

**Continued Decline for Ethnic Minorities in the Transition?: Changes in Ethnic Earnings
Differentials in Bulgaria, 1986, 1993 & 1997**

Lisa Giddings

University of Wisconsin-La Crosse

FINAL: Forthcoming at *The Economics of Transition*, last draft August 2003.

ABSTRACT

Using three Bulgarian cross-sectional household surveys from 1986, 1993 and 1997, this essay shows that the mean log wage differential between ethnic Bulgarians and Turks increased from 0.1615 in 1986 to 0.2874 in 1993 and again to 0.4075 by 1997. Bulgarian gains over ethnic Turks in the early transition are related to both changes in the relative returns to skill and changes in the composition of demand for goods and services as the country moved toward a market economy. The Turks began the transition with fewer years of education than the Bulgarians, and began to close the education gap over this time. The Bulgarians, however, were more likely to have obtained more general secondary and university degrees than the ethnic Turks—degrees that, in contrast to technical or vocational degrees, are experiencing increased remuneration in the transition. With more of an asset that has become more valuable, the ethnic Bulgarians improved their relative position.

JEL: J3, J7, P2, P3, P5

ACKNOWLEDGEMENTS

The research for this paper was funded by a University of Wisconsin-La Crosse Faculty Research Grant. I would like to thank Mieke Meurs, Taggart J. Brooks, Jan Svejnar and two anonymous referees for comments and advice on earlier drafts.

I. INTRODUCTION

The transition in Central and Eastern Europe from central planning to mixed markets has resulted in increased inequality and large changes in the distribution of wages. Empirical evidence suggests that while wages were artificially compressed by communist command structures in Central and Eastern Europe (Atkinson and Mickelwhite, 1993), they became more dispersed as the planned economies introduced market reforms (Krueger and Pischke, 1995; Torrey and Smeeding, 1992; Garner, Lubyova and Terrell, 1995; Milanovic, 1998; Brainerd, 1998). In examining Bulgaria, Jan J. Rutkowski (1996: 44) found that between 1990 and 1993 the wages of workers in the bottom income decile fell by 38 percent while those at the top dropped by only 25 percent. Furthermore, he showed that a worker in the 90th percentile earned 3.6 times more than a worker in the 10th percentile by 1993. Branko Milanovic (1999) presents increasing income Gini coefficients in Bulgaria from 21.7 to 31.7 between 1989 and 1995. Derek Jones (1991) presents a coefficient of wage variation for 11 employment sectors maintaining a consistent 0.12 between 1960 and 1970, falling to 0.10 in 1980 and returning to 0.12 in 1987. This measure increases to 0.31 in 1989 and falls slightly to 0.26 by 1990. Iskra Beleva, Richard Jackman and Mariela Nevoa-Amar (1995) show a 71 percent increase of wage variation across 18 industries between 1990 and 1992.

Such increases in earnings inequality are partially due to the fact that following the collapse of communism in Central and Eastern Europe centralized wage determination was abandoned. Jan Svejnar (1999) summarizes the extensive studies documenting a rapid increase in wage dispersion. In Bulgaria, wage decentralization has occurred, but at comparatively slower pace relative to other transitioning countries (Bobeva, 1997; Brainerd, 2000). The process began in the late 1980s involving more managerial discretion as well as the emergence of unions in the late 1980s (Jones, 1991, 1992; Petkov and Gradev, 1995; Thirkell, Petkov and Vickerstaff, 1998; Gradev, 1999).

Increased managerial freedom in wage determination can better link wages to productivity by rewarding worker's education and experience. However, such freedom also leaves room for remuneration based on non-productive factors such as sex or ethnicity. This is of particular concern to Bulgaria in its attempt to attain accession to the European Union. One objective of the EU in particular—"Social Policy and Employment"—requires equal treatment for women and men in labor markets and is forcing some transitioning economies to adopt Western-style anti-discrimination measures (Jolliffe, 2002; Jurajda, 2001). Furthermore, Bulgaria ratified the Framework Convention of the Council of Europe for the Protection of National Minorities imploring the country to establish anti-discrimination measures to protect ethnic minorities.

While there is a wealth of information on changes in the gender wage gap in Central and Eastern Europe,¹ comparatively little research has focused on the effects of the transition on ethnic groups in East and Central Europe. In what literature exists, the effects of the transition on ethnic minorities in the labor market are not consistent across transitioning countries. Preliminary evidence suggests that the ethnic wage gap between Turks and Bulgarians increased in the early transition (Giddings, 2002b). In Estonia, for example, ethnic Russians are performing relatively better in the early years of the transition. The mean log wage differential between male ethnic Estonians and male ethnic Russians fell from 0.0186 in 1989 to 0.0028 in 1994 (Kroncke and Smith, 1999: 189). The non-Slovenian males in Slovenia experienced a slight decline in their earnings premium from 2.3 percent in 1987 to 2 percent in 1992 whereas no- Estonian males in Estonia earned less than their Estonian counterparts in both 1989 (2.9 percent less) and 1994 (7.9 percent less) (Orazem and Vodopivec, 2000: 291). Data from urban China indicates that earnings

¹ See Brainerd (1998), Ogloblin (1999), Orazem and Vodopivec (1995, 1999, 2000), Newell and Riley (1996), Hunt (1998), Bird, Schwarze and Wagner (1994), Krueger and Pischke (1995), Glinskaya and Mroz (2000), Liu, Meng and Zhang (2000), Paternostro and Sahn (1999), Jurajda (2001), Pailhé (2000). On the gender gap in Bulgaria: Brainerd (2000), Giddings (2002a), and Jolliffe (2002).

premia for a male national minority fell from 1.8 percent in 1988 to -3.9 percent in 1995 (Gustafsson and Li, 2000: 320-322).

The evidence presented here shows that the mean log wage differential between ethnic Bulgarians and Turks increased from 0.1615 in 1986 to 0.2874 in 1993 and again to 0.4075 by 1997. The goal of this essay is to account for this increase in the ethnic earnings gap in Bulgaria's transition within the broader context of the wage structure changes documented in transitioning economies. In particular, the analysis distinguishes between the part of the increased ethnic earnings gap caused by changes in the returns to skills as opposed to changes in skill prices or possibly factors unrelated to skill.

The empirical research relies on cross-sectional survey data from 1986, 1993 and 1997. This allows for comparisons between pre-, early- and mid-transition in Bulgaria, as the initial measures of the economic reform were implemented in 1991 when prices and wages were liberalized. The 1986 survey is unique in that it is the only existing pre-transition survey from Bulgaria, thereby enabling an analysis of the heretofore unexplored Bulgarian wage structure prior to 1989. The changes in the earnings differentials between 1986 and 1993 and then between 1993 and 1997 is then decomposed using the Juhn, Murphy, and Pierce (1991) technique in order to identify the important factors involved in causing the change.

