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WAGE DETERMINATION UNDER PLAN AND EARLY TRANSITION: EVIDENCE FROM BULGARIA.

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Summary

For the last days of planning and the early stages of economic transition, analysis of an important large new data set for individuals and matching information on firms shows that the factors determining wages have changed significantly. The process is becoming more market driven though there is also substantial inertia. Specifically: (i) In the centralized years education and experience sometimes mattered, more than generally expected; but in the early phase of transition these factors have greatly increased in importance. (ii) Under plan, employees in some white-collar occupations earned less than workers in blue collar occupations; during early transition this pattern has been reversed; (iii) Gender discrimination was important under plan; it persists during transition and is becoming more a matter of differences in characteristics than differences in returns to factors; (iv) Under plan there is no indication of discrimination against minorities, in 1992 some evidence of discrimination against male minorities is found; (v) Under plan firm performance and firm size had modest effects on wages, during early transition both are much more important as are changes in the labor force; (vi) While both industry and regional effects exist under plan and market, the pattern of these effects has changed substantially under embryonic markets, generally in a way consistent with the process of economic restructuring; (viii) There is little evidence that either union membership or collective agreements at firm level influence wages; (ix) Under plan women who worked in firms with variable pay schemes earned a premium; during early transition women on fixed wages earn more: typically for men, no similar patterns are evident; (x) During transition, employees who work on permanent contracts typically earn more than do those on temporary contracts.

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One implication of the findings is that the process of earnings determination is becoming more market driven. Both individual characteristics that reflect productivity, such as education, as well as firm characteristics that may capture enterprise performance, are playing bigger roles in the evolving wage determination process. In addition, the changing pattern of industrial wage effects has responded to the changed imperatives of the restructuring economy.

However, another implication of the findings is that the wage determination process is far from being completely market driven; indeed several findings point to evidence of inertia in wage setting mechanisms. For example we find that workers in state owned firms earn more. Such findings are consistent with the views of those who argue that despite the system in place officially, there still is a large degree of centralization. This view implies that the basic locus of negotiation of collective agreements remains at branch (and not plant) level. However, another way of looking at this is that by 1992 it would not appear that most Bulgarian firms, especially in the state sector, were facing hard budget constraints. In turn this suggests that if market determined wages are the objective then tighter constraints are needed. Perhaps the likelihood of this will be greater after privatization of large firms accelerates thus leading to more effective decision-making at the firm level.

One condition for sustaining a program of reform is probably that most of the population perceive the process of transition to be "fair" and that the costs and benefits of restructuring do not fall too unevenly on different groups. From this perspective our findings on discrimination are potentially important. The weak evidence of discrimination against male minorities during transition highlights the potentially larger burden that ethnic minorities may endure during transition. Moreover, and contrary to the claims made during the communist period, gender discrimination in earnings was present in 1989. While it has lessened somewhat during early transition, in 1992 it remained a very large part of the average wage gap. In addition, gender discrimination has a different character in countries in transition. This may be shown by comparison with studies of gender discrimination in western countries. Typically these have found that an appreciably lower part of the gap is "unexplained" and that, in pooled regressions, there is a lower coefficient on the gender dummy. In comparison with findings from studies of gender discrimination elsewhere, our results may reflect Bulgarian women thus far having been better situated than women on average in western countries. Hence our findings indicate that consideration be given to the adoption of appropriate legislative action to protect these vulnerable groups.

Our findings also have implications for the role of labor unions during transition. Typically we do not find support for the view that unions affect individual earnings. In addition there is other evidence that points both to labor unions playing important roles in
influencing national policy, and to rejection of the hypothesis that decision-making in Bulgarian enterprises typically is controlled by workers and their representatives. Together these findings call into question those who argue that the labor movement has been behaving irresponsibly and that, therefore, legislation to enfeeble organized labor should be introduced. Rather during these often politically uncertain times, these findings provide some support for those who argue instead that there is much to commend a new industrial relations in which new independent labor unions play an important role.

Finally, it is possible that our findings for Bulgaria may have more general applicability. In part this reflects the fact that, during Communism, the Bulgarian economy had many characteristics in common with other former Communist countries, both in Eastern and Central Europe as well as newly independent countries that were formerly in the USSR. These features include: a very centralized economy, giantism in the size-distribution of enterprises, very limited economic contacts with the West and enormous dependence on trade and technology transfer with CMEA countries. For countries with such features, even though there are substantial differences in the economic reform packages that have been adopted during early transition, for many reasons the common institutional and organizational heritage may be expected to continue to influence and constrain change in the forces affecting wage setting in ways that are broadly comparable to the Bulgarian experience.
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I Introduction.

While it is clear that the sweeping changes in the former Communist countries have profoundly affected labor markets, on many matters very little is known with any precision. Often this reflects the limitations of the data that are available during early transition. Consequently, in the main, researchers and policy makers must rely on descriptive studies with limited coverage to provide them with information for policy formulation. This point clearly applies in the area of wage determination where, while many predict large changes (e.g. Burda, 1993; Boeri and Knesse, 1992) econometric studies of the determinants of individual earnings for both reforming centrally administered economies and economies in transition are extremely rare. In this paper, by using unusual data-- from a large and new probability sample of Bulgarian employees with corresponding data at the firm level-- we aim to improve understanding of changes in labor markets during these extraordinary times. Specifically, we provide econometric evidence on the determinants of earnings for a former communist country during two periods-- the final days of communism and early transition.

We test a range of hypotheses. Concerning wage determination in Soviet type economies (STEs), our results enable us to determine whether there is empirical support for widely held beliefs-- for example the alleged unimportance of discrimination based on gender and ethnicity. We also examine whether the early stages of marketization have led to changes in the factors that determine earnings. For example, in an emerging market economy is there more support for the views that: earnings will increasingly begin to represent a payment for "productive human capital"? Will the earnings determination process begin to differ for groups that allegedly are particularly vulnerable during the transition such as women and minorities? Is there a role for efficiency wages (and other competitive explanations for wage differentials? Will firm characteristics (such as profitability) and differences in regional labor markets have larger influences on earnings than in the past? Moreover, since Bulgaria shares many characteristics with other former communist countries (e.g.in the past, remarkable
centralization and limited contacts with the west), arguably our findings may have more general applicability than most other studies, which arguably examine special cases.\footnote{1}

While we consider our findings on these issues in the main sections of the paper, since little is generally known about wage setting mechanisms in Bulgaria, we continue by reviewing key features of the relevant institutional framework. Next we examine theoretical literature in order to derive hypotheses on the factors influencing earnings under fading plan and early market. In the main section, after discussing our empirical strategy, we present and examine our results. Finally, some implications of the findings are considered.

