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The Role of the Household in Explaining
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ABSTRACT

Where to Work? The Role of the Household in Explaining Gender Differences in Labour Market Outcomes

With the use of panel data constructed from the 1995 and 1997 Bulgarian Integrated Household Surveys, this paper explores the sectoral reallocation of labour by gender. In Bulgaria, men and women started the transition on an almost equal standing, allowing us to concentrate our attention on the impact of individual and household characteristics in explaining gender differences in the labour market. We find that household characteristics, rather than alternative explanations such as differences in individual characteristics or pure gender discrimination, better explain the observed gender differences in labour market outcomes.

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Women in Central and Eastern European (CEE) labour markets started the process of transition from socialist to market economies with a status quo that differed markedly from women in both developed western economies and traditional developing countries. At the beginning of the transition, they enjoyed an equal or higher level of education than men, virtually no unemployment, only temporary labour force departures, and lavish maternity and child related benefits. We investigate impacts of household and individual characteristics on the dynamics of occupational outcomes for men and women using a panel constructed from the 1995 and 1997 Bulgarian Integrated Household Surveys. This panel enables us to use individual and household level data to provide a fresh perspective on these dynamics. In particular, the panel bridges a period of severe crisis and structural change: the first year is prior to the initialization of major economic reforms and the second year of the panel is just after the economy has undergone major economic change.

Empirical studies addressing the question of how economic liberalization has affected the relative position of women and men in transition economies have shown the decrease in participation rates among women was just slightly larger than among men, while female and male unemployment rates were similar (Paukert, 1995). Indeed while unemployment did not vary by gender in countries such as Bulgaria and Russia, men in Slovenia, Ukraine and Hungary suffered higher unemployment rates than women (Brainerd, 2000; Lauerova and Terrell, 2002). In other words, little convincing evidence can be found supporting the conventional wisdom of a significant increase in the differences between male and female non-employment in Central and Eastern Europe, though the pattern of labour reallocation had gender-based elements, and in particular a disproportionate dropping out of the labour force by low skilled women (Hunt, 2002).

We model the inter-sectoral mobility of men and women using a discrete state Markov Chain. In contrast to previous studies we focus not only on the job-to-job and job-to-non-employment reallocation and the related human capital explanations of the related mobility, but also speculate on explanations of the diverse gender-based choices between the relatively secure public sector employment and the presumably higher pay-higher risk private sector employment in the context of macro-financial crisis and radical restructuring of the economy. Secondly, we explore the determinants of these sectoral reallocations with a special emphasis on household characteristics such as number of children, marital status and household wealth, after controlling for observed human capital characteristics such as education and experience.

Our results fail to provide convincing evidence in favour of disproportionate female reallocation into unemployment and out of the labour force. We do find strong support for the hypothesis that household and financial considerations play significant roles in shaping the preference structure of women in the labour market that is different from that of men.

The rest of the paper is structured as follows. Section 2 provides a brief description of the crisis-ridden transition in Bulgaria from socialist to a market based system, underlining the existent evidence on labour market outcomes for male and female participants in this transforming labour market. The data is described in Section 3, while Sections 4 and 5 report the results from our analysis. Section 4 reports the results from our Markov chain analysis of inter-sectoral reallocation of male and female labour in Bulgaria. Section 5 reports our multinomial logit results for the determinants of this reallocation. Finally, Section 6 concludes.

2. Transition, Crisis, and the Labour Market

During the first half of the 1990s, Bulgaria experienced not only one of the most persistent and dramatic economic depressions, but also one of the highest correlations between output loss and labour shedding among the transition economies of CEE. While the CEE economies that joined the European Union (EU) in 2004 reached the trough of their output losses in 1991-92 and contained inflation by 1993, Bulgaria's GDP continued to fall through 1993 and hyperinflation was witnessed as late as 1997. During the same period the cumulative employment loss in Bulgaria was almost double the CEE average, and the ratio of employment to GDP decreased by 88 percent, significantly exceeding the ratio of more advanced CEE economies (Garibaldi, Macovec and Stoyanova, 2001).

One of the primary reasons for the depressed labour market was the absence of large scale industrial restructuring in the aftermath of the breakdown of the COMECON (Council for Mutual Economic Assistance), contributing to one of the lowest rates of job creation in the midst of high job destruction among the CEE economies (Faggio and Konings, 2002). However, neither job separations nor job finding probabilities appeared to be radically different across genders. Female unemployment rates remained similar – at times lower – to those of male labour market participants, partly due to a slightly higher level of labour force drop-outs. Unemployment to employment flows were only slightly lower for women than men in the Bulgarian labour market (Rutkowski, 2003).

Large scale restructuring took place in Bulgaria only after the financial crisis of 1996-97. It included rapid privatization, reform of the pension and welfare structure, and the establishment of a currency board. One of the immediate outcomes of the program was the transfer of most of Bulgaria's productive resources from

public into private hands, such that by the end of the 1990s, the private sector accounted for nearly 70 percent of GDP (IMF, 1999; Bulgarian Privatization Agency 2000). In the process, official employment declined at the rate of 2 percent per annum and as late as 2001 the unemployment rate was as high as 17.3 percent; with 62 percent of the unemployed remaining unemployed for more than a year (Rutkowski, 2003; Garibaldi, Makovec and Stoyanova, 2001).