The earnings decomposition indicates that the returns to schooling increased in Bulgaria's transition, especially between 1993 and 1997. Focusing on the returns to specific levels of education, secondary and university degrees garnered higher earnings in the transition. Despite recent Turkish gains in years of schooling, Bulgarians still acquire more education, and are more likely to have obtained general secondary and university degrees. With more of an asset that has become more valuable, Bulgarians expanded their earnings gap over the Turks. Furthermore, the decomposition shows increased returns to the commerce and service industries during the first period, and increases in manufacturing, transportation and communications in the second. Similarly, although the Turks began to enter the service industry during the first period

and manufacturing during the second, the Bulgarians dominated both of these growing industries and increased their relative earnings as a result.

This essay is organized as follows. Section II provides a brief history of the ethnic Turks in the region. Section III presents descriptive statistics. Section IV provides a description of the methodology employed. Empirical results are presented in Section V and concluding remarks in Section VI.

II. BACKGROUND: ETHNIC TURKS IN BULGARIA

Ethnic Bulgarians and ethnic Turks in Bulgaria have experienced a chequered relationship dating back at least to the Ottoman Empire when the Turks conquered Bulgaria in the end of the 14th Century (Crampton, 1997: 31). After Bulgarian independence in 1878, many Turks remained; comprising 9.7 percent of the population, and the country continued to exist as a multi-ethnic state.² Since that time, ethnic relations have undergone waves of intolerance in which the Turks³ were denied the political, social, and economic rights accorded to them in the provisions of the Treaty of Berlin of 1878 (for a more detailed historic discussion on the ethnic Turks in Bulgaria, see Karapat, 1990).

More recently, the ethnic Turks in Bulgaria faced at least six forced expulsions from Bulgaria during the era of central planning, as well as a name-changing campaign occurring during the winter of 1984-85 during which time those who refused to voluntarily change their names lost state-enterprise jobs (Poulton, 1989: 15). Furthermore, stringent social policies limiting public displays of Turkish and Muslim culture resulted in a ban of speaking Turkish in all public places, wearing ethnic clothing, listening to Turkish music, all practices associated with Ramadan, as well as birth, death, and wedding ceremonies (Poulton, 1989:14).

² This statistic is based on 1992 Census figures. There are other ethnic minorities living in Bulgaria comprising a smaller portion of the population. The next two largest minority groups include “Pomaks” (Muslim Bulgarians) and Roma. Due to data availability, this analysis cannot explore the effects on minority groups other than the ethnic Turks.

³ The terms “Turk” and “ethnic Turk”, and “Bulgarian” and “ethnic Bulgarian” will be used interchangeably throughout the paper.

These atrocities have periodically put Bulgaria on the United Nation's Development Programme's Human Rights Watch List, and the early transition has changed the situation only marginally. A survey conducted by a sociological collective in June of 1992 found that the ethnic Bulgarians sustain a prejudice against the ethnic Turks. The survey showed that over fifty percent of Bulgarians considered the ethnic Turks to be a "real danger to national security," religious fanatics, and occupying too many important political positions. Over 35 percent supported policies encouraging emigration to Turkey (Kunev, 1992: 47). Additionally, Bulgaria is viewed as having made little progress towards compliance to the EU's requirements for accession. In particular, see Section 1.2 on Human rights and the protection of minorities of this report in which the authors encourage the strengthening of the National Council on Ethnic and Demographic issues (Commission of the European Communities, 2001).

III. DATA AND DESCRIPTIVE INFORMATION

This analysis is based on three cross-sectional household surveys conducted in Bulgaria, one administered prior to the transition and the other two after the initial economic reforms were in place. In all three surveys, the analysis focuses on employed, wage-earning civilians of working age who have completed their schooling. It includes those who are self-employed and who are working in agriculture. Furthermore, in order to focus on differences between the ethnic Bulgarians and ethnic Turks, those of other ethnicities (such as Roma or Bulgarian Muslims—"Pomaks") are excluded from the analysis.

The 1986 *Town and Village Survey* (TVS), conducted by the Institute of Sociology of the Bulgarian Academy of Sciences in Sofia, was carried out in conjunction with the national census delivered in the winter of 1985 and contains heretofore unexplored information on the structure of Bulgarian wages prior to the transition. The sample is random and representative of the population and contains 10,333 cases. The gender and ethnic composition of the sample is 5,592 women (54 percent) and 918 ethnic Turks (8.9 percent). After eliminating those not employed,

those reporting zero earnings,⁴ and those missing wage, education, industry, or household composition data, the sub-sample contains 6,487 cases, 3,237 (48.9%) of whom are men, 3,250 are women, 5,486 are Bulgarian and 645 (9.94%) of whom are ethnic Turks.

The second survey, *Social Stratification in Eastern Europe after 1989: General Population Survey* (SSEE),⁵ was conducted in 1993 by a team of investigators from University of California-Los Angeles (UCLA) in conjunction with Bulgarian officials from the Central Statistical office. The SSEE survey was carried out through a two-stage clustered sampling technique with stratification by district, municipality and size of voting section. The field research took place between June and July of 1993 during which 4,919 interviews were completed. The gender and ethnic composition of the sample consists of 2543 (51.7 percent) women and 491 (9.98 percent) ethnic Turks.

In order to focus on working-age wage earners, a sub-sample of the employed was drawn. Four hundred seventy-six persons under age 17, continuing students, or military personnel were dropped from the sample leaving 2,602 employed wage-earners. Note that the sub-sample of employed wage earners declines by a much greater amount than the 1986 sample. This is due to a large increase in those who report being unemployed (509 or 10.35 percent of the original sample), and a large increase in the number reporting being retired (852 or 17.32 percent of the sample). Finally, there were 406 individuals (approximately 8 percent of the sample) that are missing wage, education, industry, or household composition data) and these observations are excluded from the analysis. The resulting effective sample size is 2,196 wage earners. The gender and ethnic composition of the sub-sample of wage-earning adults consists of 1,081 (49.2 percent) women out of 2,196 persons and 177 (8.1 percent) ethnic Turks out of 2,196 persons.

The third set of data used in this paper is from the nationally representative *Bulgaria Integrated Household Survey* (BIHS) collected during the summer of 1997. The Gallup

⁴ There were 22 cases that reported zero earnings in the sample of the employed.

Organization in Sofia managed the survey in conjunction with the Bulgarian Ministry of Labor, the Social Affairs and the National Institute of Statistics, and the World Bank provided technical assistance. The sample frame, from which the sample was drawn, is based on the 1992 general census of Bulgaria. The planned sample size was 2,500 households, which were randomly drawn in a two-stage process. Not all households agreed to participate or could be located, and the actual sample size was 6,781 individuals of whom 3,498 (51 percent) are women and 614 (9.1 percent) are ethnic Turks.

