employment flows in recent years and their determinants are studied, as well as determinants of sectoral wage premiums and of wage differentials between skilled and unskilled labor.

2. Estimation of Labor Demand Elasticities

In this section, we analyze possible changes in employment due to Russia's accession to WTO. We estimate labor demand equation for the whole sample, and then we calculate possible changes in employment due to various shocks in output and tariffs. We use balance sheets of Russian large and medium enterprises for 1995-2000 years.

We estimate the following form of labor demand equation:

$$\ln(L_{ti}) = \alpha_1 * \ln(L_{t-1,i}) + \alpha_2 * \ln(Q_{t,i}) + \alpha_3 * \ln(W_{t,i}) + \beta * X_{i,i} + \sum_{t=1998}^{2000} \lambda_t * d_t + \mu_i + \upsilon_{i,t}$$

where $L_{i,t}$ – is the number of workers employed at the enterprise at period *t,* $Q_{i,t}$ – sales of enterprise *i* during year *t*, and $W_{i,t}$ – average wage at enterprise *i* in year *t*, X – is a set of other variables, d_t – time dummies. In our case X contains such regressors as tariffs, import penetration index, unemployment level, GRP over GDP in the Russian Federation, industrial output index, real regional average wage, HHI.

Table 2.1 reports the obtained labor demand elasticities with respect both to wage and output for the whole economy sample and for each of the nine 2-digit OKONH industry sub-samples. For the entire sample the wage labor demand elasticity is equal to –0.40 and the labor demand elasticity with respect to output equals 0.22. These estimates are higher in the absolute value than those reported by Konings and Lehmann (1999) for the Russian enterprises in 1996-1997, but they are still lower, than elasticities in Poland, Hungary and Czech Republic during the transition period[1]. The estimated coefficient for the lagged employment equals 0.24 and it is lower than the previous findings for Russia and other transitional economies, which could be partly explained by the decreased inertia of the labor market. Such low coefficient for the lagged employment has also resulted in less difference between long-run and short-run elasticities. The corresponding long-run labor demand elasticities are equal to 0.3 with respect to output and –0.53 with respect to wage. The value for the long-run own wage elasticity is approximately two times higher, while the value of the long-run output elasticity is two times lower than the figures reported by Konings and Lehmann (1999).

Such variables as lagged tariff and import penetration levels, which were included to measure the impact of trade openness on the labor demand, were found to be significantly different from zero. For the whole sample we have obtained negative impact of trade liberalization on the number of workers demanded by the Russian firms. So the coefficient for the lagged tariff level is positive, while the coefficient for import penetration index is negative. From the set of other

[1] The differences in labor demand elasticities obtained in this work and elasticities reported earlier by other authors could also be partly explained by different econometric techniques and distinctions in the samples. To get more accurate intertemporal and interregional comparisons one would need to estimate labor demand elasticities by Arellano and Bond's GMM estimator for the earlier period of 1993-1997 at the same sample used in the paper.

variables, which were used to control for regional and time differences the Herfindahl-Hirschman index, average wage in the region, GRP per capita over the GDP per capita in the whole country and time dummies had significant impact on employment.

All these findings allow us to conclude that on the whole Russian enterprises became more sensitive to the changes in output, than they were in 1996-1997, what is supported by higher labor demand elasticities, lower inertia, i.e. lower than earlier reported coefficient for lagged employment. However, coefficients for lagged employment vary across industries. The short-run wage labor demand elasticities are insignificantly different from zero in the power, petrochemical, machinery construction industries, but are as high as –0.58 in wood, woodworking, pulp and paper industry and –0.61 in the light industry. The short-run output labor demand elasticities are significantly different from zero in all industries and vary from 0.12 in power and mining industry up to 0.31 in woodworking, pulp and paper industry[2]. These differences could be partly explained by Hicks and Marshall's labor demand rules. The products of light, food, and construction materials industries are likely to face more competitive markets, i.e. markets which could characterized by higher product price elasticities, that could in turn result in higher own price demand elasticities of inputs. In the same industries where we report low wage labor demand elasticities we observe high coefficients for lagged employment equal varying from 0.54 up to 0.55, which once again indicate the labor demand inertia in these industries. At the same time in industry subsamples we find only weak support to the assumption that trade barriers, such as higher tariffs rates, have positive impact on the labor demand. In all industries with exception of metallurgy the corresponding coefficients at tariff variable were found to be insignificantly different from zero. The same results have been obtained using the ratio of import goods to the domestic output. Only in light industry the higher share of imported goods has statistically significant negative impact on the number of employed. The low correlations between tariff level, import penetration rates and labor demand, which have been found in our regressions, does not mean, however, that trade liberalization does not have impact on the labor demand. Trade liberalization, for instance after hypothetical Russia's accession to WTO, is likely to cause changes in output of the enterprises, which has significant impact on the demand for inputs.

The estimates of the model also show that enterprises, located in the regions with higher unemployment or smaller economy size, are likely to have lower number of employed. The mixed results were obtained for industry growth. The higher rates of industry growth rates correspond to higher employment in power, metallurgy, machinery construction and food industries, but to lower employment in construction materials and light industry.

The estimation of labor demand elasticities show that they differ not only across industries, but also across regions. Table 2.2 and Diagrams 2.1, 2.2 give the estimates of the labor demand

[2] Speaking about differences in coefficients between regions and industries we do not mean that they are not statistically identical. Some kind of poolability test is required here. However, the existing first-order autocorrelation of the residuals, which does not cause inconsistency of Arellano-Bond GMM estimator, makes it quite difficult to construct the formal test. This could be the sphere for further research.

equation for each of the eleven economic regions and separately for Kalingradskaya oblast. As in the case with industries all short-run labor demand elasticities with respect to output are significantly different from zero and vary from 0.15 in Povolgskiy region up to 0.34 in the Northern economic region. The negative and statistically significant impact of real wage changes on labor demand by firms has been found in all 12 analyzed regions. In the period of 1997-2000 the Northern, East-Siberian economic regions and Kaliningradskaya oblast experienced the highest own wage elasticities, which equal approximately –0.55, while the lowest –0.18 has been obtained for the North-Western economic region. From Diagram 2.1, which represents the short-run wage labor demand elasticities, it could be seen that northeastern parts of the Russian Federation are characterized by higher elasticities than its western European parts, with exception of Kaliningradskaya oblast.

Brown and Earle (2001) explain interregional differences in gross job flows by the differences in concentration of employers. At the least concentrated markets, i.e. at the markets with higher number of potential employers, the employees have more outside opportunities. This restricts firms to destroy job places. However, in our case we obtain the reverse result, i.e. we find higher wage labor demand elasticities in northeastern parts of Russia. We also conclude that HHI, which reflects concentration of employers, is not significant in the most of regressions. Other possible sources of interregional differences should be taken into account. Among them we could outline distinctions in the industrial structure and variations in the degree of paternalism of regional authorities across regions[3]. The degree of paternalism in its turn could depend on the political orientation of the political leader of the region and on the level of political system development.

To take this heterogeneity into account more carefully for the Central economic region we have estimated the labor demand equation both with and without enterprises located in Moscow, however, we have not received any tangible difference in the coefficients.

Turning to the tariff and import penetration variables included in the model to measure effect of trade openness on labor demand, we have found positive impact of higher trade barriers on the number of employed in several regions. In all cases, except one, when these variables are significant, the tariff level coefficient is positive and the import penetration coefficient is negative.

The autoregressive coefficient for employment, which allows catching up the inertia of the labor maker, as in the regressions for industries, is lower than reported in earlier works by Konings and Lehmann (1999) or Arellano and Bond (1991). This once again results in lower differences between short and long run elasticites. The latter are reported at Diagram 2.2.

It could be concluded that Russian Labor market is now characterized by higher short-run labor demand elasticites than in the 1996-1997 or in the beginning of the transition period. The estimated labor demand elasticites vary not only across industries, but also across regions. The

[3] In this sense our result could be driven by less paternalism of regional authorities in the North-East of Russia as compared with the European part.

influence of trade openness on employment could be outlined only in some industries and regions, however, in most of the cases higher protection corresponds to higher number of workers demanded by firms, holding other things constant. With exception of some cases higher industry growth rates and bigger size of the regional economy also lead to higher employment.

The observed growth in labor demand elasticities is consistent with findings for other transition economies, which have shown significant rise in elasticities during the transition period. Taking into account the obtained figures for Russia and values of elasticities for developed economies we may conclude that process of labor market liberalization is not over.

3. Analysis of Inter-Sectoral Labor Flows

Problems of mobility of work play an important role in transition economy. The opportunity of labor market to adapt to macroeconomic changes in many respects determines flexibility of economy and social consequences of these changes. In this section, we investigate mobility of labor between sectors of economy in Russia. The tests are based on theoretical model of inter-sectoral mobility of labor of Nekipelov (2003). The idea of the model is that there can be made a transition from one-dimensional model of search to multivariate model in which the worker chooses one of vacancies from several sectors. Empirical research on the basis of model was carried out in two stages.