While job loss in the first half of the 1990s can be accounted for by shrinking real output, post-crisis labour reallocation occurred during large-scale enterprise restructuring. The reallocation of labour across the public and private sectors introduced an additional dimension to the experiences of male and female participants in the labour market. Prior to the crisis the private sector absorbed an insignificant share of the labour force, mostly in small service-oriented enterprises. There is evidence of negative selection and lower returns to skills for women as compared to men in the private sector (Falaris, 2004). This may be evidence of either low preference for private jobs among women, the reallocation of women to low skill occupations in the private sector, open gender discrimination of capitalist employers, or structural characteristics such as higher availability of low skill “female” occupations in the private sector (Azmat et al, 2006). There is evidence suggesting the post crisis period led to increased availability of higher skill jobs in the private sector and large flows of labourers towards these jobs (Dimova, 2005). Moreover, it has been proposed that there is inherently higher risk aversion among women who may tend to opt for higher risk - higher return occupations only as a way to enhance household welfare, as opposed to advancing personal career prospects (Hundley, 2000). Bulgaria’s transition offers the opportunity to explore the implications of structural reform on the gender-based labour reallocation.

3. Data

Our empirical analysis uses the 1995 and 1997 Bulgarian Integrated Household Surveys of the World Bank. The surveys provide detailed information about employment, income, education, and demographic characteristics of all members for about 2500 households in 1995, 1997 and 2001.¹ While the 2001 survey is conducted on a different sample than the earlier surveys, it is possible to merge the 1995 and 1997 surveys and analyse the behaviour of the members of 1639 common households. After accounting for discrepancies in the data, we are left with 2873 individuals of whom 1969 belong to the labour force group of 15-65 years of age.²

We use a discrete state Markov chain in the first part and a multinomial logit in the second part of our analysis. We distinguish among people with different employment and non-employment states, based on the sector of employment for the person's main job.³ Each individual is allocated into one of four mutually exclusive categories, 1) Public, 2) Private, 3) Unemployed, and 4) Out-of-the-Labour-Force. The unemployed are those officially unemployed while those individuals who did not work and were not officially unemployed are Out-of-the-Labour-Force.⁴

Individuals who worked either full or part-time were allocated to the Public or Private categories. Both government employees and employees of state-owned enterprises are in the public sector,⁵ while the Private category includes those workers employed by private firms and those workers who described themselves as self-employed. The merging of private sector employees and self-employed individuals into one category was due to the small number of self-employed individuals, 60 in 1995 and 63 in 1997, of which nine changed labour force state between the two survey periods, making it impractical to analyse them as a separate category.

Descriptive statistics based on these data are reported in Tables 1a and 1b. We report the means and standard deviations of the characteristics of individuals allocated into each of the four sectors, separately for men and women and for 1995 and 1997. Included are average years of age and education, a dummy variable indicating whether an individual belongs to an ethnic minority group (the ethnic minorities in Bulgaria being Roma and Turks), a dummy variable indicating whether an individual resides in an urban as opposed to a rural area and a dummy variable indicating whether an individual is married or not.

We are also interested in exploring the impact of characteristics that may determine a different preference structure for male and female workers in the labour market. We include the number of children less than 6 years old and between 7 and 14 to control for potential child related gender based differences in the preference for leisure, home production and job security (Lundberg, 1988; Hundley, 2000). The null hypothesis is that children increase the female probability of being unemployed and out-of-the-labour force and decrease her probability of opting for high risk and high return jobs. We build upon the hypothesis of decreasing absolute risk aversion – implying that the occupation chosen by an individual with greater initial income will be riskier than the occupation chosen by a similar person with smaller initial income – by including in our analysis the logarithm of family income from earnings, social security benefits, home production and rents or financial assets (King, 1974).

Our statistics indicate that the average age of men and women working in either the public or the private sector decreased at a similar rate, the average age of unemployed men and women remained virtually the same at around 34 years of age, and the age of individuals out of the labour force increased more for men than for women. Average years of education for both men and women in the public sector

remained stable at around 11 years, and the average years of education of both males and females out of the labour force remained stable at around 9 years. However, while the years of education of men reallocated into the private sector and unemployment remained roughly the same at

[Table 1 here]

around 11 and 9, respectively, the average years of education of women who reallocated into these sectors increased slightly, from 10.95 to 11.66 for women in the private sector and from 9.82 to 10.01 for unemployed women. This observation is consistent with evidence of negative selection of women in the private sector prior to restructuring (Falaris, 2004). The increase in the average education of women in the private sector in the aftermath of the crisis and massive privatization is also consistent with the possibility that women were more prone to remaining in the public sector until pushed out during the process of massive structural reform.

These tendencies in inter-sectoral reallocation by gender are supported by other important individual and household characteristics. While the mean of the logarithm of household income for both men and women working in either the private or the public sector remained roughly the same at around 9 - 9.50, in both years the mean household income of unemployed women was significantly higher than that of men. The latter observation perhaps indicates women had a higher reservation wage and higher propensity to drop out of the labour force rather than continue looking for another job, if not constrained by household budgets. Secondly, while the proportion of both unemployed men and women and those out of the labour force who had either very small children or children of school age dropped, the pattern of gender based reallocation among the working sectors was rather different for people with children.

Although the proportion of men and women with small children who worked in the public sector remained roughly the same -- around 0.30 for females and around 0.24 for males -- the proportion of women with small children in the private sector dropped from 0.40 to 0.37 and the private sector proportion of men with small children increased from 0.36 to 0.43. At the same time, while in the public sector proportion of both men and women with school age children increased, the proportion of females with school age children in the private sector increased significantly, from 0.27 to 0.45 and the private sector proportion of men with school age children dropped from 0.42 to 0.38. The differences in sectoral reallocation of men and women with children, especially in so far as the private sector reallocation is concerned, are difficult to interpret at this stage. However, they do add an interesting dimension to the gender differences in the patterns of inter-sector reallocation of men and women.