II. Institutions

In essence in 1989 the formal structures governing the determination of the nature and type of compensation in Bulgaria typified those of a Soviet type economy. The state sector accounted for 93.5% of total employment (with the bulk of the remainder in the so-called "cooperative" sector). Managers of state enterprises were essentially agents of government economic ministries. Their objective was to implement the plan with all major decisions (including wage setting) determined by the state (Ellman, 1989). In this centrally regulated framework, there was a strong predisposition towards egalitarian wages though skill, work experience, education and industrial sector supposedly influenced pay determination (Rubin, 1986). At the level of the firm wages were set on the basis of recommendations and standards sent from above. Consequently, while earnings were highest in heavy industry and lowest in light industry, trade, agriculture and public services, in general there was considerable wage-leveling and wages displayed low dispersion (Jones, 1991). Concerning payment systems too, there was an increasingly widespread use of a standard system--piece rates. Consequently this is believed to have led to little differences in payment methods across industries and occupations. Hence education and occupation differences were not rewarded accordingly, thus little motivational incentives existed. Finally, while "trade unions" formally existed, their role and purpose was essentially that of a "transmission belt" for the policies of the Communist Party (Jones, 1992). Despite near 100% membership levels, unions did not take any part in the negotiation of wages or in any fundamental way in increasing the compensation of their worker-members.

Already by 1989, however, there were some minor ways in which the Bulgarian institutional situation and outcomes differed from the classical STE. For example, new institutional arrangements for "workers management" had been introduced, including in 1989 the possibility of employee representation on boards of directors of firms (Petkov and Thirkell, 1991). However, since in practice these and other changes have typically been found not to
have amounted to much (e.g. Jones and Meurs, 1991), there is no reason to expect any significant changes in the textbook view of the factors influencing earnings in a centrally regulated economy.

But by 1992, the second year for which we will estimate earnings equations, considerable changes had occurred in the Bulgarian economy. Major steps towards the introduction of a market economy had been introduced beginning in February 1991 with a program that freed prices, allowed the exchange rate to float, greatly reduced state subsidies, and gave firms decision-making authority regarding pricing, investment and production decisions (Wyzan, 1993; World Bank, 1992).

As part of this mainly macro reform program a wage stabilization plan was initially introduced. Overall wage growth during this period was limited to 45% in the first quarter of 1991, substantially less than inflation with prices rising about 225% in the two months following reform in February 1991. As part of the new institutional arrangements, a tripartite commission was created at the national level (with representatives from employers, unions and the government.)

Under this incomes policy (Bogetic and Fox, 1993) wage negotiations took place at three levels -- national, firm and individual level. The national level involved negotiations on issues such as minimum wages, while industry minima were negotiated at industry level. At the firm level a new and more decentralized system of wage determination took effect in July 1991. Under this plan, firms could decide the relative wages given to their employees, as long as the total wage bill was restrained. If firms let their wage bill increase by more than a stipulated amount, which varied according to previous overall inflation, productivity and the average wage, a punitive tax (up to 400%) was imposed.

Despite these advances, however, managers at the firms seldom had a completely free hand. Typically they were faced by trade unions who, together with managers, decided on wage rates, working conditions, and the system for evaluating individual employee performance. Indeed some argue that for various reasons, including the economic uncertainty facing managers in a pre-privatization context, unions gained effective control over decision-making (including wage setting) in most state firms. Moreover the situation was further complicated because of the emergence of plural unions. Initially unions affiliated with the two major trade union federations Podkrepa, which began essentially as a political movement, and the Confederation of the Independent Trade Unions in Bulgaria (CITUB), which succeeded the old official unions, were often at loggerheads (Jones, 1992). However, in the main the level of coordination between these unions appears to have increased since 1992.
The available data, typically at industry level, is consistent with some of these developments. For example, the coefficient of variation for industry average wages has increased and there is some evidence that, on average, wages vary according to regional conditions and occupation level (Beleva, et al. 1993; Standing et al., 1993). At the same time such data are quite aggregative and do not control for other factors that conceivably bear on the wage determination process. Also, the changes are potentially consistent with other modifications --for example the unequal exercise of product market power in an era of nascent price liberalization and before significant privatization has taken place (Jones and Rock, 1994).

III. Hypotheses

In this section points from the institutional discussion are integrated with theory developed for wage determination under two regimes--STEs and stable capitalist economies. For both periods of our empirical investigation--the fading days of communism in 1989 and early transition in 1992--the (potential) relevance of factors that are stressed in the literature, e.g. the role of human capital, are considered. In so doing we note that the institutional discussion indicates that the essential features of wage determination during the latter days of planning were essentially unchanged from the classic Soviet type system. Accordingly, in accounting for variation in earnings across employees in 1989, since the process was still heavily centralized and dominated by non-market forces, we hypothesize that we do not expect those factors that are usually stressed in capitalist systems to be playing a large role. But by 1992 major systemic reforms had begun as the Bulgarian economy searched for an acceptable form of a market economy. Hence, and consistent with the arguments of many (e.g. Flanagan, 1992), we hypothesize that those factors that are usually stressed in explanations of wage determination in capitalist systems would be expected to be playing a bigger role.

During the planning period in view of the prevailing ideology and values, the role of human capital type variables would not be expected to be of major importance in accounting for earnings differences. Rather wages would be centrally fixed to reflect other factors so that employees in more skilled occupations might receive lower wages than workers who were engaged in especially arduous or unhealthy work. At the same time, this is not to say that the actual process of wage determination would have ignored the role of "human capital" type variables. We know that for wage determination purposes in STEs workers were grouped by type of work performed and that several aspects of the job mattered, including "its complexities, the responsibilities involved, and other aspects delineating skill... " (Bergson.
Also to try to reduce labor turnover, many reforming socialist countries introduced 
bonus schemes that rewarded years of uninterrupted service.

However, the more decentralized system of wage setting that is being introduced during 
early transition allows for more say by autonomous managers and hence a bigger role for 
productivity type variables that are connected with individual workers' characteristics. Thus, in 
accounting for variation in individuals' earnings, in principle the human capital model would 
be expected to have become more pertinent. In this framework some of the key variables that 
would exert a greater effect on individuals' wages include the nature and quality of formal 
education and on-the-job training and opportunities for learning by doing. Similarly, workers 
in occupations which typically require unusual levels of skill and talent would be expected to 
be earning more than in the past.

Reflecting the dominant "socialist" ideology and very high participation rates in the 
labor-force by all able-bodied adults, many would not expect that pronounced earnings 
differences would exist by gender and ethnicity under communism. However, notwithstanding 
the official position, some informed scholars have argued that, in fact, gender discrimination 
was "at least as widespread in Bulgaria and Eastern Europe as in the West" (Beleva :186). But 
usually the evidence that is cited is at industry level and thus is necessarily limited. In general 
this shows that gender earnings differences were much smaller than in other countries around 
the world, and especially so in Bulgaria (e.g. Sziracski and Windell, 1993).