As the first step we estimated a model describing flows of labor between three basic groups of sectors: manufacturing, service and unemployment. These sectors were consolidated in the model of vector autoregression in the form:

$$\begin{pmatrix} Manufacturing \\ Services \\ Unemployment \end{pmatrix}_t = \boldsymbol{P} \begin{pmatrix} Manufacturing \\ Services \\ Unemployment \end{pmatrix}_{t-1}.$$

At the initial stage the opportunity of change in matrix components throughout time was taken into account by introduction of the dummy variable equal to zero till August, 1998 and equal to one - after August 1998. It is impossible to estimate the appropriate dependence for the constructed vector directly, since sum of components of the constructed vector of inter-sectoral distribution of labor is equal to one at any moment. Consequently, one of the components of constructed vector needs to be removed with introduction of the appropriate restrictions on factors of the estimated equations.

There were considered two variants of the model. In the first variant the share of employment in services was excluded, and in the second variant - the share of labor in industrial sectors was removed. Firstly the equation of vector autoregression of the second order was estimated. Coefficients for lagged terms of the second order appeared insignificant. It fits the conclusion that the dynamics of inter - sectoral distribution of labor under steady

matrix of probabilities of transitions of workers can be described by Markov equation. Estimation results for components of the matrix of probabilities for the case of excluded share of employment in services are given in Table 3.1. One can notice that obtained matrix of probabilities of transitions of labor between sectors appeared diagonal. Diagonal elements of the matrix were revealed to be the only significant coefficients. So, estimation results give arguments in favor of insignificance of pure flows of labor between extracted sectors in time. In particular, it can be treated as evidence that more significant role is played by streams of labor inside the extracted sectors. Similarly it is possible to estimate the matrix of probabilities of transitions of workers between sectors, having omitted variable of share of employment in manufacturing. Results of estimation of this model are given in Table 3.2. The results are consistent with the other specifications of the model.

We used models of vector autoregression with exogenous variables to investigate influence of external macroeconomic factors on inter-sectoral flows of labor in Russia. We considered three macroeconomic parameters representing key parameters of the model as exogenous variables. The demand for workers, measured by Employment service served as an indicator of frequency of receipt of vacancies. The volume of an industrial output was used as an indicator for the volume of demand for labor in industrial sectors, and the ratio of average incomes of the population to average wages as the indicator for alternative earnings. These parameters were included in the model one by one in order to prevent its complication.

Firstly the research was carried out for the three-sector model, since it is possible to estimate considered system of the equations only on big enough data set for this model. We possess 61 observations in time, what allows us to construct of full structural model. Nonlinearity of model was taken into account by inclusion in it the products of shares of employment in the appropriate sector and values of macroeconomic factors. It provided linearity of dependence of probability of transition of worker from one branch to another from investigated exogenous parameters.

We estimated equation of the following form

$x_t = \boldsymbol{P} x_{t-1} + \boldsymbol{Z_t} x_{t-1}$,

and it can be transformed to expression $x_t = (\boldsymbol{P} + \boldsymbol{Z_t}) x_{t-1}$, and the matrix of probabilities of transition in such formulation depends on the matrix of exogenous parameters $\boldsymbol{Z_t}$.

Results of estimation of the model are given in Table 3.3. Diagonal elements of the matrix are significant. Thus, insignificance of non-diagonal elements of matrix of probabilities of transitions of workers between sectors may be caused by the fact that these elements have changed under influence of changes on the labor market.

Estimations, mentioned above, allow drawing some important conclusions. It appears, that the probability for the worker to stay in sector of manufacturing is increased by growth

of demand for workers. At higher level of output the probability to remain in manufacturing sector is reduced (with growth of probability of unemployment). Reservation wage grows upon growth of frequency of receipt of job offers under low costs of additional training and reallocation so decrease in probability of employment takes place in the appropriate branch. On the other hand, when there is growth of demand for workers, the probability of transition of workers from manufacturing to services is reduced. Thus, the obtained results coincide with predictions of the model of Nekipelov (2003).

In this section the similar analysis will be carried out within the framework of five-sectoral division of population, able to work. The appropriate reduced form of the equation of vector autoregression looks like:

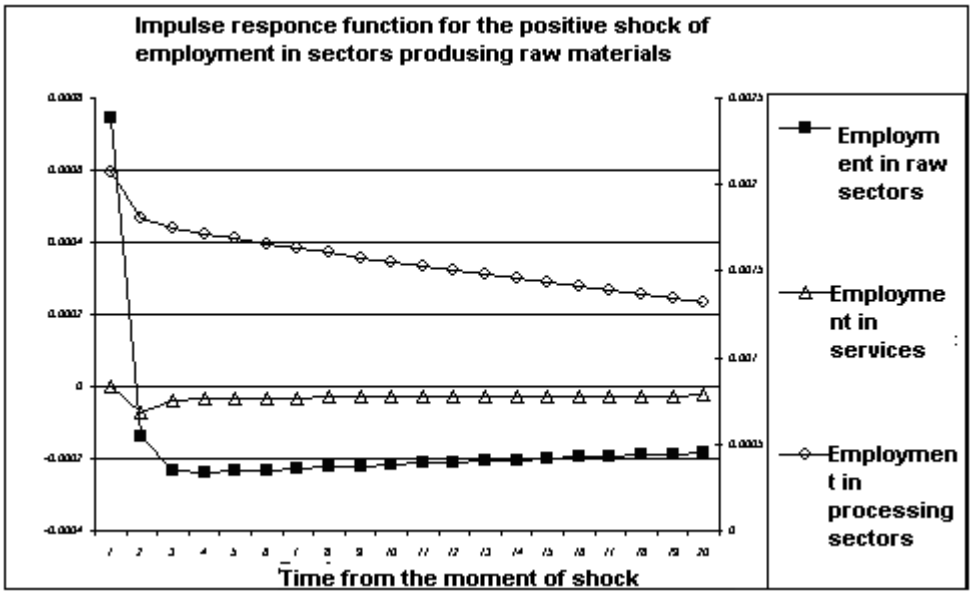
$$\begin{pmatrix} \textit{Raw material sector} \\ \textit{Processing sector} \\ \textit{Finance credit and management} \\ \textit{Other services} \\ \textit{Unemployment} \end{pmatrix}_t = \boldsymbol{P} \begin{pmatrix} \textit{Raw material sector} \\ \textit{Processing sector} \\ \textit{Finance credit and management} \\ \textit{Other services} \\ \textit{Unemployment} \end{pmatrix}_{t-1}.$$

According to the hypothesis that the dynamics of inter - sectoral flows of labor fits Markov property, the estimation of equation of vector autoregression of the second order, as well as at the first variant of extraction of sectors, has shown, that terms with lags of the second order appeared insignificant. Results of an estimated of model of vector autoregression of the first order are given in Table 3.4. It is possible to notice, that the model results is a notion that pure flows of labor from processing sectors to raw material sector, and also to sector offering services, are small (the appropriate coefficients are insignificant). However the interesting fact is that the probability at which labor moves from sectors, offering other services (including transport, communications, public health services and education) to the sectors offering services of financial intermediary is high enough (17,6%).

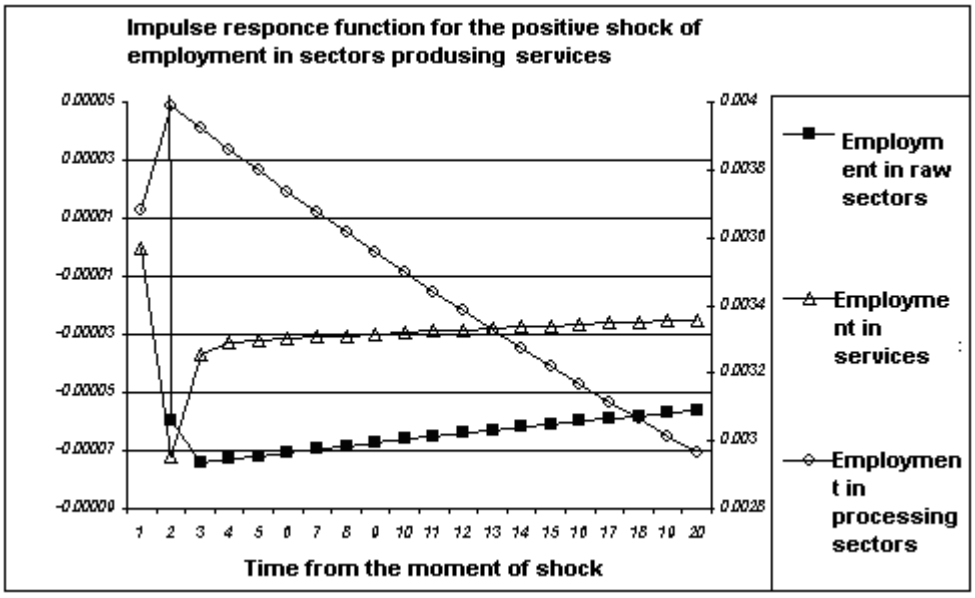
Similarly to the analysis of three-sectoral model one can consider transition of workers from unemployment to extracted sectors. In Table 3.5 it is possible to see the results of estimation of vector autoregression in which the variable of a share of employment in sector of services of financial intermediary and management was omitted. Results of an estimation of the given model of vector autoregression are similar to those received during the analysis of other models considered above. Five-sectoral model was considered with account of exogenous parameters. The estimated equation of vector autoregression with excluded variable of share of the unemployed looked like given in Table 3.6. According to the hypothesis following from the theoretical model, probability for the worker to keep work in raw sectors grows with growth of employment and of demand registered in Employment service. Moreover the probability of transition from processing sectors to raw is reduced by