4. Mobility

As indicated earlier, our analysis consists of exploring the transitions of working age women and men across labour market states, on the one hand, and the factors that explain these transitions, on the other hand. In this section we describe the results from our Markov chain analysis of inter-sectoral mobility of men and women in Bulgaria, while the next section reports the results from our multinomial logit analysis of the factors determining these transitions. Let $x_t = (x_{1t}, x_{2t}, x_{3t}, x_{4t})'$ represent the state of the world in period t , where x_{it} is the probability that an individual is a member of category i . The first-order Markov assumption is that the state of the world in period t is a function only of the state of the world in period $t-1$. That is, $p(x_t | x_{t-1}, x_{t-2}, \dots) = p(x_t | x_{t-1})$ where $p(\cdot)$ is the probability density function of the random variable x_t .

The discrete-state first-order Markov chain model (FOMC) is therefore,

$$(1) \quad x'_t = x'_{t-1} P ,$$

where $P = [p_{ij}]$ represents the transition probability matrix. The element p_{ij} of P is the unconditional probability that an individual that is a member of category i in period $t - 1$ becomes a member of category j in period t . The transition probability matrix describes the evolution of the state, x , over time. The FOMC model described in (1) has a unique limiting (ergodic) distribution if there is only one eigenvalue of P that has modulus equal to 1.⁶ Given some initial state, x_0 , it follows from (1) that

$$(2) \quad x'_t = x'_0 P^t ,$$

so that the limiting (or ergodic) distribution implied by the FOMC is

$$(3) \quad \pi' = \text{Lim}_{t \rightarrow \infty} x'_0 P^t .$$

We are interested in the three parameters that describe (1). These are, x_0 , P , and π . In order to estimate these parameters, and estimate the standard errors for these parameters we use the maximum likelihood estimator for P . The standard errors reported are the asymptotic standard errors that are obtained by inverting the information matrix at the maximum likelihood estimates. The limiting distribution is the left eigenvector of P associated with the eigenvalue equal to 1. The reported invariant distribution is the one based on the point estimate for P .

As our primary focus is on gender differences in labour market behaviour prior to and in the aftermath of the 1996-97 economic crises in Bulgaria, we present estimations for men and women, separately. Our primary interest at this stage is on finding out whether there is a tendency to disproportionately allocate women into the states of unemployment and out-of-the-labour force, as well as any observable gaps between men and women in the reallocations in and out of the public and private sector.

[Table 2 here]

[Table 3 here]

Tables 2 and 3 report the maximum likelihood estimates for the cross-sectional distributions for 1995, 1997, the limiting cross-sectional distribution under the assumption that the observed transition continued unchanged indefinitely, and the transition probability matrix, P , for men and women, separately. These results indicate that while in 1995 the proportion of women and men in the public sector and unemployment were roughly the same, around 0.38 and 0.10, respectively, the proportion of men in the private sector was about twice that of women, and the proportion of women out of the labour force was about 10 percent higher than the proportion of men. In 1997 we see that the proportion of males and females are again roughly the same in the public sector and unemployment but that the proportion in the public sector has fallen to around 0.30 while the proportion in unemployment has increased to between 0.12 and 0.13. The proportion of males and females in private sector employment has slightly increased but it is still the case that males are twice as likely to work in the private sector as females (0.15 to 0.08). It is apparent that most

people (males or females) that are separated from their job in 1995 move to the out of labour force state in 1997. Furthermore, a comparison between the initial and invariant distribution shows that if the process continued without change, the proportions of both males and females in the public sector would fall to about half of its initial levels while the proportion of both males and females among the unemployed would increase by roughly 50 percent.

When we look at the results from the probability transition matrix we also see some interesting differences between males and females. For males and females who worked in the public sector in 1995 we see that females have a higher attachment to the public sector in that the probability females stay in the public sector is 0.67 while the probability males stay in the public sector is between 0.62 and 0.63. For those males and females who left the public sector between 1995 and 1997 we see that males are more likely to move to the private sector (0.116 to 0.058), females are more likely to move to unemployment (0.076 to 0.045), while males have a slightly higher probability of moving to the out-of-labour force category.

For those individuals who were in private employment in 1995 we again see differences between males and females. Males are more likely to stay in the private sector than females (with a probability of 0.47 to the female probability of 0.36). However, males and females have the same chance of moving from the private sector to the public sector (approximately 0.16) while females are much more likely to move from the private sector to either the unemployment or out-of-the-labour-force state.

Looking now at individuals who were unemployed in 1995, we see that males and females have an equal chance of staying unemployed and an equal chance of moving from the unemployment state to private employment in 1997. However, males have a significantly higher probability of moving from unemployment to public

employment than females while females have a higher probability of moving from unemployment to the out-of-labour-force state in 1997.

Finally, there does not appear to be significant gender differences amongst males and females who began in the out-of-labour-force state in 1995. There are small differences in the probability of moving to public and private employment but these differences are not significant.

The patterns that we have identified illustrate interesting dynamics. For example, the proportion of males and females in the public sector are roughly equal in 1995 and in 1997, albeit lower in magnitude in 1997. However, how these proportions remained the same is quite different for males and females. Females were more likely to stay in the public sector while males were more likely to move out. To counterbalance this effect more males moved from unemployment into the public sector than females. We also see large differences between males and females moving into the private sector. Males who left the public sector were more likely to go to private sector employment while those females that left the public sector were more likely to go to unemployment.