Again, in order to focus on working-age wage earners, a sub-sample of the employed was drawn. 1,269 persons under age 17, 863 continuing students, and 93 military personnel were dropped from the sample leaving 4,556. Finally, there were 795 individuals that are missing wage, schooling, industry or other identifying data and these observations are excluded from the analysis. The resulting effective sample size is 1591 employed wage earners. The gender and ethnic composition of the sub-sample of wage-earning adults consists of 796 (50 percent) women out of 1,591 persons and 117 (7.4 percent) ethnic Turks out of 1,591 persons.

A. Earnings

Gross wage income is constructed in both the SSEE and the BIHS data as the sum of wage payments (before taxes) from an individual's main job and second job. In order to be consistent with the gross wage variable in the TVS, this calculation did not include wage adjustments for children, transportation costs, etc. Mean gross nominal wages by ethnicity for each year are reported in Table 1. Ethnic Bulgarians earned 214.78 *Leva* per month as compared to Ethnic Turks at 184.16 *Leva* per month in 1986. By 1993 these figures changed to 2,454.59 and 1,851.41 respectively. Nominal earnings by 1997 increased to 78,025.66 *Leva* per month for Bulgarians and 56,950.48 *Leva* per month on average among Ethnic Turks.

⁵ The Bulgarian survey is part of a larger multi-country comparative research project including five other Central and East-European countries.

Table 1: Means of Relevant Variables^a

	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks
	1986	1986	1993	1993	1997	1997
Gross Monthly Earnings	214.78 (79.75)	184.16 (69.72)	2,454.59 (1,786.13)	1,851.41 (1,053.84)	78,025.66 (63,140.18)	56,950.48 (57,737.84)
Years of schooling	10.735 (3.11)	7.510 (3.21)	11.764 (3.05)	8.610 (2.61)	12.069 (2.80)	9.145 (2.53)
Primary level incomplete	0.031 (0.17)	0.226 (0.42)	0.037 (0.19)	0.198 (0.40)	0.038 (0.19)	0.205 (0.41)
Primary	0.283 (0.45)	0.656 (0.48)	0.159 (0.37)	0.435 (0.50)	0.456 (0.50)	0.641 (0.48)
Secondary Technical	0.265 (0.44)	0.070 (0.25)	0.328 (0.47)	0.186 (0.39)	0.035 (0.18)	0 0
Secondary Vocational	0.150 (0.36)	0.149 (0.36)	0.053 (0.22)	0.040 (0.20)	0.095 (0.29)	0.051 (0.22)
Secondary General	0.131 (0.34)	0.043 (0.20)	0.271 (0.44)	0.136 (0.34)	0.219 (0.41)	0.103 (0.30)
University	0.162 (0.37)	0.023 (0.15)	0.152 (0.36)	0.006 (8.08)	0.157 (0.36)	0 0
Experience (years)	16.804 (9.80)	14.557 (9.53)	19.695 (10.93)	20.208 (11.39)	23.115 (11.01)	22.521 (11.72)
Experience-Squared	378.357 (364.53)	302.637 (341.57)	507.366 (486.91)	537.291 (512.16)	655.385 (564.35)	643.462 (588.67)
15 Years of Experience	0.041 (0.20)	0.057 (0.23)	0.002 (0.05)	0.006 (0.08)	0.025 (0.16)	0.051 (0.22)
Female	0.504 (0.50)	0.473 (0.50)	0.501 (0.500)	0.401 (0.49)	0.501 (0.50)	0.512 (0.50)
Rural	0.294 (0.46)	0.664 (0.47)	0.298 (0.46)	0.757 (0.43)	0.184 (0.39)	0.547 (0.50)
Construction	0.077 (0.27)	0.068 (0.25)	0.060 (0.24)	0.113 (0.32)	0.061 (0.24)	0.060 (0.24)
Manufacturing	0.355 (0.48)	0.278 (0.45)	0.300 (0.46)	.271 (0.45)	0.312 (0.46)	0.444 (0.50)
Agriculture	0.133 (0.34)	0.419 (0.49)	0.102 (0.30)	0.367 (0.48)	0.049 (0.22)	0.137 (0.35)
Commerce	0.075 (0.26)	0.048 (0.21)	0.142 (0.35)	0.016 (0.13)	0.118 (0.32)	0.060 (0.24)
Services	0.094 (0.29)	0.060 (0.24)	0.132 (0.30)	0.079 (0.27)	0.113 (0.32)	0.145 (0.35)
Communications	0.127 (0.33)	0.051 (0.22)	0.111 (0.31)	0.068 (0.25)	0.143 (0.35)	0.068 (0.25)
Transportation	0.064 (0.25)	0.050 (0.22)	0.091 (0.29)	0.045 (0.21)	0.079 (0.27)	0.051 (0.22)
Public Administration	0.072 (0.26)	0.023 (0.15)	0.042 (0.20)	0.011 (0.11)	0.123 (0.33)	0.034 (0.18)
Union	1 (0)	1 (0)	0.766 (0.42)	0.616 (0.488)	0.367 (0.48)	0.162 (0.37)
N	5,486	645	1,905	177	1,437	117

a. Data is from a sample of the employed. Wages are reported in nominal terms. Standard deviations are in parentheses. Source: author's calculations.

Furthermore, earnings were not adjusted for hours spent in the labor market in either the 1986 or the 1993 analysis. The number of hours worked was only available in the 1993 and 1997 surveys; however, it is a reasonable assumption that all employed individuals during Communism worked full-time. Normal working hours per week were generally longer in Central and Eastern than in Western European countries; in particular, the average workweek in Bulgaria during Communism was approximately 40.5 for both men and women (Kroupova, 1990: 10, quoted in Hubner, Maier, and Rudolph, 1991: 34). Adjusting for hours in the 1993 and 1997 analyses made no significant difference in the results.⁶

Changes in the ethnic earnings differentials during Bulgaria's transformation from a planned economy to a mixed-market economy are reported in Tables 2a and 2b, which provide information on log earnings for ethnic Bulgarians and ethnic Turks during two time periods, 1986-1993 and 1993-1997. According to the tables, the ethnic earnings gap increased over both time periods. Between 1986 and 1993 the gap increased from 0.1615 to 0.2874, or an increase of 0.1259 log points, or over 75 percent. During the period from 1993 to 1997 the ethnic earnings differential continued to increase, but at a slower rate. The ethnic wage gap increased from 0.2874 to 0.4075, or an increase of 0.1201 log points. This translates into a 41 percent increase in the ethnic earnings gap over the second period.

Table 2a. Changes in Log Ethnic Earnings Differentials, Bulgaria 1986 & 1993^a

	Log of Bulgarian Earnings	Log of Turk Earnings	Ethnic Gap
1986	5.3098 (0.347)	5.1483 (0.371)	0.1615
1993	7.6546 (0.515)	7.3672 (0.615)	0.2874
Gap₉₃ – Gap₈₆			0.1259

^a Data is from a sample of the employed. Log wages are reported in nominal terms and reflect the massive realignment of prices in the transition. Standard deviations are in parentheses.
Source: author's calculations.