growth of volume of industrial output. Besides it is possible to notice, that the probability of transition from sectors, offering services to raw sectors diminishes with growth of demand for workers and the registered demand for labor. Under growth of registered demand for workers the probability of transition from raw sectors to processing also grows, but the probability of transition to processing sectors of workers from the sectors, offering services is reduced. Growth of registered demand for workers causes the probability for workers to keep work in the sectors, offering services rise, but the probability of transition to sectors, offering services of financial intermediary and management from other branches of services is reduced.

Pictorial representation of the empirical model constructed on the basis of the given time series, is possible with the aid of impulse response functions. We shall consider in more detail the results of model with extraction of five sectors. From the diagram of impulse response given below for the shock of employment in raw sectors, it is possible to note, that the considered dynamic system passes to a new equilibrium with small growth of employment in all other sectors.



The similar situation arises when there is growth of employment in processing sectors. When there is change of employment in the branches giving services, the general picture of employment will be a little different. From the diagram given below, showing reaction employment on change of employment, in the sectors, offering other services, it is possible to notice, that such change takes place in terms of reduction in employment in all sectors, offering services, and increase of employment in industries.



Functions of the impulse response allow analyzing reaction of sectoral structure of employment to macroeconomic shocks of general nature.

Thus it is possible to analyze reaction of employment to concrete shocks. As an example of such modeling the estimation of reaction of labor market on Russian WTO accession can serve. In work (Nekipelov etc., 2002) there were constructed forecasts for changes in sectors of Russian economy, which should take place after accession of Russia to WTO. Unfortunately, the work did not consider in detail changes within particular sectors. According to the submitted forecast caused by WTO accession, the change of output is between 0,001-0,09%. Without change in services in case of gradual change of tariffs and the same scale of change in case of increase of tariffs in 2003 with their subsequent reduction by 2004. Forecasting by means of model which was constructed by Nekipelov (2003) on the basis of the time series data, shows that the change of output appeared so little that the results are within the limits of a standard error of the forecast. Thus, it is possible to draw conclusion that the changes arising on labor market as a result of predicted changes of sector output are insignificant.

4. Changes in sectoral structure are expected to affect sectoral wage premiums

Import tariffs are expected to be reduced significantly. We estimated the responsiveness of wages to the recently observed changes in tariffs. Several procedures were used.

The fist approach is, following Goldberg and Pavcnik (2001), a two-step procedure with wage premiums due to industrial affiliation of workers being estimated at the first stage (controlling for observable differences in individual characteristics), and then the premiums being regressed on tariffs in fixed effect panel framework.

First-stage: $\ln(w_{ij}) = H_{ij}\beta_H + I_{ij} * wp_j + \varepsilon_{ij}$,

where i – worker, j – industry, w_{ij} - worker i's wages, H_{ij} – a vector of worker i's characteristics (age; age squared; gender; two education type dummies, skill type dummies[4]), region (Moscow region dummy, region unemployment level, gross regional product) and firm type dummies (foreign or Russian, government or private), I_{ij} - industry indicators that reflect worker i's industry affiliation[5], wp_j – industry wage premium.

Second-stage: $wp_{jt} = T_{jt}\beta_T + D_{jt}\beta_D + u_{jt}$,

where wp_j – industry wage premium, T_{jt} - the vector of tariffs, import, export, import and export ratios, D_{jt} - time indicators. Various specifications were tried at the first stage[6] . The second stage equation is estimated using industry fixed effects panel model. The results are summarized in Table 4.1.

Table 4.2 reports the transformed wage premiums $\frac{e^{wp} - e^0}{e^0} \cdot 100\% = (e^{wp} - 1) \cdot 100\%$ allowing to set the wage premium in the refernce group - machine-building industry here - to zero.

The results show that workers in Fuel & Energy industries earned 82.03% more than workers in Machine-building industry with the same observable characteristics. In contrast, workers in Agriculture always earn 50-60% less than workers in Machine-building industry with the same observable characteristics.

Not all estimates are significant and the test for coefficient equality was done for 1994 (Table 4.3) and 1998 (Table 4.4) years. The test for coefficient equality for 1994 year shows that industry wage premiums can be divided by size into four groups relative to the wage premiums in Machine-building industry. The first group of industries with the largest wage premiums includes Fuel & Energy and Metal industries. The second group consists of Chemical, Building materials, Light and Food industries. Wood processing belongs to the third group. And the last group with the smallest wage premiums is Agriculture.

The results of the second step of the procedure are presented in Tables 4.5 and 4.6. From the Table 4.5 it may be observed that there is a positive, although insignificant, effect of import tariffs on wage

[4] Education type dummies include school education, secondary professional and high (institute or university) education. Skill type classification is the following: unskilled, low-skilled, skilled and high-skilled labor. Legislators, senior managers, officials and professionals are defined as high-skilled workers. Skilled workers include technicians, associate professionals, clerks, service and market workers, skilled agricultural and fishery workers, plant and machine operators, and assemblers. Craft and related trades workers are defined as low-skilled workers.

[5] Industry indicators I_{ij} include dummies for the following industry groups: Fuel & Energy industries (I_11), Metal industries (I_12), Chemical industries (I_13), Machine-building industries (I_14), Wood-processing industries (I_15), Building materials industries (I_16), Light industry (I_17), Food industry (I_18), Others (not mentioned above) (I_19), Agriculture (I_20).

[6] OLS and Heckman procedure to correct for selection bias in the wage equation; for males and females separately.

premiums. Therefore, using the procedure, it cannot be concluded that workers in more protected industries had larger wage premiums.

The second approach used is the estimate of whether affiliation with export-oriented industries, import-competing industries, or industries with high inter-industry trade (versus industries with high share of non-tradables) influence wages. The estimated equation is the following form:

$$\ln(w_{ij}) = H_{ij}\beta_H + IO_{ij}\gamma_H + \varepsilon_{ij} \quad ,$$

where w_{ij} - worker i's wages, H_{ij} – a vector of worker i's characteristics (age; age squared; gender; two education type dummies, skill type dummies), region (Moscow region dummy, region unemployment level, gross regional product) and firm type dummies (foreign or Russian, government or private), IO_{ij} – industry orientation dummies: export oriented, import competing, inter-industry trading. The results are summarised in Table 4.7.

It turns out that workers in import competing industries earn less than workers with the same observable characteristics in other industries. There is a positive, although insignificant, effect of being affiliated with export-oriented industries.

Finally, we analyzed how tariffs and volumes of import and export affect wages by applying fixed effect panel to the following equation:

$$\ln(w_{ij}) = T_j\beta_T + D_j\beta_D + u_{ij} \quad ,$$

where T_j- the vector of tariffs, import, export, D_j – region and time indicators. The results are summarised in Table 4.8. There is a positive, although insignificant, effect of import tariffs on wages. In another specification lagged tariffs positively affect wages, although this result is again insignificant.

Overall, it has been obtained that wage premiums in Fuel & Energy and Metal industries are high. These industries characterize by relatively low tariff levels, employment of large share of skilled workers and export orientation. These industries have large profits and have increasing demand for labor. In Russia these industries are situated in the remote regions, where the supply of labor is limited, because of worker's low mobility. Therefore, in Fuel & Energy and Metal industries employers have opportunities and needs for paying the high wage premiums to the employees.

Wage premiums in Wood processing industry and Agriculture, which have a large proportion of low skilled labor, are low. Firstly, Wood processing industry and Agriculture are not as profitable as Fuel & Energy and Metal industries. Hence, in Wood processing industry and Agriculture employers can not pay large wage premiums. The similar result was obtained for Mexican firms (Revenga A.

(1997)): the firms with the large share of low skilled workers decrease the worker's ability to capture rents.

There is no significant effect of tariffs on wages and wage premiums. This result is in line with the fact that there is no unique relation between wages and trade protection for every country. Some researchers have found a negative relation between wages and trade protection, whereas others have found a positive relation.