Another interesting finding is that, contrary to evidence from more advanced transition economies, such as the Czech republic (e.g., Lauerova and Terrell, 2002), our results fail to support the hypothesis of a lower female probability of exit from the states of unemployment and out of the labour force, the respective probabilities of exit from unemployment and out of the labour force averaging roughly 0.61 and 0.22 for both men and women.

In sum, despite similarities related to exit from the states of unemployment and out of the labour force, women faced a higher probability than men of exiting the private sector and a lower probability of entering the private sector, except via

unemployment. Men, on the other hand, faced a higher probability of exiting the public sector and a lower probability of entering the public sector, via unemployment. These results are a priori difficult to interpret. On the one hand, one could argue that women had a higher preference for the safer public sector (lower variance in wages) as opposed to more risky private employment and this influences their tastes for entering the public sector upon exiting the out of the labour force state and their lower probability of dropping out of the public sector. However, it is difficult to explain at this stage the higher probability of women exiting the labour force from unemployment together with the lower probability of entering the public sector and similar probability of entering the private sector. One possible explanation is gender discrimination against women tarnished by the unemployment experience. An equally plausible explanation would be a lower willingness among women to continue struggling in the labour market after facing unemployment unless seriously pressured by financial or other household constraints. To address these possible explanations, in the next section we take into account the impact of individual and household level characteristics on the choice between different occupations across genders.

4. Regression results

To highlight the determinants of the above inter-sectoral allocations we perform four multinomial logit regressions, in which the dependent variable is the location of an individual in 1997, namely public sector employment, private sector employment, unemployment and out-of-the-labour-force. The four regressions are performed over the samples of people that were allocated to each of the four possible sectors in 1995. Thus, the marginal effects from the multinomial logit regressions indicate the probability a person with given characteristics and starting in one of the four different

sectors in 1995 is in a particular sector in 1997. For example, in the first regression we restrict our sample to people who worked for the public sector in 1995 and look at the covariates that determine the probability these individuals remain in the public sector, move to the private sector, remain unemployed or exit the labour force by 1997. In the second regression the original sample is restricted to people who were in the private sector in 1995 and we look at what explains the chance these individuals remain in the private sector, or move to the public sector, unemployment or out of the labour force. Finally, in the third and fourth regressions we perform the same type of exercise over the samples of individuals who were unemployed and out-of –the-labour-force in 1995.

As indicated earlier, aside from the usual human capital characteristics – education and age – we control for household level characteristics such as marital status, the presence of children younger than 6 and between 7 and 15, and the logarithm of total household income. To avoid the possibility of endogeneity of these covariates we include in the regressions their 1995 values. As the size of the sample does not permit separate estimations for men and women, to account for gender differences in labour market performance, we interact all of our covariates with a dummy variable taking the value of one if the individual considered is a female.

[Table 4 here]

Table 4 reports the marginal probabilities (with standard errors in parentheses) obtained from a multinomial logit regression looking at all individuals who worked in the public sector in 1995. The results from the multinomial logit regression are consistent with what we saw from the Markov chain results in that females are

significantly more likely to stay in the public sector than males and for those individuals that move from the public sector, females are significantly less likely to move to the private sector than males.

Furthermore, using the multinomial logit regression we are able to include more covariates in order to investigate whether there were other factors apart from gender that were important in the describing what happened during the crisis to those who were in the public sector in 1995. Looking more closely at gender we see that while females are more likely to stay in the public sector, the marginal probability of staying is negatively related to household income. This suggests that women from wealthier households are less likely to stay in the public sector. We also find that married individuals are significantly more likely to stay in the public sector than single individuals but that there is no difference between married males and females.

Looking at individuals who move out of the public sector we see that the older they were the more likely they would move to the out-of-the-labour-force sector. However, the coefficient on the interaction between the female binary variable and age was not significant indicating that there are not gender differences in older individuals moving from the public to out of the labour force. In fact there does not appear to be any gender differences for those individuals that move except for the result that females are significantly less likely to move to the private sector from the public sector. We also see that having young children does not have any impact on an individual's probability of moving from or staying in the public sector. Finally, there is no evidence of a gender effect of exit of individuals out of the public sector into unemployment and out-of-the-labour force.

[Table 5 here]

Table 5 reports the marginal effects obtained from a multinomial logit regression based on those individuals who were in the private sector in 1995. The results here are somewhat different from the results for public sector employees. Individual characteristics do not appear to have a significant impact on a person's probability of staying in the private sector but we do see some significant effects for those people who move. We observe that there is a significant positive effect for married people when moving to the public sector. That is, married people are more likely to move to the public sector than single people. There is no significant difference for females and, unfortunately, we are not able to examine the interaction between gender and married for this data. This is because we do not observe any single females moving from the private sector to the public sector. This is in itself an interesting finding but we are unable to quantify this in a statistical sense.

When we examine the effect of children we see that individuals with children who move out of the private sector are significantly less likely to move to the public sector and individuals with older children are more likely to move out of the labour-force. However, females with older children are less likely to move out of the labour force if they move out of the private sector. We also see that more educated females, if they move from the private sector, have a higher probability than males of moving to unemployment. Given these results for females and individuals with children one possible explanation is that the private sector is not desirable for women who want a career but they stick to their job if they have children.