For an economy in transition, however, the story may be different. For market 
economies various theoretical frameworks have been developed that predict the existence and 
persistence of discrimination by gender and race. (For reviews, see Gundersson, 1989). Hence, 
as market forces begin to take hold, absent countervailing measures (such as the introduction of 
a strong legal framework), we would expect that such gender or ethnic based differentials 
would begin to emerge. Indeed, there is preliminary evidence (e.g. Moghadam, 1993) that the 
impact of the transformation has been especially severe on women and minorities. Women are 
found to have been over-represented in the lower administrative positions and under- 
represented in managerial or skilled occupations. Since that employment surplus is greatest in 
those positions that women were over represented in, we would expect that this will show up 
in a relative loss of earnings for women (compared to other groups). Analogously, Sziracski 
and Windell (1993) argue that minorities were concentrated in sinking industries and low 
skilled occupations, and that they have suffered disproportionately from labor shedding. Again, 
however, the available data are limited and more rigorous tests of the existence of 
discrimination are needed.
In 1989 nearly all employees were members of the official unions and collective bargaining over wages was essentially non-existent under central wage fixing. Hence there was no scope for unions to influence wages either through formal channels or informally because of variation in union power (membership rates) at firm-level. But by 1992, the Bulgarian system of labor relations was being transformed (Jones, 1992). The appearance of independent unions and firm-level collective bargaining, and average union density in the state sector of about 70%, imply that such processes were now potentially important and that various kinds of conventional *union wage effects* (Pencavel, 1991) might be beginning to appear.

In the main the administered nature of the economy in 1989 would mean that *regional* differences in earnings would not be expected to be very important. However we would expect that there would be *industry* wage effects. These would reflect the preferred model of development under communism—a bias towards heavy industry—as well as any changes in planners’ priorities.4

By 1992, however, we would expect that the varying impact of the reform process on different industries and different regions would begin to give rise to regional and sectoral differences in earnings. Thus the relative fall in earnings would be expected to be most severe in industries suffering the most serious falls in output. These occurred in the first half of 1992, and were especially evident in food processing, mechanical, chemical and electrical engineering, chemicals, and least of all in non-ferrous metals (A.E.C.D., 1993). Regional differences might also be expected to be becoming quite significant in the wage determination process. Unemployment rates increased the most in Plovdiv (20% in June 1992), (where there had been considerable specialization in electrical engineering during the CMEA period) compared to a 9% rate in Sofia at the same time (EEC, 1992). Such differences in local labor markets would be expected to have effects on individual earnings. Hence, to test these hypotheses it will be important to examine for both years the effect on individuals’ wages of sectoral and regional differences.

In 1989, in addition to centralized wage-fixing, firms had no risk of bankruptcy and operated within a context of soft budget constraints (Kornai, 1990). Also, most firms were large (Jones and Parvulov, 1992) and wages played no fundamental allocative role. Hence we would not expect any substantial and significant *firm-level effects*, including a firm size effect, on the determination of wages.

But in an imperfectly competitive situation, even after controlling for region and industry, we would expect that there would be firm-level effects on the wage determination process. Such effects will reflect several potential factors including differences in managerial
quality and differences in product markets (concentration) and access to other resources, especially in a world with poorly developed capital markets. Hence, following Pinto et al. (1993) we hypothesize that by 1992 firm level effects on individual earnings may have emerged in Bulgaria. Moreover, by 1992, with firm restructuring and substantial downsizing underway, efficiency wages theory might lead one to expect firm size effects. To overcome potential inefficiencies of size --it is argued that intra firm coordination and cooperation breaks down as firm size increases and that working in a huge establishments may foster alienation and possibly sabotage--employers in large firms may choose to pay workers above the competitive rate. In turn this increases worker efforts and leads to less need for supervision (Kreuger and Summers, 1988.)

By now there is a substantial body of work that argues that the form of the compensation system has effects on the level of compensation too (e.g. Lewin, Mitchell and Zaidi, 1995). And in the Bulgarian economy in 1989 we know that in principle incentive payments were widely used. However, these were not all that they seem—for example they were not necessarily applied to the most "productive" individuals (Bergson, 1988). For supervisory and technical personnel too, as for ordinary workers, incentive pay was customary. Hence, we have no strong hypothesis on this effect in 1989.

By 1992 though there had been changes in the pattern of preferred forms of payment (ILO, 1993). Given the crucial importance of the incentives issue we would hypothesize that these changes had some market logic. Specifically we expect that workers receiving bonus payments will have higher earnings.

IV Empirical Strategy, Data, and Empirical results

The basic approach is to estimate separate OLS earnings equations for men and women for 1989 and 1992 using the semi-log functional form. However, the adoption of this approach reflects a number of decisions and preliminary tests. Thus in estimating separate wage equations for men and women, while we follow the literature, we also established the validity of gender specific regressions. Also, to check whether OLS estimates are compromised by workers self-selecting into different firms (e.g. based on ownership), the mobility of individuals in the sample was examined. We find strong evidence of immobility. Finally, rather than estimate separate cross sections we could have used a fixed effects estimating method. While potentially this offers some well-known advantages (e.g capturing the time-invariant heterogeneity of some firm characteristics for which data are unavailable), to have done so means that we would have had to exclude all workers hired after 1989. More importantly, the fixed effects procedure assumes that
individual effects are time invariant. But during transition this is an unreasonable assumption to impose. Adopting a fixed effects procedure precludes investigation of the questions that are of central interest-- the potentially changing impact on earnings determination of individual characteristics such as gender and education during this period of systemic change.

So far as the specific way in which particular variables are included in the earnings equation, for the most part we follow the literature (e.g. Polachek and Siebert, 1993). In the main this entails including standard proxies for the individual and firm specific characteristics of interest--e.g. education, experience and gender. In addition we include some interaction terms (with dummies) to capture non-linear effects. Since data on individual hours worked are available only for 1992, for comparative purposes in most specifications in 1990 and 1992 the dependent variable is the monthly wage. However in 1992 we also estimate models of hourly wages.

All estimates include traditional human capital measures. In the reported regressions education is included as a series of dummies for different levels of education (e.g EDUC1). Since human capital theory suggests that earnings generally should not be constant after leaving school but rather follow a parabolic shape, reaching a maximum somewhere in mid-life, we include variables in the estimates earnings equation that are quadratic in experience (e.g EXP89, EXPS89). Also, following the literature, we are able to estimate earnings equations not only with total experience but with the conceptually preferable employer-specific experience. In addition, our model contains several measures for occupation-- whether the worker has a job in a higher skill category (e.g. STAFF).

For 1992 we also include a variable to see if the legal type of labor contract (PERM) influenced earnings. For the plan period this is not at issue since, in an era when labor markets were taut and the state was committed to full employment, there was essentially a single type of contract in the labor market (a permanent contract). But by 1992, and reflecting the basic changes occurring in labor markets including the rapid rise of unemployment, an alternative kind of contract (essentially a temporary contract) had begun to emerge.