5. *Wage differentials between skilled and unskilled labor*

Average unskilled worker earned 16.75% less than the average skilled worker in 1994, and earned 27.03% less than the average skilled worker in 1998.

Some inference on the wage differentials between skilled and unskilled labor could be made from previously cited regressions. In particular, return to high skill, skill and low skill levels (as compared with unskilled labor) are positive. The results imply that in 1994 high skilled workers earned 32% more than unskilled workers with the same observable characteristics, whereas in 1998 high skilled workers earned 62% more. Skilled workers earned 17% more than unskilled workers with the same observable characteristics in 1994, but in 1998 skilled workers earned 35% more. The results of the test that return to the low skill level is equal to the return to no skill level (see Table 5.1) suggest that the wages of low skilled workers are not significantly different from the wages of unskilled workers with the same observable characteristics. For further analysis it was decided to change skill group classification (to binary classification[7]).

Wage gap between skilled and unskilled labor is analyzed employing Oaxaca-Ranson decomposition. Wage equations for skilled and unskilled workers separately for each year were estimated, as well as separate regressions for 1994 and 1998 years for each type of worker (skilled and unskilled). This allows us to decompose the wage gaps both "statically" and "dynamically".

The static wage gap decomposition led to the results presented in the Table 5.2. The wage gap between skilled and unskilled workers was 52.99% in 1994 and decreased to 46.32% in 1998. All else being equal, observable differences in education accounted for 55.4-66.5% of the Skilled/Unskilled gap in 1994 and 30.3-66.7% of the gap in 1998. Observable differences in Moscow & St. Petersburg accounted for 5.32-9.19% of the Skilled/Unskilled gap in 1994 and for 3.48-6.12% of the gap in 1998. It was found that work in non-manufacturing sector tended to increase the wage gap between skilled and unskilled workers in 1994, whereas work in manufacturing sector decreased it in 1994 and 1998. Among all industries in manufacturing sector, Light and Food industries decreased Skilled/Unskilled gap most of all in 1994. However, in 1998 the wage differentials

[7] The skilled workers will include legislators, senior managers, officials, professionals, technicians, associate professionals, clerks, service and market workers, skilled agricultural and fishery workers, plant and machine operators, and assemblers. Craft and related trades workers, sweepers, garbage collectors will be regarded as unskilled workers.

between skilled and unskilled labor was the smallest in Machine building industries in the manufacturing. It was obtained that observable characteristics could not explain much of the Skilled/Unskilled gap: overall, observable factors explained 44.77-49.62% of the wage gap between skilled and unskilled labor in 1994 and 20.99-28.39% of the wage gap in 1998.

Using the dynamic wage differential decomposition, the results presented in the Table 5.3 are obtained. Firstly, there was decline in wages of skilled and unskilled labor. Skilled workers had 40.69% decline in wages during the period of 1994 to 1998, and unskilled workers suffered more because they had 43.28% decline in wages. It follows that the manufacturing sector affiliation mitigated the decrease in the wages of all workers between 1994 and 1998, whereas work in non-manufacturing sector intensified this decrease, with unskilled workers suffering more: 10.87-14.24% decrease in wages of unskilled workers versus 7.04-7.29% decrease in wages of skilled workers. Gender wage differentials favored males: the wages of males decreased less than the wages of females during the period of observation both for skilled and unskilled workers. Education turns to help the unskilled: as decomposition follows that if it has not been for education, the wage decrease of unskilled workers would be even more, however, there is no such effect for skilled labor. This result can be explained by the rise in education endowment of unskilled workers in 1998, in comparison with 1994. Education endowment of unskilled labor increased in such a short period due to reallocation of the labor force: there was an outflow of more educated workers from skilled group into unskilled group. For example, share of educated workers in unskilled occupation group was 60% in 1994 and 65% in 1998.

Overall, it has been obtained that the wage gap between skilled and unskilled decreased by 12,59% from 1994 to 1998. Taking into account the increase in tariff levels during the period of 1994-1998, it seems that the increase in tariff levels associated with the decrease in wage gap between skilled and unskilled labor. But the evidence for this conclusion is not very strong, because the industry affiliation does not explain much of the wage variation between skilled and unskilled workers. This result coincides with that of obtained for Mexico (Cragg, Epelbaum (1996)): that industry dummies did not explain much of the wage gap between skilled and unskilled labor.

It was obtained that work in manufacturing sector decreased wage gap between skilled and unskilled workers, whereas work in non-manufacturing sector increased it. It can be explained by the fact that skilled workers in Russia earn less working in manufacturing sector. For example, the worker employed in services earns more than the worker with the same observable characteristics employed in manufacturing.

Next result obtained is that manufacturing sector affiliation mitigated the decrease in the wages of all workers in 1994 and 1998, whereas work in non-manufacturing sector intensified the decrease. It should be noted that the effect on unskilled workers was more harmful: the mitigation of the reduction in wages of manufacturing unskilled workers was less than that of in wages of

manufacturing skilled workers, and the reduction in wages of non-manufacturing unskilled workers was sharper. These results can be explained by the following: although on average the wages in manufacturing are lower than the wages in non-manufacturing sector, they are less volatile. For example, many business firms were closed in 1998, because of the crisis. Many workers employed in private firms had large decrease in their wages, whereas in government firms, which adhere the labor law, the workers had a smaller decrease in their wages. Skilled workers are more mobile and have larger opportunities of finding the job; therefore, the wage reduction effect on skilled workers was less than that of on unskilled workers.

Conclusion

In the paper we investigate several features of the Russian labor market which could play an important role in the process of the adaptation to trade reforms which should take place in the context of the expected WTO accession. We estimated wage and output labor demand elasticities, measure the intensiveness of inter-sectoral labor flows, evaluate the impact of import pressure and import tariffs reduction on labor demand and wage differentiation.

We find that short-run own wage and output labor demand elasticities have grown significantly since the transition period and are higher than elasticities reported for the period for 1996-1997. Labor flows analysis shows that intensiveness of inter-sectoral labor flows is small. These findings provide evidence that labor market became more dynamic but we do not observe enough sectoral mobility. Given the high production concentration inherited from the soviet economy, low sectoral mobility could slow down the production structure changes in response to the relative prices changes.

We also find that trade openness has mixed on labor demand. We conclude that under the output shock, which is predicted by the Computable General Equilibrium model, after Russia's accession to the WTO, the change in employment is insignificantly different from zero. The hypothetical output shock of 1% could result in approximately 0.2% change in employment and even less if the real wage adjustment mechanism is taken into account.

On the basis of the results obtained the prediction can be made that the future trade liberalization would not have a significant effect on wages. It is likely that tariff reduction and trade liberalization would lead to only slight increase in the wage differentials between skilled and unskilled labor, because manufacturing sector affiliation explains not more than 20% of the wage gap between skilled and unskilled workers. In comparison with 1994, the average wage of unskilled and low skilled workers increased in 2001, although, the average wage of high skilled and skilled decreased. The highest wage premiums are found to be in Fuel & Energy and Metal industries and the lowest in Agriculture. It is obtained that there is no significant effect of tariffs on wages and wage premiums. Therefore, no significant evidence for the claim that "workers in more protected

industries earn relatively more" is found. The results of the paper suggest that there is a significant negative effect of import on wage premiums and export orientation affects positively the wages. We get that the wage gap between skilled and unskilled decreased by 12,59% from 1994 to 1998. The analysis of the wage differentials implies that work in manufacturing sector decreased wage gap between skilled and unskilled workers, whereas work in non-manufacturing sector increased it. Manufacturing sector affiliation mitigated the reduction in the wages in 1994 and 1998, whereas work in non-manufacturing sector intensified it.

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Table 2.1. Estimation of labor demand – sectoral differences.