[Table 6 here]

Table 6 reports the marginal effects from a logit regression for those people who were unemployed in 1995. Looking at column three we do not find any characteristic that have a significant effect on a person's probability of staying unemployed. However, when we look at those people who do move out of unemployment we see that education has a positive impact on the probability of finding employment in the private sector and this impact is the same for males and females while females have a significantly lower probability of finding work in the public sector than males. This result is consistent with what we saw in the Markov chain results. For individuals with young children we also see some interesting results. Individuals with children younger than six years old and who move out of unemployment are more likely to move to the private sector and less likely to move out of the labour force. However, there are some gender differences in this result in that the positive impact for females with young children is significantly lower than for males as evidenced by the significant negative coefficient on the interaction between the Female binary variable and the Children Less than 6 binary variable. This is consistent with females with young children not finding the private sector a suitable place to work.

Finally, Table 7 reports the marginal probabilities from the multinomial logit regression for those individuals who were out of the labour force in 1995. Looking first at column four we see that older people are more likely to stay out of the labour force, married people are less likely to stay out of the labour force, females are more likely to stay out of the labour force and males with higher household income are more likely to stay out of the labour force. When we look at interaction terms we see that the marginal probability that a female stays out of the labour force declines with household income.

For those individuals who moved out of the out-of-labour-force state we see that older people were less likely to move to any of the other three classifications, married individuals are more likely to move to the public sector than single people, ethnic minorities are less likely to move to the public sector, and urban people are more likely to move to the private sector than rural individuals. We also see that females who have children less than six years old are less likely to move to the private sector than males with young children and we also see the higher the household income the lower the probability of moving to the public sector or unemployment. However, the effect of household income is effectively zero for females when looking at movements to unemployment.

[Table 7 here]

Looking at all of our results together some interesting gender differences appear across the different sectors. It is clear that females in the public sector behave differently from those females that were not in the public sector in 1995. Females already in the public sector are far more likely than males in the public sector to stay in public sector employment. However, for women outside of the public sector the pattern is to move away from private employment and into either the out-of-labour-force sector or to unemployment. This is true even for those females who moved from the public sector. When females did move into employment they appeared to favour the public sector over the private sector, especially those who were married or had families. Potential explanations for this observed behaviour are that females are more risk-averse than males and more so if they are married and/or have a family or that the private sector is not a desirable place to work if you are a female. Evidence in favour of the explanation that females are more risk-averse includes the fact that we see that public sector wages have a much smaller variance and hence are less risky and that

women who do move from the relatively low-risk public sector are from wealthier families. Another way to think about this problem is that households are solving an optimal portfolio type problem with their joint incomes, taking into account both expected income and expected risk in their decision making.

An obvious question to ask is whether females are being discriminated against in the labour market during this time. We saw that the probability a male worked in the public sector is equal to the probability a female worked in the public sector both in 1995 and in 1997. We did observe gender differences among those who got jobs in the public sector in 1997, but this could be due to the public sector needing to hire more males in order to make up for the fact that more males left the public sector than females.

The private sector showed more bias in that females were less likely to move to the private sector from the public sector but it is not clear what type of bias is involved. It could be that the males who moved from the public sector took the good jobs in the private sector that were on offer while the females who moved were less interested in taking the other jobs the private sector had to offer. Or it may be that the jobs on offer in the private sector were male oriented jobs (construction, physical labour).

While we do not have detailed occupation data that can help us explore these possibilities, we observe neither a significant effect of gender alone on the mobility of individuals in and out of unemployment and out of the labour force or major differences in human capital endowments of men and women reallocating into any of the labour market states explored. Household characteristics, such as family income, marital status and household composition, on the other hand, prove to be the main explanatory factors behind labour market allocations, indicating a more important role

for household level determinants in labour market choices than played by open discrimination or structural factors favouring male employees in Bulgaria.

5. Concluding Remarks

With the use of panel data constructed from the 1995 and 1997 Bulgarian Integrated Household Surveys, this paper explores the reallocation of male and female labour in Bulgaria across four different sectors of the labour market, namely unemployment, out of the labour force, public sector and private sector. First, we used a Markov chain model to assess both the gender based steady state distribution of individuals across the four sectors and the respective unconditional and conditional probabilities of reallocation across each pair of sectors. Second, we used a multinomial logit model assessing the determinants of mobility for each sector. The timing of the surveys is especially fortuitous as it allows us to compare the labour reallocation of male and female labour force participants prior to the crisis of 1996-97 when little structural reform had taken place and after the crisis which witnessed the initiations of one of the most drastic industrial restructuring processes in the history of the transition economies of CEE. With this we explore the impact of the crisis and radical restructuring by gender and their differential ability to capture the rents of the changing environment.

Our results reveal striking gender differences with respect to the reallocation of male and female employees to and out of the public and private sectors. We find that human capital characteristics, and in particular years of education, did not have a significant impact on the choices made by women, while household characteristics in the form of total income and family size influenced these choices substantially. Specifically, the presence of children in the family seems to generate a higher

preference for secure public sector employment among women, and larger initial household income increases their relative reservation wage and level of risk taking. Moreover, we do not find convincing evidence in favour of disproportionate female reallocation into unemployment and out of the labour force.

Our results highlight the role household characteristics play in male and female labour market decisions. The Bulgarian experience is interesting in a more general context as men and women started the transition on an almost equal standing, allowing us to concentrate our attention the impact of individual and household characteristics in explaining gender differences in the labour market. Our results highlight the position of women less as victims of a discriminatory environment than as members of the labour market whose actions are often determined more by considerations at the household level than the individual level.