⁶ The results of the 1993 and 1997 analyses after adjusting for hours as well as a description of how the data was adjusted to account for hours, are available from the author upon request.

Table 2b. Changes in Log Ethnic Earnings Differentials, Bulgaria 1993 & 1997^a

	Log of Bulgarian Earnings	Log of Turk Earnings	Ethnic Gap
1993	7.6546 (0.515)	7.3672 (0.615)	0.2874
1997	10.9673 (0.834)	10.5598 (0.902)	0.4075
Gap₉₇ – Gap₉₃			0.1201

^a Data is from a sample of the employed. Log wages are reported in nominal terms and reflect the massive realignment of prices in the transition. Standard deviations are in parentheses. Source: author's calculations.

B. Education and Experience

Economists traditionally approach the question of wage differentials between men and women, and among racial/ethnic groups by focusing on the role of differences in qualifications between gender and ethnic groups, and on differences in the treatment of similarly qualified individuals (discrimination). Segregation by occupation, industry, or sector in which members of different gender, racial, or ethnic groups are disproportionately employed in particular occupations (industries or sectors) can also lead to differences in wages. Such differences between groups in human capital or occupational characteristics, can be referred to as *group-specific* factors—where groups are based on gender, race, or ethnicity—that influence wage differentials (Blau and Kahn, 1996).⁷

The countries of Central and Eastern Europe were noted for providing high levels of education under socialism (Laporte and Ringold, 1997: 5). The three surveys used in this analysis support the claim of similarly high levels of education. According to Table 1, ethnic Bulgarians obtained over ten years of schooling on average, with this number increasing in 1993 to over 11 years and to over 12 years by 1997. While men and women in Bulgaria have obtained essentially equal schooling during this time (Giddings, 2002a), with regard to ethnicity, the Bulgarian educational system has not been as egalitarian. The data in Table 1 indicates that in 1986 the

⁷ Francine Blau and Lawrence Kahn refer to these factors as “gender-specific.” Because this essay focuses on ethnic differences, the term “group-specific” will be used here instead.

ethnic Bulgarians obtained over 40 percent more schooling on average than Turks at over 10 years versus over 7 years in 1986. By 1993 the ethnic Turks began to close the education gap with the ethnic Bulgarians achieving 11.8 years as compared to the ethnic Turk's 8.6 years on average in 1993. The gap closed even further by 1997 where the ethnic Bulgarians obtained nearly 32 percent more schooling on average than the ethnic Turks at 12 years versus 9 years.

Education in Bulgaria is compulsory for children from the age of six or seven to the age of 16. Students attend primary school for four years, followed by middle school for another four years. At this time students are tested in Bulgarian and mathematics in order to determine which secondary track they will enter. Similar to the Western European multi-track system, Bulgarian secondary schools are vocational, technical or more generally academic in nature. During the early transition in Bulgaria, each track enrolled approximately 30 percent of the students (Laporte and Ringold, 1997).

Referring again to Table 1, differences between the ethnic groups become more striking when focusing on the different levels of education obtained and the different secondary tracks chosen. In all three years ethnic Turks are much more likely than ethnic Bulgarians to drop out of primary school, or receive only a primary level education. Ethnic Bulgarians are more likely in all years to obtain a vocational or technical degree, a general secondary degree, or a university-level education. This is especially significant as the country introduces market reforms. Bruno Laporte and Dena Ringold (1997) argue that those obtaining more generalized and higher education such as the general secondary and university degrees have greater flexibility in the uncertain transition and earn higher wages. In a survey of Bulgarian workers, Derek Jones and Kosali Ilayperuma (1994) corroborate this finding with a significant increase in the return to higher education between 1989 and 1992 for women and a small effect for men by 1991. This implies that although the evidence here suggests that ethnic Turks have begun to close the gap in the number of years of schooling, real differences exist between the Bulgarians and the Turks in terms of the

kind of degrees they are completing which could explain some of the increase in the earnings gap.⁸

In terms of labor market experience, the ethnic Turks are less likely to lag behind the ethnic Bulgarians.⁹ In 1986 ethnic Turks obtained over 14 years of experience on average as compared to nearly 17 years on average for the ethnic Bulgarians. This gap closed by 1993 where ethnic Turks obtained over 20 years while the ethnic Bulgarians obtained 19 years of experience. By 1997 the gap had again increased with the ethnic Turks obtaining over 22 years with the ethnic Bulgarians obtaining 23 years of experience.

C. Industry

In addition to education and experience, systematic differences between the Bulgarians and the Turks in the industry in which they are predominately employed may explain some of the increase in the ethnic earnings gap. Table 1 presents the distribution of ethnic Bulgarians and ethnic Turks in the labor market. This information indicates that commerce, services and transportation experienced the most growth in employment in the early transition. In contrast, manufacturing, construction, agriculture, public administration, and communications saw a decline in overall employment over this time. Employment among the ethnic Bulgarians grew in commerce, services and transportation in the early transition whereas employment among the ethnic Turks grew in construction, services, and communications. During the second period, among Bulgarians, manufacturing showed small growth as well as communications and public administration. Among Turks, employment grew in manufacturing, commerce, and services.

There is a debate regarding the appropriateness of including industry or occupational dummies in earnings regressions. The concern is that earnings differentials may be the result of discrimination against women/racial minorities/ethnic minorities wanting to enter into high-paying industries or occupations. Andrew Gill (1994) showed that racial differences in access to

⁸ It is important to note that the differences in education may themselves be the result of discrimination.

high-paying occupations played a significant role in racial wage differentials in the U.S. For this study, this implies that there may be barriers in place preventing ethnic Turks from entering some high-wage industries in Bulgaria. If so, ethnic Turks might become concentrated in low-wage industries or occupations. Thus, the inclusion of industry or occupational dummies could be endogenous, leading to an under-estimation of actual wage discrimination. Despite these caveats, industry dummies are included in the regression analyses in order to explore the degree to which changes in the returns to industry over time explain the increase in the ethnic earnings gap.

D. Wage Structure

In addition to group-specific factors, labor market institutions associated with the overall wage structure in an economy can affect wage differentials and play an important role in generating wage differentials (Blau and Kahn, 1992, 1995, 1996, 1997, 1999, 2000). “Wage-structure” factors refer to how different characteristics (such as schooling, experience, or industry) are *rewarded* in an economy as well as changes in the overall level of inequality in an economy.

Table 3 presents the percentage change in nominal earnings over the two periods in question within education and industry categories. From this information, it is possible to test Laporte and Ringold’s hypothesis and see if obtaining higher educational degrees command an earnings premium in Bulgaria’s early transition. During the first period, nominal earnings grew fastest among those obtaining a vocational secondary education and among those that obtained university-level education. During the second period, those obtaining vocational and general secondary levels of education experienced the largest nominal earnings growth. From this evidence, it is clear that the ethnic Bulgarians have an advantage over the ethnic Turks—with more of an asset that is better paid, the ethnic Bulgarians increased their earnings advantage in the early transition.