	The whole sample		Power	Metallurgy	Petrochemical	Machinery	Timber	Const. Materials	Light	Food	Other
lnemp(-1)	**0.238**	**0.263**	**0.548**	**0.276**	**0.540**	**0.547**	**0.020**	**0.259**	**0.210**	**0.195**	**0.247**
	[8.12]***	[9.46]***	[3.71]***	[2.11]**	[4.29]***	[11.07]***	[0.30]	[2.50]**	[2.55]**	[4.31]***	[2.94]***
lnwperemp_d	**-0.401**	**-0.372**	**0.125**	**-0.080**	**-0.107**	**0.005**	**-0.576**	**-0.265**	**-0.609**	**-0.175**	**-0.311**
	[16.00]***	[16.10]***	[1,14]	[1.06]	[1.11]	[0.05]	[5.53]***	[2.99]***	[6.36]***	[6.87]***	[5.82]***
tariff_l	**0.717**	**0.651**		**0.880**	**0.254**	**-0.426**	**1.422**	**2.618**	**-0.393**	**0.014**	**0.366**
	[5.32]***	[4.58]***		[1.71]*	[0.34]	[0.37]	[0.97]	[1.01]	[0.61]	[0.18]	[1.33]
lnoutdef	**0.227**	**0.221**	**0.119**	**0.177**	**0.144**	**0.146**	**0.312**	**0.214**	**0.215**	**0.186**	**0.167**
	[34.11]***	[35.10]***	[6.18]***	[6.86]***	[6.22]***	[7.41]***	[15.88]***	[11.09]***	[11.43]***	[20.94]***	[10.42]***
ipokpofill	**-0.119**			**-0.154**	**-0.094**	**-0.033**	**-0.033**	**0.082**	**-0.977**	**-0.024**	**0.013**
	[4.73]***			[1.07]	[1.02]	[0.60]	[0.12]	[0.76]	[5.07]***	[0.65]	[0.28]
HHI	**-0.058**	**-0.055**	**-0.145**	**-0.173**	**0.027**	**0.014**	**0.320**	**-0.005**	**-0.030**	**-0.057**	**-0.034**
	[2.08]**	[2.02]**	[1,19]	[2.02]**	[0.25]	[0.18]	[1.69]*	[0.08]	[0.25]	[0.87]	[0.65]
lnavwag	**0.091**	**0.082**	**-0.107**	**-0.187**	**-0.004**	**-0.046**	**0.007**	**0.116**	**0.251**	**-0.017**	**0.024**
	[4.34]***	[3.99]***	[1,03]	[1.24]	[0.03]	[0.64]	[0.11]	[1.80]*	[3.97]***	[0.53]	[0.57]
unempl_level	**-0.001**	**-0.001**	**-0.004**	**-0.001**	**-0.003**	**0.001**	**-0.001**	**-0.002**	**-0.006**	**0.001**	**-0.001**
	[1.56]	[1.64]	[1,76]*	[0.16]	[0.61]	[0.52]	[0.23]	[1.14]	[2.98]***	[1.06]	[0.89]
grp_r_rf	**0.043**	**0.043**	**0.08**	**0.038**	**0.095**	**-0.045**	**0.058**	**0.066**	**0.059**	**0.054**	**0.016**
	[4.31]***	[4.42]***	[1,33]	[0.64]	[2.06]**	[1.68]*	[1.26]	[2.73]***	[1.94]*	[3.27]***	[0.70]
ind_gr	**0.000**	**0.000**	**0.001**	**0.004**	**-0.000**	**0.001**	**0.000**	**-0.001**	**-0.001**	**0.001**	**0.000**
	[0.81]	[0.97]	[1,87]*	[3.48]***	[0.59]	[2.48]**	[0.27]	[1.73]*	[3.47]***	[2.73]***	[1.07]
year1998	**0.093**	**0.093**	**0.012**	**0.074**	**0.040**	**0.016**	**-0.004**	**0.123**	**0.005**	**0.051**	**0.039**
	[7.90]***	[7.94]***	[0,21]	[0.86]	[0.61]	[0.27]	[0.09]	[3.18]***	[0.13]	[2.98]***	[1.60]
year1999	**0.074**	**0.085**	**0.023**	**0.138**	**0.050**	**0.048**	**-0.037**	**0.172**	**-0.132**	**0.053**	**0.005**
	[5.38]***	[6.06]***	[0,38]	[1.39]	[0.64]	[0.46]	[0.33]	[3.58]***	[1.97]**	[2.39]**	[0.15]
year2000	**0.127**	**0.139**	**0.065**	**0.352**	**0.101**	**0.085**	**0.011**	**0.182**	**-0.194**	**0.126**	**0.036**
	[8.22]***	[8.62]***	[1,07]	[3.26]***	[1.18]	[0.57]	[0.07]	[3.54]***	[2.15]**	[5.46]***	[1.02]
constant	**-0.080**	**-0.080**	-0.062	**-0.160**	**-0.046**	**-0.056**	**-0.102**	**-0.071**	**0.010**	**-0.067**	**-0.041**
	[15.95]***	[15.17]***	[3.84]***	[6.21]***	[1.92]*	[1.06]	[2.03]**	[4.69]***	[0.30]	[11.07]***	[4.51]***
Obs.	53817	55136	3393	899	1330	9527	6645	6095	6537	14852	6678
Groups	17562	17999	1260	317	407	3202	2360	1954	2128	4692	2085

*Note: Dependent variable is log employment. Arellano-Bond GMM estimator is used. Tariff and Wage are treated as endogenous. t-statistics are in parentheses. *** - significant at 1%, ** - at 5%, * - at 10% level. lnwperemp - real wage per worker, tariff_1 - one year lagged tariff level, lnoutdef - real output, ipokpofill - import penetration by firms, HHI - Herfinfal-Hershman index, lnavwage - real average wage in the region, deflated by CPI, unempl_level - level of unemployment in the region, grp_r_rf - gross Domestic product in the region over the GDP in Russia, ind_gr - industrial output index, year1998-year2000 - time dummies. Cent/Mosc - regression for the central economic region without Moscow.*

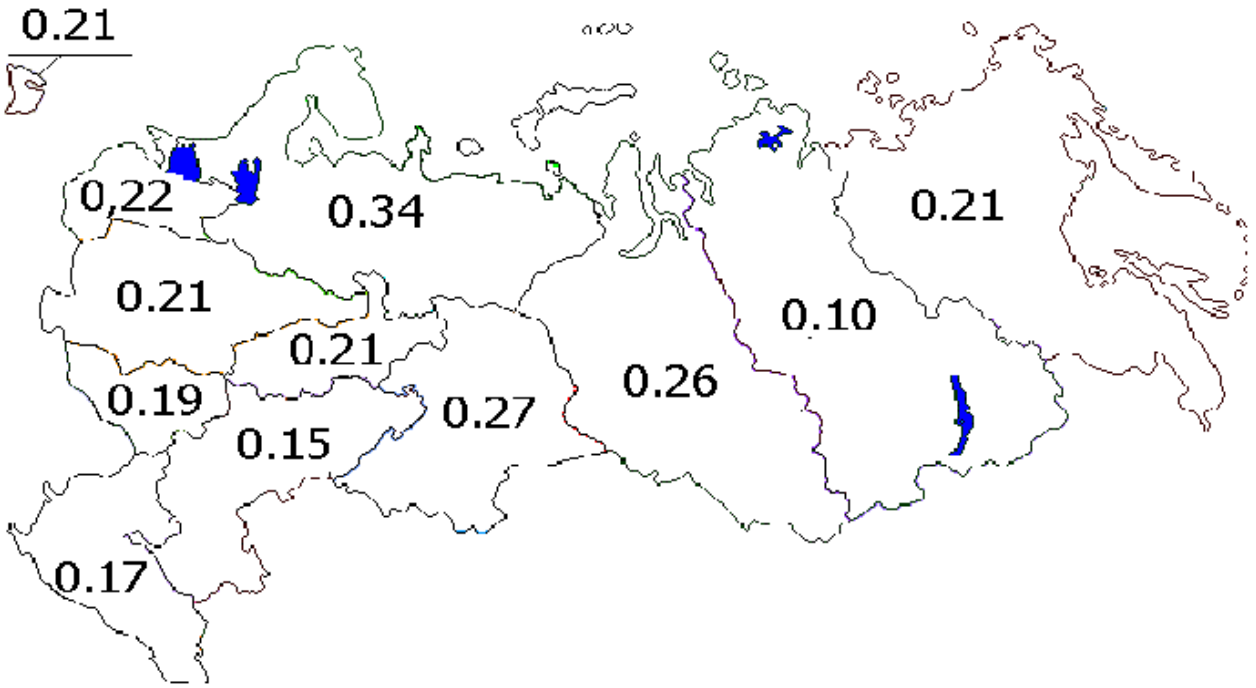
Table 2.2. Estimation of labor demand – regional differences.