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¹The surveys included information for about 2466 households with a total of 7199 members in 1995, 2323 households with 6947 members in 1997 and 2633 households with 7844 members in 2001.

² In restricting the labour force sample to age group 15-65 we use the ILO standards which were applied by the National Statistics Institute in Bulgaria in its labour force surveys and by World Bank reports based on these surveys. Although the typical age of entering the labour force is 18 and the official retirement rate in Bulgaria in the mid-1990s was lower than 65, we prefer to stick to this standard age group due to the possibility that the largely unregulated private sector absorbs labourers at age groups lower than 18 and higher than 60. While we did experiment with an age restriction of 18-60, this did not qualitatively change our results, but reduced our degrees of freedom on account of smaller number of observations.

³ Given that an average of 30 individuals reported having a second job for each of the survey years, the categorization of labourers in accordance with their main job should not significantly affect our analysis.

⁴ In particular, an unemployed person is classified as somebody who a) did not work at all during the survey week, b) was actively looking for work within the preceding four weeks period, and c) was ready to start work within two weeks following the reference period. People who were neither working nor unemployed were classified as out of the labour force.

⁵ Since in our sample only 60 individuals in 1995 and 59 individuals in 1997 worked for the government, it is impractical to analyse them as a separate category.

⁶ Note that P is a row stochastic matrix, which implies that the rows of P sum to 1. In this case the maximum eigenvalue of P has modulus equal to 1. If there are no repeated eigenvalues with modulus equal to 1 then the limiting distribution is unique.

Table 1a: Descriptive Statistics

	Public'95		Public'97		Private'95		Private'97	
	Female	Male	Female	Male	Female	Male	Female	Male
Age	40.48	42.87	39.27	41.92	37.67	39.15	35.41	36.79
	11.55	0.03	8.67	9.60	11.16	10.80	11.15	11.33
Education	11.55	11.31	11.79	11.43	10.95	11.25	11.66	11.29
	2.95	3.02	2.92	3.33	3.45	3.15	2.99	2.82
Ethnic	0.10	0.08	0.08	0.09	0.15	0.18	0.19	0.21
	0.30	0.26	0.28	0.29	0.36	0.38	0.39	0.41
Urban	0.80	0.78	0.78	0.79	0.73	0.70	0.80	0.72
	0.40	0.60	0.41	0.41	0.45	0.46	0.40	0.45
Married	0.86	0.88	0.85	0.88	0.72	0.84	0.72	0.76
	0.35	0.34	0.35	0.33	0.45	0.37	0.45	0.43
Log Income	9.41	9.47	9.31	9.39	9.41	9.52	9.33	9.42
	0.60	0.60	0.71	0.72	0.64	0.65	0.80	0.70
Child6	0.29	0.24	0.30	0.24	0.40	0.36	0.37	0.43
	0.55	0.51	0.59	0.51	0.67	0.62	0.65	0.67
Child714	0.48	0.45	0.54	0.50	0.27	0.42	0.45	0.38
	0.73	0.71	0.74	0.75	0.57	0.69	0.75	0.69
N Obs	384	371	310	290	78	137	86	145

Table 1b: Descriptive Statistics

	Unemployed'95		Unemployed'97		Out of LF'95		Out of LF'97	
	Female	Male	Female	Male	Female	Male	Female	Male
Age	34.20	34.85	34.34	34.28	41.11	36.68	42.49	39.63
	11.19	13.09	11.74	12.17	18.35	19.12	17.34	18.52
Education	9.82	9.22	10.01	9.53	9.12	9.31	9.15	9.63
	3.21	2.95	3.19	2.74	3.71	3.47	3.63	3.34
Ethnic	0.30	0.33	0.27	0.32	0.17	0.25	0.17	0.20
	0.46	0.47	0.45	0.47	0.38	0.44	0.37	0.40
Urban	0.57	0.52	0.60	0.54	0.60	0.59	0.62	0.61
	0.50	0.50	0.49	0.50	0.49	0.49	0.48	0.49
Married	0.76	0.60	0.67	0.65	0.56	0.52	0.62	0.59
	0.43	0.49	0.47	0.48	0.50	0.50	0.49	0.49
Income	9.06	8.83	9.17	8.99	9.02	8.99	9.13	9.15
	0.83	0.91	0.76	0.89	0.90	0.81	0.84	0.75
Child6	0.40	0.42	0.35	0.36	0.23	0.19	0.24	0.18
	0.70	0.70	0.63	0.61	0.55	0.49	0.55	0.48
Child714	0.55	0.50	0.44	0.48	0.39	0.41	0.36	0.40
	0.74	0.77	0.70	0.74	0.68	0.69	0.66	0.68
N Obs	103	100	131	118	443	353	481	408

Table 2: Male Sample Results

	Public	Private	Unemployed	Out of LF
π_{95}	0.3861 (0.0157)	0.1426 (0.0113)	0.1041 (0.0098)	0.3673 (0.0156)
	0.6253 (0.0251)	0.1159 (0.0166)	0.0458 (0.0109)	0.2129 (0.0213)
P	0.1606 (0.0314)	0.4745 (0.0427)	0.1679 (0.0319)	0.1971 (0.0340)
	0.1800 (0.0384)	0.1500 (0.0357)	0.4000 (0.0490)	0.2700 (0.0444)
	0.0510 (0.0117)	0.0623 (0.0129)	0.1076 (0.0165)	0.7790 (0.0221)
π_{97}	0.3018 (0.0148)	0.1509 (0.0115)	0.1228 (0.0106)	0.4246 (0.0159)
π_{∞}	0.2020	0.1463	0.1469	0.5047