To investigate hypotheses on gender wage discrimination, we first include a dummy variable in a pooled regression. However, as reported above, a test of the restriction that the corresponding coefficients are equal for men and women, was rejected at the 5% level. To decompose the wage gap between average male and female wages, we use the standard Blinder-Oaxaca decomposition method (which splits the gap into explained and unexplained components for each year), and an alternative decomposition method (as used by Blau and Kahn, 1992) which looks at the changing elements for the increment in the wage differential.
between two years in more detail. In addition to gender effects, by including dummy variables for marital status (MARRIED) and ethnicity (NONBULG), we investigate hypotheses for other forms of discrimination based on non productivity related personal characteristics.

To test for union wage effects in 1992 (when independent unions had appeared) we use three methods. First, we include separate dummy variables for: (i) whether or not individuals were currently a member of a labor union; (ii) whether or not a collective agreement had been concluded at the firm at which each individual worked; (iii). Second, we interact the two dummy variables; (iii) Finally, we include both separate dummies and an interactive dummy. While all approaches yield similar results, in the reported regressions we include only the interactive dummy (UNIONCOL).

To explore hypotheses on regional effects, we include four regional dummies. To see whether there are industry effects, in the reported regressions we include eight industry dummies\(^1\). While the reform process during transition will be expected to produce wage differences across industries, the available literature and other information does not predict a story for each industry in detail. However we anticipate that the group of industries that received emphasis during planning (namely, heavy industries) will have been hardest hit since restructuring began. To examine whether this is reflected in relative salaries, in unreported regressions we also created two industrial categories, heavy and light\(^2\).

Diverse hypotheses concerning the compensation system and the form of ownership are tested. To scrutinize for the potential effect of enterprise ownership on wages a dummy variable for state and non-state entities (e.g. STATE92) is included. Also, specifications incorporate a dummy variable measure for the payment system— fixed wage (salary) versus some form of performance-related payment systems at the firm level (e.g. SALARY92).

Finally we examine for other firm effects. In the reported regressions we take value added per worker as a measure of the productivity of the firm (e.g. VA\(_L\)89), which could directly affect the wages of that firm. Another indicator of how the firm behaves under transition is the rate of change of employment. The rate of labor force change during 1991 (DLF91) should capture information about how different firms were faring during transition, possibly leading to different wage effects by firms. Also to test theories which predict size effects we include the log of the labor force (e.g. LNLF89).

Our estimates are based on what is perhaps the first probability data base that includes individual data and matching information at the firm level and spans both the last years of communism and early transition (see Appendix A). Importantly, when sampled establishments by industry are compared with the country-wide population by employment shares per
industry, in general the sample closely reproduces the population distribution. Data on individuals are from a sub-sample of randomly chosen establishments. The sampling design for individuals establishes a sampling floor of at least 10 employees per establishment with the probability of inclusion declining with the size of the establishment. The primary interest was in achieving at least minimally reliable average data per establishment rather than a random sample of the employed labor force in manufacturing firms. Our empirical work uses information from this Bulgarian worker survey for which all relevant information are available.

While Appendix B provides definitions of variables, in Table 1 we report the means of variables used in the basic models for male and female earnings. For purpose of comparison, the last three columns of Table 1 include the pooled sample means.

In highlighting some of the descriptive statistics in Table 1 we focus on the 1992 monthly wage model. We see that in our 1989 sample there were approximately 17% fewer males than females, with the difference dropping to about 14% by 1992. In both 1989 and 1992 a greater proportion of women worked in white-collar positions than did men, although in terms of education levels men and women in the sample are broadly comparable. In 1989 women in the sample average about two months more firm specific experience than men; by 1992 this had risen to almost half a year. In 1992 (though not in 1989) a marginally greater proportion of men are married compared to the female segment.

About 4% (1989) and 5% (1992) of the women and between 6.8% (1989) and 7.14% (1992) of the men reported that they belonged to a minority ethnic group, which is somewhat less than the national average estimated to be closer to 10%. One plausible reason for the latter is the hesitancy of workers to openly identify themselves as minorities. The lower figure for women could be due to the more traditional cultures (mainly Islamic) of the minorities which stress the domestic duties of married women.

Unsurprisingly, about half of the workers work in the heavy industry sector. The highest proportion of workers (a fifth in each case) worked in Pleven and Sofia while the least (between 8% and 13%) work in Pernik. Reflecting the slow pace of privatization of large state-owned firms, the percentage of men and women working in state firms was quite stable during the period. The figure is slightly higher for men in 1992 (94% compared to 91% for women), indicating that women are marginally more likely to be found in non-state (mostly cooperative) enterprises. About half the men and little more than half of the women in 1989 and 1992 received compensation as a fixed salary compensation as opposed to a variable compensation package.

There are striking differences in the ostensible performance of firms in which men and women worked in 1989; the average man then worked in a firm whose value added per worker
was almost double that of the average woman. By 1992 these firm-level productivity differences were much smaller—less than a 10% difference. Throughout the period men typically worked in much bigger firms. Whereas in 1989 the average firm size for a firm in which a woman worked was 1102 workers, for men the corresponding figure was 1513. Although transition has meant downsizing of firms, enterprises in which women work have fallen to an average employment level of 697, while for men the comparable number is 1100. We also see that in 1992 similar percentages of respondents were union members and worked in firms covered by a collective agreement—about 70% (men) and 72% (women).

Our main results are reported in Table 2. Before discussing them in detail we note that, in the main we find strong support for our key hypothesis—that the factors determining earnings differ in economies in transition than in centrally administered economies. Of particular interest, there is evidence that in 1992 the process of wage determination was starting to become more market driven. This is indicated in part by the existence of a greater measure of support for some specific hypotheses, especially an increasing role for human capital type variables such as education, experience and occupation. In addition, typically the overall explanatory power of the models during early transition is higher than during plan. However, there are also some surprising findings, which may be interpreted as indicating substantial evidence of inertia in the earnings determination process. Also, in the main, our results are unaffected by the use of either monthly earnings or hourly earnings as the dependent variable. Hence, unless there are differences in the results using the two specifications, we focus on the results for monthly earnings, since these are available for both periods.

Turning to specific findings, the negative and significant (almost all at the 1% level) coefficients on the lower education levels, (as compared to the omitted category of 15+ years), means that for women, as expected, education affects wages positively in both 1989 and 1992. Thus estimates for the 1989 female equation show that having 0-8 years (as compared to 15+ years) decreases wages by 21%; during transition the comparative effect increases to almost 30% for women with little education. In 1989, while the effect is a little less pronounced at higher levels of education, in 1992 the comparable effects, especially at the highest level, falls to 11%. For men, a similar pattern prevails in 1992—education has a positive effect on earnings and the effect increases monotonically. But in 1989 we find no such effect: earnings of men do not appear to be influenced by education during communism. In comparing our findings for men and women in 1992, typically we find that women who are in the least educated group are at a greater disadvantage than are men—for example with lower wages in 1992 of 30% compared with 14% for men. Finally these
estimates indicate that the returns to education were increasing during early transition. This is confirmed in unreported regressions, when education was included as a continuous measure. For 1989 these show 2% more earnings for each year of education, but by 1992 the corresponding figure was 4%.