	Northern	North-Western	Central	Cent/Mosc	Centr-Chernoz	Uralskiy	West-Siberian	East-Siberian	Far Eastern	Volg-Vyat	Povolgskiy	North-Caucasian	Kaliningrad
lnemp(-1)	-0.036	0.476	0.296	0.325	0.403	0.251	0.238	0.19	0.350	0.315	0.455	0.486	0.659
	[0.40]	[5.07]***	[5.38]***	[6.08]***	[4.53]***	[4.58]***	[2.79]***	[1,83]*	[4.48]***	[4.29]***	[7.18]***	[6.50]***	[3.45]***
lnwperemp	-0.548	-0.182	-0.283	-0.262	-0.253	-0.452	-0.435	-0.548	-0.382	-0.276	-0.308	-0.253	-0.562
	[7.02]***	[2.26]**	[6.58]***	[6.34]***	[2.70]***	[8.58]***	[6.14]***	[6.10]***	[4.79]***	[4.03]***	[4.71]***	[3.29]***	[3.00]***
tariff_l	2.507	-0.175	0.342	0.170	-0.154	0.675	0.397	1.579	1.405	-0.096	0.933	-0.213	3.571
	[3.55]***	[0.23]	[1.12]	[0.55]	[0.32]	[2.18]**	[0.95]	[2.42]**	[3.21]***	[0.31]	[2.45]**	[0.82]	[1.78]*
lnoutdef	0.340	0.218	0.208	0.206	0.193	0.274	0.261	0.259	0.206	0.214	0.149	0.172	0.207
	[13.22]***	[9.00]***	[16.63]***	[16.22]***	[7.09]***	[16.51]***	[11.81]***	[10.52]***	[10.78]***	[11.74]***	[11.17]***	[8.27]***	[4.05]***
ipokpofill	-0.424	-0.002	-0.093	-0.069	-0.003	-0.043	-0.202	-0.448	-0.228	0.059	-0.219	0.153	-0.416
	[2.83]***	[0.02]	[2.01]**	[1.37]	[0.03]	[0.73]	[1.98]**	[3.63]***	[1.65]*	[0.93]	[2.79]***	[2.26]**	[1.12]
HHI	0.290	0.060	-0.174	-0.192	-0.050	0.002	0.081	0.024	-0.149	-0.177	0.052	-0.045	0.113
	[2.40]**	[0.40]	[1.71]*	[1.62]	[0.54]	[0.03]	[0.49]	[0,17]	[1.81]*	[1.61]	[0.60]	[0.62]	[0.61]
lnavwag	-0.026	-0.428	0.448	0.429	-0.555	0.144	0.308	0.044	0.373	0.012	-0.325	0.087	
	[0.53]	[1.48]	[5.50]***	[5.55]***	[2.05]**	[1.89]*	[3.46]***	[0,33]	[2.27]**	[0.20]	[3.46]***	[1.28]	
unempl_level	-0.003	0.013	-0.005	-0.006	0.010	-0.001	-0.006	0,000	-0.007	0.001	0.001	-0.001	
	[0.66]	[2.20]**	[3.66]***	[4.02]***	[3.61]***	[0.28]	[2.48]**	[0,06]	[1.78]*	[0.51]	[0.51]	[0.78]	
grp_r_rf	-0.064	0.110	0.053	-0.050	0.238	0.037	-0.002	0.147	0.054	-0.169	0.067	0.005	3.571
	[0.68]	[0.77]	[3.83]***	[1.00]	[2.04]**	[0.68]	[0.06]	[1,76]*	[1.06]	[1.76]*	[1.23]	[0.06]	[2.93]***
ind_gr	-0.000	0.002	0.001	0.001	-0.000	-0.001	0.001	-0.001	0.001	0.000	0.003	-0.000	0.002
	[0.25]	[1.81]*	[2.61]***	[2.98]***	[0.43]	[1.49]	[2.45]**	[1,01]	[0.96]	[0.08]	[6.69]***	[0.94]	[0.63]
year1998	0.019	-0.235	0.333	0.327	-0.205	0.124	0.175	0.051	0.170	0.006	-0.074	0.032	0.218
	[0.47]	[1.50]	[5.85]***	[6.09]***	[1.86]*	[2.71]***	[3.69]***	[0,75]	[2.11]**	[0.17]	[1.57]	[0.93]	[4.04]***
year1999	0.005	-0.253	0.341	0.322	-0.179	0.081	0.082	0.022	0.155	-0.026	-0.090	0.006	
	[0.07]	[1.44]	[5.46]***	[5.48]***	[1.55]	[1.54]	[1.53]	[0,27]	[1.64]	[0.65]	[1.72]*	[0.16]	
year2000	0.091	-0.121	0.369	0.335	-0.023	0.101	0.038	0.058	0.153	-0.016	0.068	-0.005	
	[1.00]	[0.75]	[5.20]***	[4.92]***	[0.23]	[2.04]**	[0.64]	[0,71]	[1.54]	[0.31]	[1.44]	[0.13]	
constant	-0.114	-0.010	-0.118	-0.110	-0.041	-0.047	-0.051	-0.107	-0.101	-0.020	-0.105	-0.010	-0.144
	[3.89]***	[0.26]	[5.52]***	[5.25]***	[1.81]*	[3.82]***	[2.88]***	[3.97]**	[3.79]***	[1.25]	[6.32]***	[0.84]	[1.94]*
Obs.	2647	2528	11018	9758	3564	7380	5362	3195	2358	4365	5955	5073	372
Groups	883	840	3474	3061	1093	2398	1766	1059	910	1405	1992	1620	122

*Notes: Dependent variable is log employment. Arellano-Bond GMM estimator is used. Tariff and Wage are treated as endogenous. t-statistics are in parentheses. *** - significant at 1%, ** - at 5%, * - at 10% level. lnwperemp - real wage per worker, tariff_1 - one year lagged tariff level, lnoutdef - real output, ipokpofill - import penetration by firms, HHI -Herfinfal-Hershman index, lnavwage - real average wage in the region, deflated by CPI, unempl_level - level of unemployment in the region, grp_r_rf - gross Domestic product in the region over the GDP in Russia, ind_gr - industrial output index, year1998-year2000 - time dummies. Cent/Mosc - regression for the central economic region without Moscow*

DIAGRAM 2.1 - REGIONAL VIEW (short-run)

The short-run output labor demand elasticities



The short-run wage labor demand elasticities.

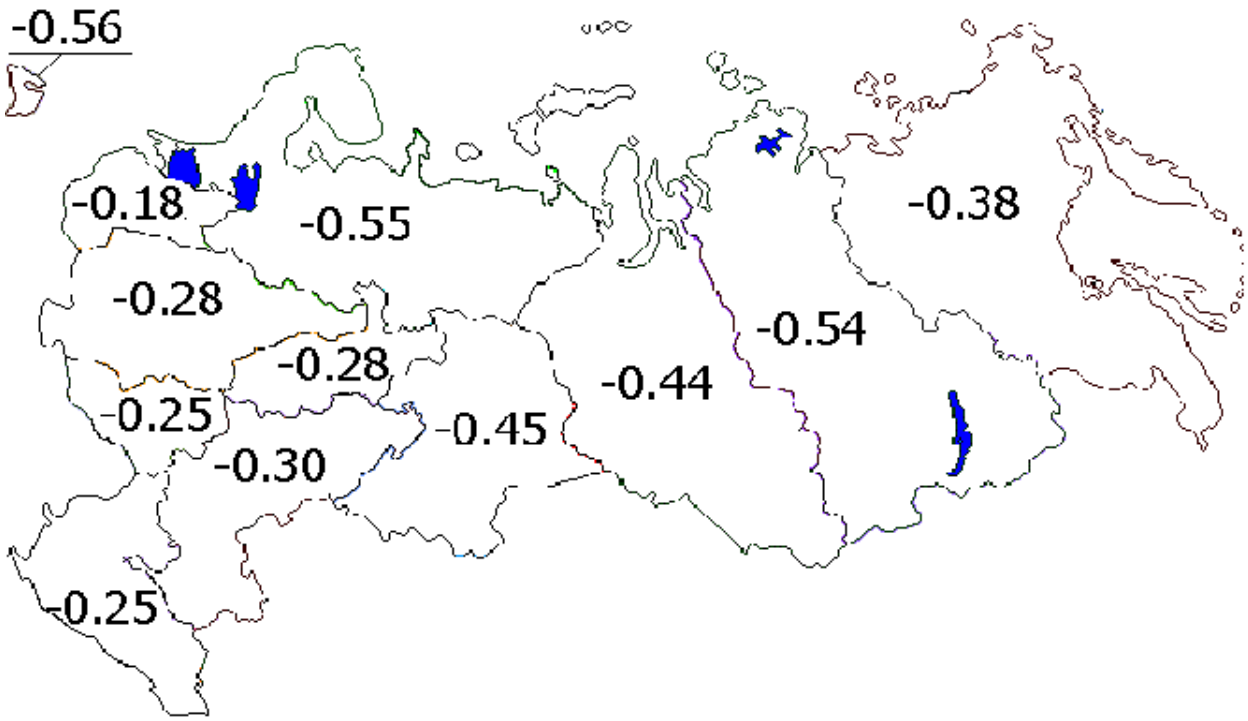
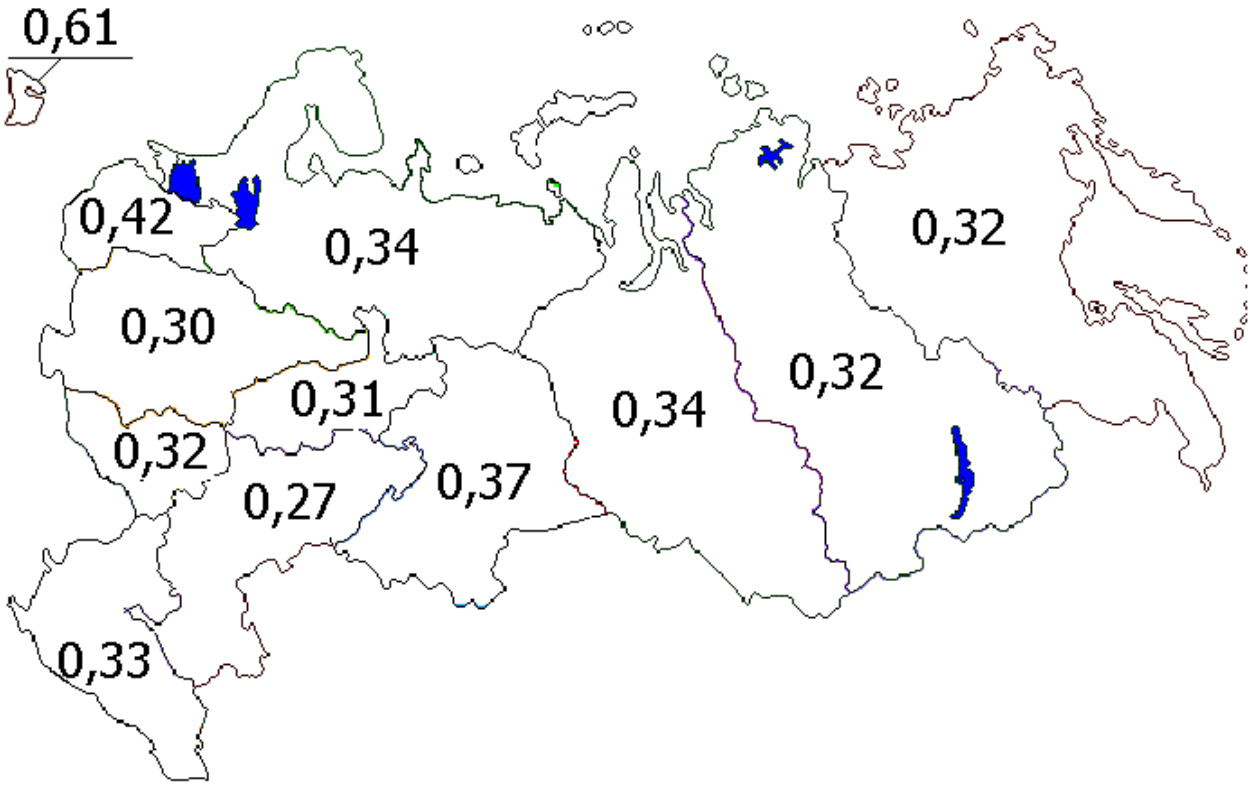