Table 3: Female Sample Results

	Public	Private	Unemployed	Out of LF
π_{95}	0.3810 (0.0153)	0.0774 (0.0084)	0.1022 (0.0095)	0.4395 (0.0156)
	0.6719 (0.0240)	0.0573 (0.0119)	0.0755 (0.0135)	0.1953 (0.0202)
P	0.1667 (0.0422)	0.3590 (0.0543)	0.2308 (0.0477)	0.2436 (0.0486)
	0.0971 (0.0292)	0.1456 (0.0348)	0.3981 (0.0482)	0.3592 (0.0473)
	0.0655 (0.0118)	0.0474 (0.0101)	0.0971 (0.0141)	0.7901 (0.0193)
π_{97}	0.3075 (0.0145)	0.0853 (0.0088)	0.1300 (0.0106)	0.4772 (0.0157)
π_{∞}	0.2024	0.0932	0.1505	0.5539

Table 4: Public sector employment in 1995

	Public 97	Private 97	Unemployed 97	Out of LF 97
Age_Years	-0.0043 (0.0031)	-0.0004 (0.0014)	-0.0024* (0.0015)	0.0070*** (0.0026)
Years_Education	0.0122 (0.0084)	-0.0008 (0.0042)	-0.0047 (0.0043)	-0.0067 (0.0070)
Married	0.2660*** (0.0965)	-0.0619 (0.0576)	0.0085 (0.0322)	-0.2126** (0.0970)
Female	0.9226*** (0.1081)	-0.8595*** (0.3020)	-0.0014 (0.0770)	-0.0617 (0.2471)
Ethnic Minority	0.0143 (0.0652)	-0.0030 (0.0380)	0.0068 (0.0242)	-0.0181 (0.0540)
Urban	0.0742* (0.0459)	0.0202 (0.0219)	-0.0443* (0.0234)	-0.0501 (0.0399)
Children Less than 6 Years	-0.0710 (0.0711)	0.0464 (0.0385)	0.0099 (0.0341)	0.0146 (0.0617)
Children 7 to 14 Years	0.0295 (0.0565)	0.0018 (0.0272)	-0.0118 (0.0240)	-0.0195 (0.0497)
Log Family Income	0.0406 (0.0416)	0.0151 (0.0196)	-0.0350* (0.0202)	-0.0206 (0.0354)
Female*Age_Years	0.0012 (0.0045)	0.0007 (0.0025)	0.0008 (0.0019)	-0.0028 (0.0038)
Female*Years_Education	0.0063 (0.0123)	0.0043 (0.0072)	-0.0041 (0.0054)	-0.0065 (0.0104)
Female*Married	-0.1417 (0.1231)	0.0866 (0.0842)	-0.0338 (0.0433)	0.0888 (0.0994)
Female*Children Less than 6 Years	-0.0268 (0.0962)	-0.0123 (0.0425)	-0.0153 (0.0291)	0.0544 (0.0899)
Female* Children 7 to 14 Years	0.0428 (0.0783)	-0.0023 (0.0443)	-0.0107 (0.0291)	-0.0299 (0.0668)
Female*Log Family Income	-0.1316** (0.0608)	0.0503 (0.0318)	0.0153 (0.0259)	0.0660 (0.0518)
Pseudo R_square	0.0598			
Number of Observations	742			
LR chi2 (chi2>0)	87.78 (0.0001)			

*, **, *** indicate significance at the 10%, 5% and 1%, respectively. The figures in brackets are standard deviations.

Table 5: Private sector employment in 1995

	Public 97	Private 97	Unemployed 97	Out of LF 97
Age_Years	-0.0011 (0.0035)	-0.0054 (0.0052)	-0.0073 (0.0046)	0.0138*** (0.0041)
Years_Education	0.0120 (0.0107)	0.0242 (0.0172)	-0.0193 (0.0151)	-0.0169 (0.0119)
Married	0.1336*** (0.0475)	-0.0394 (0.1179)	0.0445 (0.0753)	-0.1388 (0.1155)
Female	0.8298 (0.6527)	-0.2729 (0.7892)	-0.1107 (0.4685)	-0.4461 (0.6417)
Ethnic Minority	-0.1035* (0.0585)	0.1110 (0.1186)	0.0492 (0.0973)	-0.0566 (0.0744)
Urban	-0.1038 (0.0796)	0.1357 (0.0926)	-0.0029 (0.0724)	-0.0290 (0.0707)
Children Less than 6 Years	-0.1116* (0.0650)	0.1353 (0.1103)	-0.0566 (0.0853)	0.0328 (0.0952)
Children 7 to 14 Years	-0.1027* (0.0552)	-0.1129 (0.1040)	0.0534 (0.0902)	0.1623* (0.1002)
Log Family Income	-0.0203 (0.0511)	-0.0162 (0.0745)	0.0102 (0.0593)	0.0263 (0.0548)
Female*Age_Years	-0.0034 (0.0058)	0.0047 (0.0083)	0.0033 (0.0065)	-0.0046 (0.0061)
Female*Years_Education	-0.0149 (0.0177)	-0.0003 (0.0262)	0.0337* (0.0203)	-0.0185 (0.0186)
Female*Married	-	-	-	-
Female*Children Less than 6 Years	-0.0563 (0.1110)	-0.0376 (0.1867)	-0.0084 (0.1421)	0.1024 (0.1852)
Female* Children 7 to 14 Years	0.3534 (0.2247)	-0.0821 (0.2027)	-0.0861 (0.0943)	-0.1852*** (0.0437)
Female*Log Family Income	-0.0493 (0.0900)	-0.0230 (0.1278)	-0.0396 (0.0949)	0.1119 (0.0978)
Pseudo R_square	0.1216			
Number of Observations	209			
LR chi2 (chi2>0)	66.35 (0.0097)			

*, **, *** indicate significance at the 10%, 5% and 1%, respectively. The figures in brackets are standard deviations.