In the reported regressions, annual returns to firm-specific experience (which proxies "on the job training" in the human capital framework), range between 0.7% and 1.1%. Typically the effect of experience on female earnings is lower than for men. For example, in 1989, when evaluated at the mean level of experience, women received about 0.7% for an extra year of firm experience while men, again when evaluated at the mean level of experience, were rewarded at the rate of almost 1.1% in 1989 and about 1% in 1992. Indeed, since the only significant result for women is in 1989, usually we find that experience counts very little in determining wages for women. But for men, work experience has larger effects on earnings and does so during both regimes. This concave relationship between experience and pay suggests a peak effect between about 27-28 years, depending on the particular specification.

Our findings indicate that returns to occupation are clearly embodying the effects of early marketization. In 1989, and in accordance with the ideology of low wage dispersion and an emphasis on rewarding manual work, we see significant negative effects on pay of belonging to several skilled occupations. But in all 1992 models, there is evidence, at conventional levels of statistical significance, that workers in skilled occupations receive higher earnings. Furthermore the size of this effect, typically indicates bigger effects for women—e.g. 18% for women who are SPEC2 compared with 10.5% for men in that occupational category.

We find that in 1992 contract status had an effect on earnings. Compared to those on temporary contracts, those with a permanent contract were at a distinct advantage: females earned 16.4% more and men 18.4% more. However, for specifications using hourly wages as the dependent variable, we find earnings were unaffected by the type of contract. Since temporary jobs entail non-standard hours, this suggests that those working under temporary contracts are likely to be given less work in a month that employees with standard contracts.

One of the crucial public policy issues during transition is discrimination. Our discussion starts with the observation that, in the sample, the (log) earnings gap based on gender fell from .2911 in 1989 to .2159 in 1992. However, to the extent that these differences in wages represent equal returns to unequal endowments of human capital and other characteristics between men and women in the sample, a discussion of gender discrimination based on these figures alone would be tainted. To decompose the earnings gap to parts arising from differences in factor endowments (the "explained" part) and a part reflecting pure
discrimination (i.e. differences in returns to the same characteristics, the "unexplained" part). Two standard decomposition approaches are used. Results based on these methods are presented in Table 3.18

Using the standard Oaxaca-Blinder decomposition method (Part A) the main finding is that in both years very little of the gap can be attributed to differences in factor endowments, broadly defined. Thus for monthly earnings in 1989 only between 9.4% and 11.3% can be explained by differences in factor endowments for men and women. By 1992, the explained portion falls to between -1.3% and 5.7%. This is consistent with the findings emerging from our descriptive statistics that, unlike the case that has often been found in the west, in Bulgaria the situation of men and women in the labor market was often quite similar. The key finding is that most of the gap (at least 94 to 96%) is unexplained, reflecting the lower rate of return that women receive for their endowments.

The Blau-Kahn decomposition (Table 3B) reinforces the story told by the standard method. This approach breaks the gap into four parts, with special emphasis on how the gap changes between the years. This method indicates that, between 1989 and 1992, the gap in male/female monthly earnings increased by 25.4% due to changes in characteristics, while changes in returns to factors decreased the gap by 53%. Overall only about 27% of the change in the gap was explained, leaving 73% unexplained. Hence, during early transition, this decomposition implies that the nature of gender discrimination is changing in the direction that typically seems to occur in the west--becoming based more on differences in characteristics and less on differences in returns to factors.

Finally in pooled regressions (which assume that men and women receive the same returns to factors), for several model specifications we always find strong evidence of gender discrimination-- the gender dummy indicates that women received between 19% and 27% lower earnings than men.

The relatively small number of non-Bulgarians (ethnic minorities) in our sample prevents us from investigating ethnic discrimination in earnings to the same degree as gender differentials. However, while the ethnicity variable remains insignificant in most of the reported models, in the 1992 specification for men, it emerges as significantly negative. The result implies that in 1992 being a male ethnic minority reduced monthly earnings by 9.6%, all else being equal.

Marital status is another standard variable included in earnings equations which is normally considered to be a non-productivity related personal characteristic. In 1989, when full employment was the norm and most families had both husband and wife in the labor force.
marital status is insignificant. But in 1992 being married enhances earnings for men (in both hourly and monthly income models), while it plays no part in the earnings determination process for females. Perhaps the extra income paid to married men (8.35% of monthly earnings) is related to more women having retreated from the labor market during early transition (to work exclusively in the home) than have men. Typically no evidence of union wage effects is found— in the reported regressions the coefficient on UNIONCOL is statistically insignificant in the monthly earnings specifications. However, for women there is evidence that in 1992 hourly earnings were 5.3% higher. But in unreported regressions, separate dummies for union membership and whether or not a collective agreement exists are always insignificant.

From the reported regressions, we see that often there are industry effects. Indeed F tests on the vector of eight industry dummies always reject the hypothesis that there are no industry effects in all reported estimates. Moreover the pattern of effects usually confirms our expectation that workers in high priority industries of communism are now typically suffering in the early transition to a market economy. With the loss of COMECON markets, the economy is gearing away from producer industries and placing greater emphasis on consumer goods. This is especially the case for women workers in former showcase industries such as chemicals and non-metals who, in 1992, were receiving from 18-23% less than comparable workers in other industries. However, women in mining were doing considerably better during early transition. Also, in unreported regressions, when the sample is simply split into heavy and light industries, a negative and statistically significant coefficient on HEAVY is found, thus confirming this general pattern.

Turning to regional effects, F tests on the set of four regional dummies show that they are jointly significant at the 5% level in all models, including surprisingly for 1989. So far as individual regional effects are concerned, the most interesting findings are for Plovdiv. There we consistently find a significant (at the 1% level) effect, and also an effect that changes sign. Whereas in 1989 earnings of workers in Plovdiv were substantially less than in other regions (19% for women, relative to Sofia), by 1992 we find that workers in firms in that region have benefitted considerably from the transition. While we had no strong a priori expectations for this effect, perhaps this somehow reflects Plovdiv being a center of early opposition to communism and/or one of the areas in which the private sector apparently is growing fastest (and thus is an area in which market pressures are especially strong which leads to employers in state firms paying premia to retain better workers who have alternative opportunities, despite the growth in unemployment.)
Consistent with almost universal state ownership, in 1989 we find no evidence of a wage effect resulting from the type of ownership. But by 1992 we find that employees in state firms earned a premium of from 17-28% over other workers. Even though employees in other firms in our sample worked mainly in cooperatives (rather than in private firms), this finding is consistent both with the interpretation that state firms are not yet facing budget constraints equal to those faced by other firms.