DIAGRAM 2.2 - REGIONAL VIEW (long-run)

The long-run output labor demand elasticities



The long-run wage labor demand elasticities.

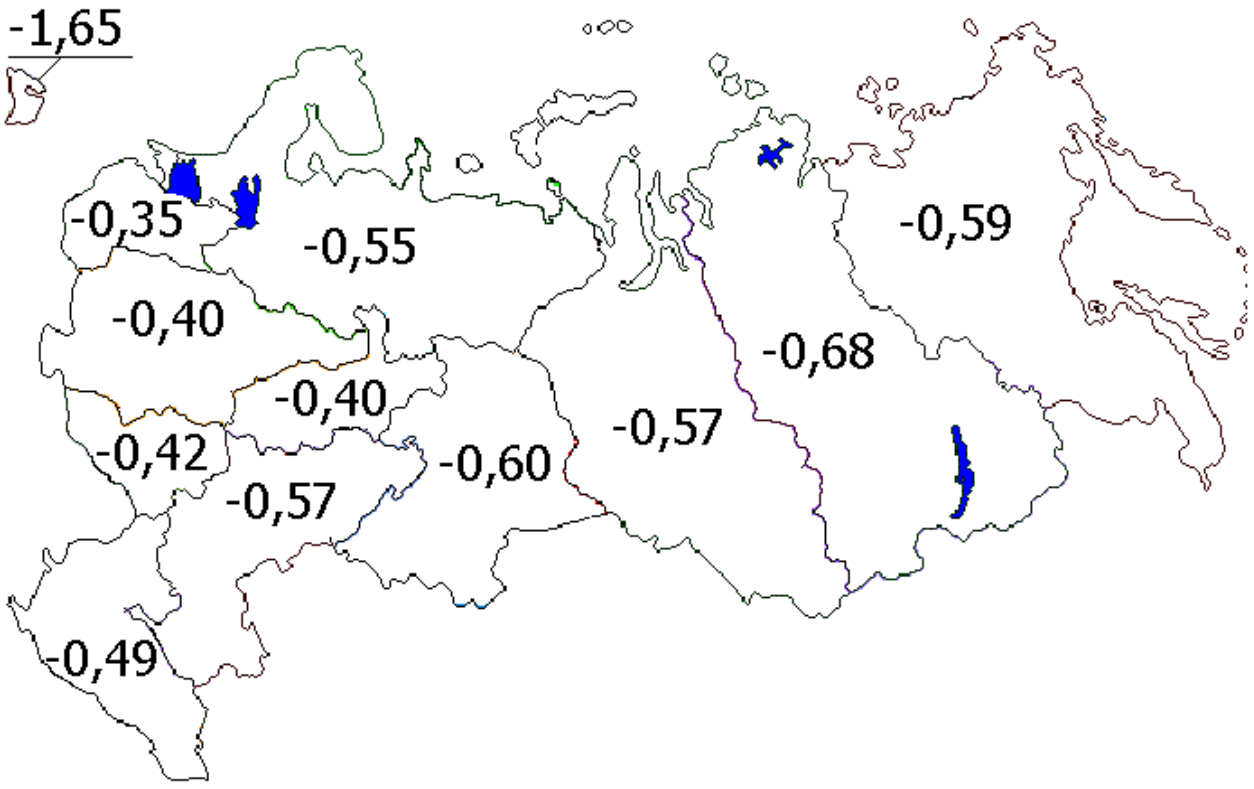


Table 3.1. VAR estimation.

	Production	Unemployment	Binary variable	F-statistics
Production	0.99 [0.01]***	0.027 [0.20]	0.002 [0.80]	104.79
Unemployment	0.0001 [0.03]	0.977 [0.02]***	0.0007 [0.0006]	930.45

Note: SE are in parentheses.

Table 3.2. VAR estimation.

	Services	Unemployment	Binary variable	F-statistics
Services	0.99 [0.02]***	0.1 [0.13]	-0.001 [0.003]	123.14
Unemployment	0.003 [0.003]	0.955 [0.02]***	0.0001 [0.0006]	949.15

Note: SE are in parentheses.

Table 3.3. VAR estimation.

	Production	Services	Production· Demand for labor	Production · Production	Services· Demand for labor	F-statistics
Production	0.511 [0.20]***	0.512 [0.21]***	0.468 [0.23]**	-0.179 [0.03]***	-0.401 [0.23]*	104.79
Services	0.129 [0.03]***	0.869 [0.03]***	-0.07 [0.02]***	0.136 [0.04]***		930.45

Note: SE are in parentheses.

Table 3.4. VAR estimation.

	Raw sectors	Processing sectors	Services financial intermediation and management	Other Services	F-statistics
Raw sectors	0.975 [0.15]***	0.013 [0.06]	0.005 [0.05]	-0.003 [0.03]	216.84
Processing sectors	0.047 [0.45]	0.912 [0.14]***	0.034 [0.039]	-0.017 [0.03]	154.78
Services financial intermediation and management	-0.072 [0.29]	0.183 [0.48]	0.89 [0.11]***	0.176 [0.07]***	42.42
Other Services	-0.137 [0.52]	0.038 [0.68]	0.109 [0.19]	0.654 [0.13]***	10.11

Note: SE are in parentheses.

Table 3.5. VAR estimation.

	Raw sectors	Processing sectors	Other Services	Unemployment	Binary variable	F-statistics
Raw sectors	0.975	0.013	0.005	-0.003	-0.003	217.47
	[0.15]***	[0.06]	[0.05]	[0.03]	[0.03]	
Processing sectors	0.047	0.912	0.034	-0.017	-0.017	153.21
	[0.45]	[0.14]***	[0.039]	[0.03]	[0.03]	
Other Services	-0.072	0.183	0.89	0.176	0.176	38.06
	[0.29]	[0.48]	[0.11]***	[0.07]***	[0.07]***	
Unemployment	-0.137	0.038	0.109	0.654	0.654	516.82
	[0.52]	[0.68]	[0.19]	[0.13]***	[0.13]***	

Note: SE are in parentheses.

Table 3.6. VAR estimation.