⁹ Labor market experience is reported in the 1986 and 1993 surveys. For the 1997 survey, the variable is proxied by the standard method: Age minus years of schooling minus 6.

Table 3. Relative earnings growth by skill, industry and other demographic variables
(percentage change in nominal earnings in Bulgaria 1986-1993 & 1993-1997)

	1993-1986			1997-1993		
	All	Bulgarians	Turks	All	Bulgarians	Turks
Primary Complete	7.656	7.446	7.410	33.259	36.229	32.727
Secondary Technical	9.231	8.932	10.042	35.301	35.730	31.787
Secondary Vocational	10.007	10.229	8.408	37.904	36.992	Na
Secondary General	8.576	8.481	11.243	32.792	33.417	20.867
University	11.385	11.573	9.824	27.723	28.133	15.380
15 years of Experience	12.422	12.507	11.146	29.762	29.652	Na
Manufacturing	9.907	9.988	9.502	37.923	38.451	33.500
Construction	10.245	10.613	8.816	31.644	31.362	36.809
Agriculture	8.590	8.478	8.721	20.972	22.140	14.144
Commerce	15.184	15.392	15.336	22.427	22.683	8.125
Services	10.592	10.780	7.614	22.824	22.643	29.356
Communications	10.261	10.301	9.530	25.866	25.914	24.181
Transportation	9.743	9.908	7.593	34.772	34.137	53.603
Public Administration	8.832	8.950	8.974	33.075	33.406	9.854
Female	10.523	10.464	10.397	29.842	30.322	23.051
Rural	9.433	9.572	9.276	25.046	26.069	20.327
Union	10.249	10.281	8.540	36.483	36.204	30.328

^a Data is from a sample of the employed. Log wages are reported in nominal terms and reflect the massive realignment of prices in the transition.

Source: author's calculations.

Changes in industrial demand as the economy shifts towards markets may favor certain industries. Such changes could inadvertently benefit one group over another due to industrial segregation in an economy. Table 3 presents percentage changes in earnings by industry of employment between 1986 and 1993 and between 1993 and 1997 to test if employment in particular industries commands an earnings premium over time. This information indicates that nominal earnings grew fastest among those employed in commerce, services, and communications. This indicates a clear advantage to Bulgarians during the first period studied. Because the ethnic Bulgarians are more likely to be employed in these sectors, they are also experiencing earnings gains in the early transition. The data in Table 3 indicates that during the second period nominal earnings grew fastest in manufacturing, transportation and public administration. It is not clear that this would immediately disadvantage the ethnic Turks as they began entering manufacturing during this time, although the Bulgarians began entering

communications and public administration as well as manufacturing. Presumably both groups are responding to market forces, however, this data cannot clarify any barriers to entry that either group might experience.

Changes in the overall level of inequality in an economy can also affect earnings differentials. An increase in inequality penalizes the low-end of the income distribution. Table 4 presents evidence of a widening distribution of wages in Bulgaria in the early transition. The ratio of average top-decile to bottom-decile earnings for both 1986 and 1993 are presented as are percentage changes in the ratio by ethnicity, education and industry. Earnings differences between the very rich and the very poor in Bulgaria grew between 1986 and 1993. The increased inequality grew most among those with technical and general secondary degrees as well as those working in construction, agriculture and commerce. The widening of the wage distribution indicates that the position of those at the low-end of the earnings distribution in 1986 worsened by 1993.

Table 4: Changes in the Wage Structure: Ratios of Top Decile Earnings to Bottom Decile Earnings by Ethnicity, Education, and Industry^a

	Ratio of Top Decile to Bottom Decile		
	1986	1993	1997
All	2.3077	3.6364	7.500
Male Bulgarians	2.2815	3.3333	7.6190
Male Turks	2.4348	3.0000	10.8000
Primary Incomplete	2.3564	2.6596	9.2308
Primary Complete	2.5000	3.1200	75.0000
Technical Complete	2.1429	3.1667	5.7142
Vocational Complete	2.3077	3.2200	4.8000
General Complete	2.1961	3.1417	6.0000
University Complete	2.1371	3.5125	6.6943
Manufacturing	2.1571	3.3333	8.0000
Construction	2.1375	3.5088	7.5000
Agriculture	2.4167	3.0928	9.9200
Commerce	1.2042	4.1667	6.5000
Services	2.1458	2.9091	5.9880
Public Administration	2.5000	3.4333	7.3947
Transportation	2.3586	3.3333	4.4379
Communication	2.3333	2.9091	5.5150

^a Data is from a sample of the employed
Source: author's calculations

In summary, group-specific factors and wage-structure factors may both contribute to the increased earnings gap between ethnic Bulgarians and ethnic Turks in Bulgaria's transition to a market economy. In terms of group-specific factors, the relative standing of the ethnic Turks is ambiguous. Although the Turks began to close the education gap in terms of number of years of schooling and completely closed the experience gap relative to ethnic Bulgarians during the first period, they continued to obtain less education on average than the ethnic Bulgarians. Further, differences between the Bulgarians and the Turks existed in terms of the educational degrees each group obtained. The ethnic Turks also began to move into at least one of the growing industries in the transition, services, and during the second period, manufacturing, and began moving out of the declining agricultural industry.

Wage structure factors such as the changing returns to education, experience, and industry highlight a worsening situation for the Turks. In both periods, nominal earnings increased to the greatest extent for those with secondary vocational and university levels of education and during the first period for those in the commerce industry—both of which saw under-representation of the Turkish minority. Further, increased inequality between the rich and the poor penalizes those in the low-end of the wage distribution, the ethnic Turks. To more precisely determine the degree to which each factor explains the increase in the ethnic earnings gap, it is necessary to decompose the changes in the ethnic earnings gap. It is expected that the changing returns to the educational degree obtained and to employment in particular industries that favored ethnic Bulgarians in the early transition will explain the bulk of the increase in the ethnic earnings gap.

IV. DESCRIPTION OF THE WAGE DECOMPOSITION METHODOLOGY

The methodology used to decompose the change in the ethnic wage differentials over time is based on the decomposition developed by Juhn, Murphy, and Pierce (1991) in their analysis of black-white wage convergence in the United States. This method, sometimes referred to as “trend decomposition,” improves upon other wage decompositions in its ability to

decompose the residual of the wage functions. The Juhn *et al.* methodology begins by estimating an ethnic Bulgarian wage equation for ethnic Bulgarian worker i in time t ¹⁰

$$Y_{it} = X_{it}\beta_t + \sigma_t\theta_{it} + u_{it} \quad (\text{Eqn. 1})$$

where X_{it} is a vector containing the observable characteristics of an individual ethnic Bulgarian worker including years of schooling, experience, experience-squared and a dummy representing fifteen (15) years of experience, categorical educational variables representing primary incomplete, secondary technical, secondary vocational and secondary general levels, and university (primary is the benchmark), dummy variables for industry (manufacturing as the benchmark), a dummy variable for living in a rural area, a dummy variable for sex (1 = male), and a dummy variable for union status,¹¹ and β_t gives the coefficients on these characteristics in year t ; it is assumed that $E(u_{it}|x_{it}) = 0$, so that this equation gives mean wages for ethnic Bulgarians with given characteristics. σ_t is the standard deviation of the residual of the ethnic Bulgarian wage function in year t , and $\theta_{it} = u_{it}/\sigma_{bt}$ is a “standardized” residual of the ethnic Bulgarian regression (with mean zero and variance one).¹² Changes in σ_t through time reflect changes in within-group inequality.