Turning to the form of the compensation system, we find that, for women, performance-related pay continues to be a significant determinant of pay during early transition. However, in 1989 women in firms with only fixed wage compensation systems received about 12.8% less than similar women in firms with variable pay; but in 1992, depending on the model specification, women in enterprises with fixed wage payment systems earn 13% to 14% more than those in firms with a variable component in pay. One interpretation of this pattern is that this is one way in which those receiving incentive pay are more vulnerable.

Finally we consider findings on other firm-specific effects. As expected, enterprise performance (measured by value added per worker) usually is not a determinant of earnings during the planning regime; then the evidence supports the hypothesis that wages were determined independently of outcomes such as individual and firm performance. But by 1992, in all specifications there is a relationship between firm productivity and earnings. Reflecting managers increased authority to set wages, and presumably their desire to pay greater attention to individual productivity, the female premium for hourly (monthly) wages for a unit increment in value added per worker is .14% (.15%) of wages. For men, the corresponding figures are about 0.1%. An alternative indicator of firm performance is the change in labor force. In 1992 this variable (measured for the preceding year) is significant and positive in most specifications. In a context of generalized downsizing, these estimates show imply that a 1% reduction in firm size is accompanied by between a 0.08% and a 0.26% fall in earnings. This pattern, is consistent with the hypothesis that wages are reflecting performance--in this case, relative prosperity. Finally in 1989, surprisingly there is a firm size effect on female wages. But by 1992 in all specifications, size effects are always present for both men and women and usually they are much larger than in 1989. This can be interpreted as evidence consistent with an efficiency wage hypothesis. Moreover, the effects are quite large, though they are about half as large for women as for men.
V. Conclusions and Implications

An important new and unusual probability data set on individuals and matching information on firms is used to estimate the determinants of earnings during plan and early market in Bulgaria. We find strong support for our key hypothesis—that, consistent with the observed changes in the legal, institutional and economic environment, the factors determining wages have changed significantly during early transition. Specifically we find: (i) In the centralized years education and experience sometimes mattered, perhaps more than generally expected; but in the early phase of transition these factors have greatly increased in importance; (ii) Under plan, employees in some white-collar occupations earned less than workers in blue-collar occupations; during early transition this pattern was reversed; (iii) Gender discrimination was important under plan; it persists during transition and is becoming more a matter of differences in characteristics than differences in returns to factors; (iv) Under plan there is no indication of discrimination against minorities. In 1992 some evidence of discrimination against male minorities is found; (v) Under plan firm performance and firm size had modest effects on wages, during transition both are much more important as are changes in the labor force; (vi) While both industry and regional effects exist under plan and market, the pattern of these effects has changed substantially under embryonic markets, generally in a way consistent with the process of economic restructuring; (viii) There is little evidence that either union membership or collective agreements at firm level influence wages; (ix) Under plan women who worked in firms with variable pay schemes earned a premium: during early transition women on fixed wages earn more; typically for men, no similar patterns are evident; (x) During transition, employees who work on permanent contracts typically earn more than do those on temporary contracts.

One implication of the findings is that the process of earnings determination is becoming more market driven. Both individual characteristics that reflect productivity, such as education, as well as firm characteristics that may capture enterprise performance, are playing bigger roles in the evolving wage determination process. In addition, the changing pattern of industrial wage effects has responded to the changed imperatives of the restructuring economy. As such these changes are consistent with the hypothesis that, even absent privatization, an important degree of change is possible in economies in transition. That is, the change in the forces determining individual incomes is consistent with the hypothesis that increasingly autonomous managers operating in more competitive contexts, with price liberalization and a growing private sector, increasingly are making decisions that have a market logic.

However, another implication of the findings is that the wage determination process is far from being completely market driven: indeed several findings point to evidence of inertia in
wage setting mechanisms. For example we find that workers in state owned firms earn more. Such findings are consistent with the views of those who argue that despite the system in place officially, there still is a large degree of centralization (e.g. Beleva, 1993). This view implies that the basic locus of negotiation of collective agreements remains at branch (and not plant) level. However, another way of looking at this is that by 1992 it would not appear that most Bulgarian firms, especially in the state sector, were facing hard budget constraints. In turn this suggests that if market determined wages are the objective then tighter constraints are needed (e.g. Svejnar, 1993). Perhaps the likelihood of this will be greater after privatization of large firms accelerates thus leading to more effective decision-making at the firm level.

One condition for sustaining a program of reform is probably that most of the population perceive the process of transition to be “fair” and that the costs and benefits of restructuring do not fall too unevenly on different groups (Freeman, 1993). From this perspective our findings on discrimination are potentially important. The weak evidence of discrimination against male minorities during transition highlights the potentially larger burden that ethnic minorities may endure during transition. Moreover, and contrary to the claims made during the communist period, gender discrimination in earnings was present in 1989. While it has lessened somewhat during early transition, in 1992 it remains a very large part of the average wage gap. In addition, gender discrimination has a different character in countries in transition. This may be shown by comparison with studies of gender discrimination in western countries. Typically these have found that an appreciably lower part of the gap is “unexplained” and that, in pooled regressions, there is a lower coefficient on the gender dummy. In comparison with findings from studies of gender discrimination elsewhere, our results may reflect Bulgarian women thus far having been better situated than women on average in western countries. Hence our findings indicate that consideration be given to the adoption of appropriate legislative action to protect these vulnerable groups.

Our findings also have implications for the role of labor unions during transition. Typically we do not find support for the view that unions affect individual earnings. In addition there is other evidence that points both to labor unions, in part by membership on tripartite bodies (ILO, 1993), playing important roles in influencing national policy, and to rejection of the hypothesis that decision-making in Bulgarian enterprises typically is controlled by workers and their representatives (Jones, 1994). Together these findings call into question those who argue that the labor movement has been behaving irresponsibly and that, therefore, legislation to enthrone organized labor should be introduced. Rather during these often politically uncertain times, these findings provide some support for those who argue instead...
that there is much to commend a new industrial relations in which new independent labor unions play an important role.

Finally, it is possible that our findings for Bulgaria may have more general applicability. In part this reflects the fact that, during Communism, the Bulgarian economy had many characteristics in common with other former Communist countries, both in Eastern and Central Europe as well as newly independent countries that were formerly in the USSR. These features include: a very centralized economy, giantism in the size-distribution of enterprises, very limited economic contacts with the West and enormous dependence on trade and technology transfer with CMEA countries. For countries with such features, even though there are substantial differences in the economic reform packages that have been adopted during early transition, arguably for many reasons (e.g. Ben-Ner, Montias and Neuberger, 1993) the common institutional and organizational heritage may be expected to continue to influence and constrain change in the forces affecting wage setting in ways that are broadly comparable to the Bulgarian experience.
ENDNOTES

1. The few econometric studies are typically for the special cases of the former East Germany (e.g., Bellman et al., 1993) and for parts of the former (self-managed) Yugoslavia (e.g., Orazem and Vodopivec, 1994). Non-econometric studies for other former Soviet countries include Standing et al., (1993), Szriacski and Windell, (1993) and Atkinson (1992).