Table 6: Unemployed in 1995

	Public 97	Private 97	Unemployed 97	Out of LF 97
Age_Years	-0.0009 (0.0033)	-0.0019 (0.0038)	-0.0024 (0.0062)	0.0052 (0.0061)
Years_Education	-0.0053 (0.0103)	0.0360** (0.0183)	-0.0169 (0.0233)	-0.0138 (0.0229)
Married	0.0387 (0.0895)	-0.1261 (0.1596)	0.1271 (0.1855)	-0.0397 (0.1938)
Female	-0.8765** (0.3551)	0.6079 (0.6681)	0.0384 (0.4346)	0.2302 (0.5450)
Ethnic Minority	-0.0331 (0.0331)	0.0519 (0.0687)	0.0821 (0.0990)	-0.1009 (0.0905)
Urban	0.0770 (0.0502)	-0.0754 (0.0569)	-0.1219 (0.9000)	0.1203 (0.0835)
Children Less than 6 Years	-0.0432 (0.0553)	0.3855** (0.1733)	-0.0902 (0.1569)	-0.2521** (0.1193)
Children 7 to 14 Years	0.0899 (0.0834)	-0.0141 (0.0832)	0.0776 (0.1440)	-0.1534 (0.1425)
Log Family Income	0.0123 (0.0316)	0.0314 (0.0414)	-0.0854 (0.0657)	0.0416 (0.0651)
Female*Age_Years	0.0042 (0.0059)	-0.0022 (0.0057)	0.0114 (0.0093)	-0.0134 (0.0091)
Female*Years_Education	0.0032 (0.0173)	-0.0154 (0.0217)	0.0217 (0.0300)	-0.0094 (0.0289)
Female*Married	-0.1714 (0.1359)	0.1764 (0.2175)	-0.1654 (0.2489)	0.1603 (0.2606)
Female*Children Less than 6 Years	0.2581 (0.2595)	-0.1345*** (0.0432)	-0.1334 (0.2073)	0.0098 (0.2303)
Female* Children 7 to 14 Years	0.0216 (0.1164)	-0.0417 (0.0432)	-0.1825 (0.1734)	0.2025 (0.2093)
Female*Log Family Income	0.0651 (0.0585)	-0.0423 (0.0575)	-0.0176 (0.0946)	-0.0052 (0.0892)
Pseudo R_square	0.1095			
Number of Observations	182			
LR chi2 (chi2>0)	50.95			

*, **, *** indicate significance at the 10%, 5% and 1%, respectively. The figures in brackets are standard deviations.

Table 7: Out of the labour force in 1995

	Public 97	Private 97	Unemployed 97	Out of LF 97
Age_Years	-0.0014* (0.0008)	-0.0011* (0.0006)	-0.0055*** (0.0020)	0.0080*** (0.0022)
Years_Education	0.0039 (0.0026)	0.0019 (0.0018)	0.0017 (0.0057)	-0.0074 (0.0067)
Married	0.0412* (0.0222)	0.0144 (0.0123)	0.0394 (0.0429)	-0.0950* (0.0526)
Female	-0.0536 (0.1727)	-0.0002 (0.0294)	-0.8812 (0.2593)	0.9349*** (0.1360)
Ethnic Minority	-0.0282** (0.0109)	0.0521 (0.0334)	-0.0175 (0.0257)	-0.0065 (0.0442)
Urban	-0.0187 (0.0124)	0.0347** (0.0150)	-0.0182 (0.0253)	0.0004 (0.0325)
Children Less than 6 Years	0.0262 (0.0288)	0.0092 (0.0183)	0.0811 (0.0686)	-0.1165 (0.0800)
Children 7 to 14 Years	-0.0003 (0.0197)	-0.0154 (0.0103)	-0.0136 (0.0383)	0.0293 (0.0478)
Log Family Income	-0.0311** (0.0130)	-0.0004 (0.0064)	-0.0381* (0.0223)	0.0697** (0.0293)
Female*Age_Years	0.0000 (0.0008)	-0.0002 (0.0006)	0.0015 (0.0018)	-0.0013 (0.0023)
Female*Years_Education	0.0036 (0.0030)	0.0016 (0.0021)	0.0033 (0.0070)	-0.0085 (0.0082)
Female*Married	-0.0558 (0.0491)	0.0032 (0.0209)	-0.0464 (0.0624)	0.0990 (0.0864)
Female*Children Less than 6 Years	0.0042 (0.0259)	-0.0185** (0.0087)	-0.0196 (0.0393)	0.0339 (0.0518)
Female* Children 7 to 14 Years	0.0015 (0.0244)	0.0610 (0.0837)	0.0602 (0.0833)	-0.1227 (0.1188)
Female*Log Family Income	0.0127 (0.0119)	0.0016 (0.0079)	0.0475* (0.0276)	-0.0619* (0.0342)
Pseudo R_square	0.2783			
Number of Observations	524			
LR chi2 (chi2>0)	213.71 (0.0000)			

*, **, *** indicate significance at the 10%, 5% and 1%, respectively. The figures in brackets are standard deviations.