The actual wage differential between ethnic Bulgarians and ethnic Turks is:

$$\Delta Y_t = Y_{bt} - Y_{kt} = (X_{bt}\beta_{bt} + \sigma_{bt}\theta_{bt}) - (X_{kt}\beta_{kt} + \sigma_{kt}\theta_{kt})$$

Because ethnic Turk wage regressions are based on ethnic Bulgarian regression coefficients (and ethnic Bulgarian wage residuals), it can be assumed that $\beta_{bt} = \beta_{kt}$, such that the wage differential can then be written as:

¹⁰ Note that this discussion will reference the ethnic wage gap in Bulgaria, but could be easily applied to any gender or racial/ethnic wage differential. Subscripts ‘b’ and ‘k’ refer to the ethnic Bulgarians and the ethnic Turks respectively.

¹¹ Note that unions, although formally introduced in the late 1980s, were not effectively introduced until after the transition had begun. For a more thorough discussion on the development of unions in Bulgaria see Jones (1991), Thirkell and Tseneva (1992), Thirkell, Scase and Vicerstaff (1995), Petkov and Thirkell, (1991), Petkov and Gradev (1995).

¹² Note that there will be a difference between the ethnic Bulgarian and the ethnic Turk standardized residuals (θ_{bt} and θ_{kt}) because, though the ethnic Turk regression is based on ethnic Bulgarian coefficients, it relies on ethnic Turk characteristics.

$$\begin{aligned}\Delta Y_t &= Y_{bt} - Y_{kt} = (X_{bt} - X_{kt})\beta_{bt} + \sigma_{bt}(\theta_{bt} - \theta_{kt}) \\ &= \Delta X_t \beta_{bt} + \sigma_{bt} \Delta \theta_t\end{aligned}\quad (\text{Eqn.2})$$

where $\Delta X_t = (X_{bt} - X_{kt})$ is the difference between ethnic Bulgarians and ethnic Turks in the average of the individual observable characteristics, the term $\Delta X_t \beta_{bt}$ is the predicted gap between ethnic Turks and ethnic Bulgarians in time t . $\Delta \theta_t = (\theta_{bt} - \theta_{kt})$, is the difference in the average standardized residual for ethnic Bulgarians and ethnic Turks in time t . $\theta_{kt} = (Y_{kt} - X_{kt}\beta_{bt}) / \sigma_{bt}$ where $(Y_{kt} - X_{kt}\beta_{bt})$ is the difference between an ethnic Turk's actual wages and the wages that he would have received had s/he been rewarded for his/her characteristics at the same rate as ethnic Bulgarians. This difference can be interpreted as a measure of wage discrimination. If there were no difference in returns between ethnic Bulgarians and ethnic Turks ($\beta_{bt} = \beta_{kt}$), the difference would have a mean of zero.

Typically, this value is negative, implying that ethnic Turks with the same characteristics as ethnic Bulgarians earn less on average. This difference is then divided by the standard deviation of the residual of the ethnic Bulgarian wage function in time t , σ_{bt} . This standardization yields the number of ethnic Bulgarian residual standard deviations that the average ethnic Turk is paid below zero. The term $\sigma_{bt} \Delta \theta_t$ then can be interpreted as an ethnic Turk's relative position in the ethnic Bulgarian residual wage distribution at a given level of residual ethnic Bulgarian wage inequality in time t .

Using this formulation, wage divergence between ethnic Bulgarians and ethnic Turks between one year, such as year t , and another year, such as year s , can be written as:

$$\Delta Y_s - \Delta Y_t = (\Delta X_s - \Delta X_t) \beta_{bt} + \Delta X_s (\beta_{bs} - \beta_{bt}) + (\Delta \theta_s - \Delta \theta_t) \sigma_{bt} + \Delta \theta_s (\sigma_{bs} - \sigma_{bt}) \quad (\text{Eqn.3})$$

This equation decomposes the wage convergence into four components of observable and unobservable characteristics. The first term in Equation 3 is the portion of the change in the wage gap due to differences in measured characteristics such as years of schooling and experience, or industry, evaluated at fixed ethnic Bulgarian prices, $(\Delta X_s - \Delta X_t) \beta_{bt}$. Blau and Kahn refer to this

term as the “Measured Characteristics Effect.” The second term measures the amount of the change in the wage differential over time that is attributable to changes in the prices paid to ethnic Bulgarians for those measured characteristics, or the ethnic Bulgarian returns to education, experience, and industry, $\Delta X_s (\beta_{bs} - \beta_{bt})$. Blau and Kahn refer to the second term as the “Measured Prices Effect.” The third term denotes changes in ethnic Turk’s relative position in the ethnic Bulgarian residual wage distribution—that is, whether ethnic Turks are moving up or down within the distribution of ethnic Bulgarian wage residuals over time, $(\Delta\theta_s - \Delta\theta_t) \sigma_{bt}$. Blau and Kahn refer to this term as the “Gap Effect.” The last term reflects differences in residual inequality over time, or the difference in the “penalty” placed on being at a lower position in the wage distribution, $\Delta\theta_s (\sigma_{bs} - \sigma_{bt})$. Blau and Kahn refer to this term as the “Unmeasured Price Effect.” Provided that the $\Delta\theta_t$ term is negative (that ethnic Turks earn less than ethnic Bulgarians on average), the fourth term indicates that an increase in inequality would increase the Bulgarian-Turk wage differential even if ethnic Turks maintained the same relative position in the ethnic Bulgarian distribution, $\Delta\theta_s - \Delta\theta_t = 0$.¹³

According to Blau and Kahn (1996), the sum of the first and third terms is a reflection of the group-specific factors that contribute to the difference in wages. Group differences in qualifications and group differences in wage rankings at a given level of measured characteristics. The sum of the second and fourth terms is a reflection of the labor market structure. The wage-structure effect measures the impact of cross-time differences in returns to measured and unmeasured characteristics. The sum of the third and fourth terms represents the impact of cross time differences in the “unexplained” differential in traditional decompositions.

¹³ It is important to note that although this decomposition breaks down the residual factors into two components, as opposed to the Blinder (1973) or Oaxaca (1973) techniques, the residual components still represent that portion of the difference in wages that cannot be explained by the explanatory variables in the wage equation. In other words, regardless of the fact that the residual is decomposed, it is still a residual, and it is still a measure of our ignorance and dependent on the structure of the regression equation.