2. See Beleva et al. (1993b) for a good description of wage policies during this period.

3. Indeed Beleva et al., (1993b) argue that these unions, if in control, are trying to maximize wages for core members, rather than employment for all potential members.

4. For example, Bergson (1988), in discussing the process of industrialization for CMEA countries, reports that wages of metal and coal mining workers rose, while wages in low priority industries such as clothing, which initially were at or above the average for all industry, tended to fall well below the average.

5. So far as we know there have been very few econometric studies of wage determination for former communist countries. Exceptions include Orazem and Vodopivec for the special (self-managed) case of Slovenia and Bellman et al. (1993) for the special case of the former East Germany.

6. To do this, we first estimated a pooled sample model with a gender dummy. An F test on the restriction that the returns to compensation related factors are equal for men and women, and that gender discrimination is captured solely by the gender dummy was rejected at the 5% level for this and all earnings models.

7. Specifically, 4.2% of the respondents had been in the firm 1 year, 4.5% had been there 2 years or less and 5% had been there fewer than 4 years. Moreover, of those who had been at their place of work for 2 years or less, the bulk were new workers who had not changed jobs. Thus, selectivity does not appear to be a problem, and OLS estimation methods are appropriate in this context.

8. In unreported estimates we also experimented by using continuous measures of education. The basic pattern of the results is unaltered by this alternative approach.

9. While we also estimated models using total experience, for several reasons we report results only for employer specific experience. First, the conventional measure of total experience (age minus years of schooling less 6) may be an inaccurate estimator, especially for females (who tend to leave the labor market for brief spells for reasons such as child rearing. Second, the particular type of experience that is more likely to be rewarded in the case of former communist countries may well be the employer specific type (a reward for loyalty.) Notwithstanding the above points, we expect that in a context of low labor turnover, firm specific and total (true) experience measures will be highly and positively correlated. In fact this is borne out in the unreported regressions (using total experience) which are very similar to those in the reported regressions.

10. The available multivariate analysis on discrimination for former communist countries is usually quite aggregative and hence quite limited. Thus in testing for gender and ethnic related wage discrimination, Szriacski and Windell (1992) are unable to control for differences in human capital endowments and other individual variables that potentially affect earnings.

11. Following Kreuger and Summers (1988) "...industry dummies should pick up labor demand and efficiency wage effects after controlling for qualifications and seniority".

12. These are: Heavy = Engineering, Electrical, Chemicals, Nonmetals, Mining, Wood; Light = Textiles, Food, and Other. Results with these two categories are broadly supportive of this restructuring hypothesis and are available from the authors.

13. The underlying data set in the Bulgarian worker survey is approximately gender balanced.
14. A possible problem with our approach follows from the overlap in the samples for the two years. To examine the potential impact of this we ran separate regressions for the observations unique to each year (i.e. for non-overlapping cases). Because of size constraints we estimated the pooled models. Using the specification with the log of the monthly wage, comparison of the estimates based on the 898 non-overlapping cases in 1992 and the 147 cases for 1989 are very similar to the reported estimates. Almost all of the variables that enter significantly in the estimates based on the non-overlapping observations, did so with similar significance levels and comparably sized coefficients as in the reported regressions.

15. By comparison Corcoran and Duncan (1979), using 1975 data for the US, find that years with the current employers are rewarded at 2.4% for white men, 1.9% for black men, 2.2% for white women and 1.8% for black women.

16. Similar patterns are usually found in studies of western economies; for example, see the review in Polachek and Siebert (1993). Moreover, the specific estimates for Bulgaria supports the hypothesis that the peak of the life cycle earnings model, or in the earnings profile itself, occurs a little after mid-life. For example see the reviews in Berndt (1991).

17. Note that we discuss only discrimination in earnings based on findings from our survey of a sample of active participants in the labor market in early 1992. That is, we exclude the unemployed, the majority of whom in 1992 in Bulgaria were women. Arguably women who have lost employment are those who faced more gender discrimination and/or possessed lower qualifications.

18. Such methods assume that returns to characteristics are constant across gender. To arrive at an upper and lower bound for the explained and unexplained components, we use the men’s returns and the women’s returns alternatively as the economy-wide rates.

19. In 1992, factor differences explain only 3% to 6.9% of differences in hourly earnings.

20. These results are consistent with results based on the Oaxaca-Blinder method. Because the earnings gap decreased between 1989 and 1992, changes in factor endowments hindered equality, while changes in factor returns helped women gain equality. In this respect our results are comparable to those of Orazem and Vodopievec (1993) who, in examining the determinants of earnings in recent years in Slovenia find that "...the greatest impact occurred through the gap effect with women gaining by moving up the male residual earnings distribution. The next largest effect was from increasing inequality in the residual wage distribution".

21. In unreported regression there is other evidence of discrimination based on ethnicity. When all eight industry dummies are included, in the pooled regression for 1992 the ethnicity variable is significant at the 10% level and implies a 6% decrease in earnings. More surprising, however, we find evidence of positive discrimination in favor of ethnic minorities in 1989.

22. In unreported regressions we experimented with alternative measures of performance including firm profitability; the results were essentially unaltered by these alternative measures. Also for individuals working in the 20 firms best represented in the sample, we tested for firm effects by including firm dummies. This procedure also confirmed the existence of firm-specific effects on wages.

23. Knut and Schmidt (1990) report large positive effects from size for firms in the former East Germany.

24. Thus for western economies Corcoran and Duncan (1979) find that only 56% of the gap between white men and women is 'unexplained'. And in East Germany, in November 1990, Knut and Gerlach (1990) find that men earn 10% greater wages than do women, other things equal, but that there was no evidence of gender discrimination in earnings by November 1991.
Appendix A

The data for the analysis come from the Bulgarian Enterprise Survey, which gathered several frames of data in 1992 (Jones, 1993). The population was defined as all state-owned (in 1989) Bulgarian manufacturing organizations (SOE's) that operated on a for-profit basis and had more than 80 employees in 1992. The sampling design for enterprises operated at two levels. First, five groupings of the 320 municipal districts in Bulgaria were selected on the bases of geographic and urban variability, reproducing aggregate country-wide industry distributions, and minimizing data collection costs (Sofia, Pernik, Pleven, Burgas and Plovdiv). Second, within each of the five regions, population enumeration lists of SOE’s were compiled by the Central Statistical Bureau. The number of sampled establishments per region was set to reproduce the population proportions of establishments per region. The five regions contained a population of 727 SOE’s. Within each region, within major industry categories, establishments were ordered by size and the approximate two-thirds largest were selected up to the desired sample size of about 500. Thus the sample contains 69% of the population of establishments, but selected to reproduce population distributions by region and industry. In terms of employment, the sample SOE’s contain about 95% of all SOE employees in the five regions.