	Raw sectors	Processing sectors	Services financial intermediation and management	Other Services	Raw sectors· Demand for labor	Process industry· Production	Other Services · Demand for labor	Services finance intermed· Demand for labor	F-statistics
Raw sectors	0.406	0.085	0.102	0.257	0.551	-0.129	-0.256	-0.053	216,84
	[0.09]***	[0.09]	[0.02]***	[0.03]***	[0.06]***	[0.03]***	[0.03]***	[0.03]*	
Processing sectors	-0.261	0.932	0.04	0.179	0.394	-0.021	-0.198	-0.019	154,78
	[0.08]***	[0.08]***	[0.02]**	[0.03]***	[0.05]***	[0.08]	[0.03]***	[0.03]***	
Other Services	0.24	0.259	0.647	0.328	-0.608	0.023	0.381	-0.475	10,11
	[0.18]	[0.17]	[0.07]***	[0.04]***	[0.11]***	[0.06]	[0.06]***	[0.05]	
Services financial intermediation and management	0.346	-0.249	0.034	0.151	0.005	0.091	-0.187	1,130	10,11
	[0.16]***	[0.15]**	[0.04]	[0.06]***	[0.1]	[0.05]	[0.05]***	[0.05]***	

Table 4.1. OLS Regression (Machine building industry is the reference group)

	1994	1995	1996	1998
Wage premiums in Fuel & Energy industries	0.497	0.281	0.521	
	[2.94]***	[1.73]*	[2.49]**	
Wage premiums in Metal industries	0.421	0.154	0.513	0.157
	[2.46]**	[-0.97]	[2.44]**	[-0.65]
Wage premiums in Chemical industries	0.209	0.211	0.625	0.159
	[-0.69]	[-0.98]	[2.61]***	[-0.25]
Wage premiums in Wood processing	-0.243	-0.14	0.439	-0.978
	[-1.41]	[-0.79]	[2.14]**	[3.46]***
Wage premiums in Building materials	0.233	0.044	0.004	-0.109
	[-1.16]	[-0.22]	[-0.01]	[-0.4]
Wage premiums in Light industry	0.226	-0.044	0.25	-0.254
	[-1.24]	[-0.23]	[-1.1]	[-0.93]
Wage premiums in Food industry	0.233	0.044	0.253	-0.338
	[-1.59]	[-0.29]	[-1.62]	[1.74]*
Wage premiums in other industries	-0.202	-0.075	0.417	-0.056
	[-0.92]	[-0.39]	[1.73]*	[-0.19]
Wage premiums in Agriculture	-0.761	-0.706	-0.705	-0.891
	[7.08]***	[6.06]***	[4.99]***	[6.66]***

*Note: Dependent variable log hourly wage, t-statistics in parentheses, *, ** and *** indicate 10%, 5% and 1% significance, respectively.*

Table 4.2. OLS Regression (Machine Building industry is the reference group)

	1994	1995	1996	1998
Wage premiums in Fuel & Energy industries	64.38	32.45	68.37	
	52.35	16.65	67.03	17
Wage premiums in Chemical industries	23.24	23.49	86.82	17.23
	-21.57	-13.06	55.12	-62.39
Wage premiums in Building materials	26.24	4.5	0.4	-10.33
	25.36	-4.3	28.4	-22.43
Wage premiums in Food industry	26.24	4.5	28.79	-28.68
	-18.29	-7.23	51.74	-5.45
Wage premiums in Agriculture	-53.28	-50.64	-50.59	-58.98

Dependent variable log hourly wage, the numbers are the percentages of the worker's wage.

Table 4.3. Test for coefficient equality for 1994 year, H_0: $wp_i=wp_j$

	wp11	wp12	wp13	wp15	wp16	wp17	wp18	wp19	wp20
wp11	1								
wp12	0.72	1							
wp13	0.38	0.52	1						
wp15	0	0	0.18	1					
wp16	0.28	0.44	0.95	0.05	1				
wp17	0.23	0.4	0.96	0.04	0.98	1			
wp18	0.18	0.34	0.94	0.02	1	0.98	1		
wp19	0.01	0.02	0.25	0.87	0.12	0.11	0.07	1	
wp20	0	0	0	0	0	0	0	0.01	1

Table 4.4. Test for coefficient equality for 1998 year, H_0: $wp_i=wp_j$

	wp12	wp13	wp15	wp16	wp17	wp18	wp19	wp20
wp12	1							
wp13	1	1						
wp15	0	0.1	1					
wp16	0.43	0.69	0.02	1				
wp17	0.23	0.54	0.05	0.69	1			
wp18	0.07	0.44	0.04	0.45	0.78	1		
wp19	0.55	0.75	0.02	0.89	0.6	0.39	1	
wp20	0	0.1	0.76	0	0.02	0	0	1

Table 4.5. Panel Regression with Fixed Effects

tariffs	2.149
	[-0.7]
lagged tariffs	-3.557
	[-1.7]
1994 year	0.255
	[2.10]**
1996 year	0.288
	[2.59]**
1998 year	0.144
	[-0.94]

Table 4.6. OLS Regression

import	-0.201
	[1.72]*
export	0.485
	[-0.9]
1994 year	0.112
	[-0.86]
1996 year	0.251
	[2.07]**
1998 year	-0.069
	[-0.56]

*The dependent variable is estimated wage premium, t-statistics in parentheses, *, ** indicate 10% and 5% significance, respectively.*

Table 4.7. OLS Regression (nontraded industry is a reference group)

	1994	**1995**	**1996**	**1998**
high inter-industry trade	0.189		-0.149	
	[-0.433]		[-0.241]	
export oriented	0.159	0.299	0.549	0.056
	[-1.3]	[2.209]**	[-3.788]***	[-0.233]
Import competing	0	0.1	0.026	-0.085
	[-0.003]	[-0.831]	[-0.2]	[-0.481]

*The dependent variable is log hourly wage, t-statistics in parentheses, **, *** indicate 5% and 1% significance, respectively.*

Table 4.8. Panel regression with fixed effects.

	(i)	**(ii)**
tariffs	0.028	-0.967
	[-0.04]	[-0.75]
1994 year	0.224	0.196
	[2.52]**	[2.29]**
1996 year	-0.035	0.023
	[-0.47]	[-0.33]
1998 year	-0.361	-0.324
	[3.93]***	[2.95]***
GRP	-0.749	
	[-0.4]	
tariffs lagged		0.763
		[-0.49]

*The dependent variable is log hourly wage, t-statistics in parentheses, **, *** indicate 5% and 1% significance, respectively.*

Table 5.1. test *Low skilled=0*

p-value	0.293	0.086	0.937	0.154

Table 5.2. State Decomposition of Log Hourly Wage Differences

	1994		**1998**	
	Unskilled	**Skilled**	**Unskilled**	**Skilled**
	weight	**weight**	**weight**	**weight**
Total log wage differential	52.99	52.99	46.32	46.32
Age	-1.29	-0.41	-6.77	2.95
Gender	-8.24	-4.98	-5.06	-10.67
Education	66.5	55.4	66.7	30.3
Moscow & St. Petersburg	9.19	5.32	6.12	3.48
Wage premiums in Fuel & Energy industries	-2.97	-3.25		
Wage premiums in Metal industries	-2.92	-3.77	-2.57	-2.81
Wage premiums in Chemical industries	-1.93	-1.57	-0.11	-0.13
Wage premiums in Machine building	-2.25	-1.45	-5.29	-4.75
Wage premiums in Wood processing	-1.15	-1.43	0.09	0
Wage premiums in Building materials	-0.86	-1.74	-1.91	-5.42
Wage premiums in Light industry	-3.45	-4.01	-1.45	
Wage premiums in Food industry	-3.52	-4.06	-3.33	-4.77
Wage premiums in other industries	0.3	0.32	-0.01	-0.01
Nonmanufactoring	2.16	10.4	-18	12.78
Attributable to difference in observable characteristics	49.62	44.77	28.39	20.99
Attributable to difference in unobservable characteristics	50.38	55.23	71.61	79.01

Table 5.3. Dynamic Decomposition of Log Hourly Wage Differences

	Skilled		Unskilled	
	1994 year	**1998 year**	**1994 year**	**1998 year**
Total log wage differential	-40.69	-40.69	-43.28	-43.28
Age	-0.46	-0.59	-1.57	1.53
Gender	0.75	0.46	0.05	0.1
Education	-3.14	-3.63	6.28	4.13
Moscow & St. Petersburg	-0.09	-0.11	1.94	2.27
Wage premiums in Fuel & Energy industries	4.82		2.43	
Wage premiums in Metal industries	1.14	1.29	0.49	0.47
Wage premiums in Chemical industries	2.66	2.11	0.89	1.03
Wage premiums in Machine building	1.82	2.21	1.87	3.17
Wage premiums in Wood processing	1.31	0.51	0.24	0
Wage premiums in Building materials	-0.63	-0.44	1.21	1.19
Wage premiums in Light industry	0.95	0.35	1.03	
Wage premiums in Food industry	1.17	1	1.22	1.3
Wage premiums in other industries	0.2	0.31	0.45	0.91
Nonmanufactoring	-7.29	-7.04	-10.87	-14.24
To difference in observable characteristics	3.22	-3.58	5.65	1.86
To difference in unobservable characteristics	96.78	103.58	94.35	98.14