It is important to note that this method of decomposing wage differentials, not unlike other decomposition techniques, is subject to the familiar index problem. The year that one chooses as a base may alter the specific values obtained for each of the four components of the decomposition. For example, in the decomposition below, 1986 is the base year used to examine changes in the ethnic wage differentials that occur by 1993 as opposed to using 1993 as the base year. Regardless of what base year is used, the overall results are robust.¹⁴ Similarly, whether or not one chooses to base the decomposition on an ethnic Turk wage equation versus an ethnic Bulgarian wage equation will also affect the specific results. Following other studies, this formulation bases the decomposition on the ethnic Bulgarian regression because it is expected that differences over time in discrimination against ethnic minorities will affect the ethnic Bulgarian regression coefficients to a lesser extent. These estimates form the basis for the estimate of the Observed Price effect and doing so is expected to limit any distortions that could occur from discrimination (see also Blau and Kahn, 1996: S43).

V. RESULTS

The decomposition of the increase in the ethnic wage differentials between 1986 and 1993 is presented in Table 5. In order to explain these changes, the differentials are broken down into four separate effects: the observed characteristics effect, the observed price effect, the gap effect, and the unmeasured prices effect. Group-specific factors consist of the “observed characteristics effect plus” the “gap” effect. Wage-structure factors consist of the “observed price effect” plus the “unmeasured prices effect”.

From the descriptive information provided in the previous sections, it is hypothesized that differences in the educational degree obtained as well as differences in the rate at which ethnic groups participate in growing industries in the transition will contribute to the increase in the earnings gap between Turks and Bulgarians. The portion of the gap explained by these factors is

¹⁴ See Giddings (2000) for the test for robustness concerning the difference between using the 1986 and the 1993 base year.

captured in two parts of the decomposition. The first is within the “observed characteristic effects.” This result shows the effect of changes in the level of education obtained over time and employment in a particular industry. The second is within the “observed price effect” which shows the effect of changes in the returns to different levels of education and to employment in different industries on the ethnic wage gap.

Group-specific and Wage-structure Factors Both periods of the study follow a similar pattern that wage-structure factors shoulder more of the explanation for the ethnic earnings gap. Focusing on the period from 1986 to 1993 in Table 5, one of the four components of the Juhn *et al.* decomposition are negative, contributing to a decline in the ethnic wage gap.¹⁵ The “observed characteristics effect” served to diminish wage differences between ethnic Bulgarians and ethnic Turks. This is not surprising given that the Turks began to close the gap in number of years of schooling and experience between 1986 and 1993. This is in contrast to studies of the gender wage gap in the United States which find that between one-third and two-thirds of the earnings gap can be explained by differences in human capital (Blau and Kahn, 2000; Sicilian and Grossberg, 2001).

The other three components, the “observed prices effect,” the “gap effect” and the “unobserved prices effect” are positive, serving to increase the ethnic earnings gap. The “observed prices effect” and the “unobserved prices effect” together refer to the “wage-structure factors” and indicate that changing returns to education, experience, and industry benefited the ethnic Bulgarians and served to worsen the ethnic earnings differential. This evidence is similar to that found when analyzing the male-female earnings gap in Bulgaria (Giddings, 2002a). Jones and Ilayperuma (1994) explained much of the male-female earnings gap with evidence that women received a lower rate of return on their human capital endowments. Furthermore, changes in overall inequality in the economy penalized the ethnic Turks to a greater extent than the ethnic

Bulgarians. With regard to the second period of the study, two of the four components are negative, the “observed prices effect” and the “unobserved prices effect.”

In all, changes in “group-specific factors” helped the ethnic Turks whereas changes in “wage-structure factors” hurt the ethnic Turks. Further, some of the differential is also explained by unknown factors sometimes referred to as “discrimination” (the gap effect plus the unobserved prices effect).

Observed Characteristics Looking first at the “observed characteristics” category, Table 5 shows that the impact of measured characteristics is negative for both periods of the study, indicating that the ethnic Turks in 1993 have relatively favorable levels of schooling, experience, and industry of employment as compared to 1986. Members of the ethnic Turkish minority experienced a relative gain in observable characteristics contributing to a decline in the ethnic wage differentials between 1986 and 1993 by 0.0592 log points and by 0.0155 log points between 1993 and 1997.

The same is true for the year 1997 as compared to 1993 although the effect is somewhat smaller. This is due to a dampening of the effects seen in the prior period and one change. In particular, while the fact that the ethnic Turks obtained fewer years of general-secondary and university-level education served to increase the earnings gap, in contrast to the earlier period, so did the fact that the ethnic Turks obtained fewer years of experience during the second period. By 1997 the effect of experience and experience-squared together contributed over 16 percent ($0.0025/0.0592$) toward increasing the ethnic earnings gap. However, this effect was not large enough to contrast the gains that the ethnic Turks made in bettering their personal characteristics, particularly in their response to market forces through the movement toward growing industries such as manufacturing.

¹⁵ Note that a negative number indicates that the factor serves to decrease the ethnic earnings gap, or a relative improvement of the standing of the ethnic Turks. A positive number indicates that the factor serves