Several establishment-level surveys were conducted. These include the Bulgarian Worker Survey (BWS), a sample survey of 4600 individual workers who worked in a randomly chosen sub-sample of 371 establishments. The BWS data were collected during May-June 1992, following pre-pilots and pilots during the preceding months. Within establishments, by using personnel records, individuals were classified by gender and occupation and then randomly selected. At least 10 individuals were sampled at each establishment; smaller percentages were sampled in the larger establishments. Sixteen percent of the subsample of establishments had 10 sampled employees: 77% had 10-14 employees: 6% had 20-29 employees: and only 1% had more than 30 employees. Comparisons of lists of respondents and non-respondents by establishment does not reveal any obvious differences in the pattern of non-respondents.

The BWS was undertaken in tandem with other establishment-level surveys, two of which are drawn on in this paper-- the Bulgarian Management Survey (BMS) and the Bulgarian Economic Survey (BES). The BMS collected survey data from the chief executive officers in the 490 Bulgarian establishments. A wide variety of questions were asked including whether or not a collective agreement existed at their establishment, the form or enterprise ownership and whether or not the enterprise operated a performance-related compensation system. The BES comprises mainly economic data from the establishments that participated in the BMS. The data are annual for 1989-1991 and include balance sheet and income statement information. Questions from the BES that were used in this study include measures of size, firm performance, region and industry.
Appendix B: Definitions of Variables

PERM Dummy Var: 1 = on permanent contract; 0 = on temporary contract

JOB Dummy Var: 1 = unskilled worker; 0 = other

EDUC1 Dummy Var for education level 1 (0-8 years); 1 = Yes, 0 = No. 
Highest level (15 plus yrs) omitted

EDUC2 Dummy Var for education level 2 (9-12 yrs); 1 = Yes, 0 = No.

EDUC3 Dummy Var for education level 3 (13-14 years); 1 = Yes, 0 = No.

EXP92(89) Number of years worked in current enterprise in 1992 (and in 1989)

EXPS92(89) Square of number of years worked in current enterprise in 1992 (and in 1989)

MARRIED Dummy var; 1 = married, 0 = not

NONBULG Dummy var; 1 = ethnic minority, 0 = not

MALE Dummy var; 1 = male, 0 = female

HEAVY Dummy Var; 1 = firm in heavy industry; 0 otherwise.

WOOD (TEXTILE, ENGINE, ELEC, CHEM, NONM, MINING, OTHER)
Industry dummy variables (For wood, textile, engineering, electric, chemicals, nonmetal, mining and other) For each, dummy var 1 = that sector, 0 = otherwise

PLOVDIV (PLEVEN, PERNIK, BOURGAS, SOFIA)
Regional dummy variables. For each, dummy var; 1 = that sector, otherwise 0.

STATE92(89) Dummy Var; 1 = State-owned firm, 0 otherwise.


LF92(89) Number of people employed by firm in 1992 (and in 1989)

LNLF92(89) Number of people employed by firm in 1992 (and in 1989)

SALARY92(89) Dummy var; 1 = firm has a fixed wage system; 0 = firm has a performance related compensation system

DLF91 Percentage change in labor force during 1991

UNIONCOL Dummy var; 1 = union member and employed in a firm covered by a collective agreement, 0 otherwise.

STAFF, SPEC1, SPEC2 and MANAG
Occupational Dummy variables; 1 = that category, 0 = otherwise (Blue collar omitted category).
### Table 1  
**Descriptive Statistics**

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**Notes:**

1. For dummy variables, the mean shows the percentage that answered affirmatively.

2. Abbreviations of the models.
   - F89=Wage regression for females in 1989.
   - F192=Wage regression for women in 1992, monthly wage.

3. In the pooled samples, the industrial distribution was as follows (%):
   - Food = 18; Textile = 15; Wood = 6; Engineering = 22; Electric = 10;
   - Chemical = 5; Non-Metals = 3; Mining = 3; Other = 18.
Table 2: Gender Specific OLS Earnings Equations

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<th>F92</th>
<th>M92</th>
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Note: *** significant at 1% level; ** significant at 5%; * significant at 10% level

2. In the specifications headed (Hour) the dependent variable is ln hourly earnings. In all other specifications the dependent variable is ln monthly wage.
Table 3: Male Female Wage Gap Decompositions

A. Oaxaca/Blinder Decomposition

<table>
<thead>
<tr>
<th>Year</th>
<th>Unexplained % At male rates</th>
<th>Unexplained % At female rates</th>
<th>Explained % At male rates</th>
<th>Explained % At female rates</th>
<th>Wage gap</th>
</tr>
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<tr>
<td>1989</td>
<td>88.70%</td>
<td>90.60%</td>
<td>11.30%</td>
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<tr>
<td>1992</td>
<td>94.30%</td>
<td>101.30%</td>
<td>5.70%</td>
<td>-1.30%</td>
<td>0.2159</td>
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Notes:
1. Explained = Portion of male female pay difference due to differences in factor endowments (assuming, alternatively that male or female factor returns represent the economy wide rates).
2. Unexplained = Portion of male female pay differences due to differences in factor returns (assuming, alternatively, that male or female factor returns represent the economy wide rates).
3. Explained + Unexplained = wage differential.

B. Blau/Khan Decomposition

(Decomposition of the change in female/male log wage difference between 1989 and 1992)

<table>
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<th>Observed Changes</th>
<th>Percent of gap</th>
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<tr>
<td>1. Observed Xs</td>
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<tr>
<td>2. Observed prices</td>
<td>52.70%</td>
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<tr>
<td>3. Gap</td>
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<td>4. Unobserved Prices</td>
<td>45.70%</td>
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<tr>
<td>Gender Specific(1+3)</td>
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<td>Wage structure(2+4)</td>
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<td>Explained(1+2)</td>
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<td>Unexplained(3+4)</td>
<td>72.70%</td>
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</table>

Notes:
1. How male/female earnings differential changed in response to changes in the male female gap in characteristics
2. How changes in returns to these characteristics affected wage gap
3. How changes in women's relative position in male distribution affected pay gap
4. How increase in the standard deviation of the residual earnings distribution affected the male female wage gap.
References


Boeri, Tito and Mark Kneese (1992) Labor Markets and the Transition in Central and Eastern Europe *OCED Economic Studies*, # 18, Spring, 133-159

Bogetic, Zeljko and Louise Fox (1993) "Incomes Policies During Stabilization: A Review and some lessons from Bulgaria and Romania" *Comparative Economic Studies*


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Pinto, Brian, Marek Beleva and Stefan Krajewski (1993) "transforming State Enterprises in Poland" *Brookings papers on Economic Activity*


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**HAPPY HOLIDAYS TO ALL!**