Table 5. Analysis of Log Wages: 1986-1993 and 1993-1997

	1986-1993	1993-1997
Observed Characteristics Effect (Xs)	-0.0592 (0.0486)	-0.0155 (0.088114)
Years of Schooling	-0.0014 (0.0006)	-0.0089 (0.003008)
Primary Incomplete	-0.0004 (0.0019)	-0.0001(0.000749)
Secondary Technical Complete	-0.0015 (0.0026)	0.0036 (0.010126)
Secondary Vocational Complete	0.0002 (0.0006)	-0.0024 (0.00227)
Secondary General Complete	-0.0014 (0.0026)	0.0001(0.0010)
University Complete	0.0012 (0.0007)	0.0017 (0.0010)
Years of Experience	-0.0688 (0.0092)	0.0276 (0.0072)
Experience Squared	0.0473 (0.0080)	-0.0251 (0.0058)
15 Years of Experience	0.0001 (0.0031)	-0.0010 (0.0028)
Female	-0.0179 (0.0015)	0.0287 (0.0049)
Rural	0.0036 (0.0021)	-0.0059 (0.0046)
Construction	0.0005 (0.0030)	-0.0006 (0.0063)
Agriculture	-0.0019 (0.0008)	-0.0206 (0.0182)
Commerce	-0.0189 (0.0036)	-0.0041 (0.0055)
Services	-0.0035 (0.0007)	0.0030 (0.0054)
Communication	0.0054 (0.0012)	-0.0046 (0.0022)
Transportation	-0.0018 (0.0012)	0.0001 (0.0012)
Public Administration	-0.0000 (0.0009)	-0.0036 (0.0037)
Union	0	-0.0034 (0.0022)
Observed Prices Effect	0.1051 (0.0012)	0.1486 (0.0046)
Years of Schooling	0.0620 (0.0000)	-0.0467 (0.0001)
Primary Incomplete	-0.0052 (0.0001)	0.0178 (0.0004)
Secondary Technical Complete	-0.0086 (0.0000)	0.0094 (0.0002)
Secondary Vocational Complete	-0.0013 (0.0001)	0.0105 (0.00014)
Secondary General Complete	0.0037 (0.0000)	0.0101 (0.0001)
University Complete	0.0018 (0.0001)	0.0310 (0.0003)
Years of Experience	0.0000 (0.0000)	-0.0033 (0.0000)
Experience Squared	0.0045 (0.0000)	0.0027 (0.0000)
15 Years of Experience	-0.0001 (0.0008)	-0.0052 (0.0016)
Female	0.0004 (0.0000)	-0.0002 (0.0000)
Rural	0.0098 (0.0000)	0.0562 (0.0001)
Construction	0.0002 (0.0000)	-0.0002 (0.0003)
Agriculture	0.0065 (0.0000)	0.0432 (0.0002)
Commerce	0.0318 (0.0000)	-0.0197 (0.0002)
Services	0.0071 (0.0001)	0.0159 (0.0001)
Communication	0.0007 (0.0001)	-0.0226 (0.0001)
Transportation	0.0028 (0.0001)	-0.0004 (0.0001)
Public Administration	-0.0020 (0.0001)	-0.0006 (0.0001)
Union	-0.0090 (0.0000)	0.0508 (0.0001)

to increase the ethnic earnings gap, contributing to a relative decline in standing for the ethnic Turks.

Gap Effect	0.0320 (0.8067)	-0.0569 (0.8067)
Unobserved Price Effect	0.0477 (0.0042)	0.0439 (0.0042)
Total Change in Gap (1993-1986)	0.1260	0.1200
Sum of Group-Specific Effects	-0.0271	-0.0724
Sum of Wage Structure Effects	0.1530	0.1930
Sum of Unobserved Effects	0.1730	0.1640

Note: The components of the decomposition are defined as follows: Observed Characteristics Effect = $(\Delta X_2 - \Delta X_1)\beta_{b1}$, Observed Price Effect = $\Delta X_2(\beta_{b2} - \beta_{b1})$, Gap Effect = $(\Delta\theta_2 - \Delta\theta_1)\sigma_{b1}$, Unobserved Price Effect = $\Delta\theta_2(\sigma_{b2} - \sigma_{b1})$. Where “1” indicates year 1 (1986 or 1993) and “2” indicates year 2 (1993 or 1997). Where X is a vector of explanatory variables, β is a vector of estimated coefficients from an ethnic Bulgarian earnings equation, θ is a standardized residual, σ is the residual standard deviation of ethnic Bulgarian earnings, and Δ denotes the average of the ethnic Bulgarian/ethnic Turk difference in the variable that follows. Standard errors are in parentheses.⁸ Data is from a sample of the employed. Log wages are reported in nominal terms and reflect the massive realignment of prices in the transition. Standard errors are in parentheses.¹⁶

Source: Author’s calculations.

Observed prices In contrast to the “observed characteristics effect”, the “observed prices effect” served to increase the ethnic wage differential in both time periods by 0.1051 and 0.1486 log points respectively. This effect is the largest of the four components of the decomposition in both periods. This indicates that rising returns to schooling and industry, for example, favored the ethnic Bulgarians over the ethnic Turks in the transition, particularly between 1993 and 1997.

Focusing on the first period from 1986 to 1993 and breaking down the “observed prices effect”, changing returns to schooling, and in particular to general-secondary and university-level degrees served to exacerbate the ethnic earnings differential in the transition. The higher education components consist of 0.0055 log points, translating into five percent of the observed prices effect (0.0055/0.1051). Changes in returns to schooling more generally constituted an even larger component of the “observed prices effect” at nearly 60 percent (0.0620/0.1051).

¹⁶ The standard errors for the four components earnings decomposition were computed following Brown and Corcoran (1997) as applied in Gill and Leigh (2000). For the “observed characteristics” and observed prices” effects it was assumed that the means were known so that standard errors take into account the sampling error in the estimated coefficients. The standard error for the “observed characteristics effect” are calculated as $[(\Delta X_1 - \Delta X_0)^T \text{Var}(B_1)(\Delta X_1 - \Delta X_0)]^{-.5}$. Standard errors for the “observed prices” effect are calculated as $[\Delta X_0^T \text{Var}(B_1 - B_0)\Delta X_0]^{-.5}$. Here $\text{Var}(B_1)$ and $\text{Var}(B_1 - B_0)$ refer to relevant blocks of the variance-covariance matrices of the regression coefficients. The standard errors for the “GAP” effect are calculated as $[\sigma_t^2 \text{Var}(\Delta\theta_1 - \Delta\theta_0)]^{-.5}$ assuming that $(\Delta\theta_1 - \Delta\theta_0)$ is a simple difference in means test and that σ_t (the male residual earnings inequality for each year) is known. The standard error for the unobserved prices effect is calculated as $[\Delta\theta_0^2 (\text{Var}\sigma_1 + \text{Var}\sigma_0)]^{-.5}$ assuming that $\Delta\theta_0$ (the average male-female difference in standardized residuals in year 0) as known. This relies on the result that for large N the sampling distribution of σ_t approximates a normal distribution with mean σ_t and variance $\sigma_t^2/2N$.

Changes in returns to the previously identified “growth” industries (commerce, services and transportation) also contribute to an increase in the ethnic earnings differential in Bulgaria’s early transition. These three industries alone comprise of 0.0417 log points, translating into over 39 percent of the observed prices effect ($0.0417/0.1051$). This indicates that rising returns to commerce, services, and transportation favored the ethnic Bulgarians over the ethnic Turks in the transition. Furthermore, Turk’s continued participation in agriculture did not help matters, contributing 0.0065 log points or just over six percent.

A similar analysis of the 1993-1997 period shows that the “Observed Prices Effect” is larger than in the first period indicating that the returns to education and industry further widened the ethnic earnings gap. In contrast to the earlier period, the returns to schooling did not contribute while differences in the returns to all upper levels of schooling favored the ethnic Bulgarians. Incorporating all secondary levels as well as university-level education, changes in the returns contributed 0.061 log points or over 41 ($0.061/0.1486$) percent to the “observed prices” category. Living in a rural area contributed 0.0562 log points or nearly 38 percent ($0.0562/0.1486$). In terms of industry contribution, only changes in the returns to agriculture and services served to exaggerate the “observed prices effect” (39 percent).

One interpretation of the large observed price effect in both periods on the change in the ethnic wage differential is that this is due to the persistent high level of industry segregation by ethnicity. Blau and Kahn (1997) point out that the observed price effect may reflect discrimination if segregation by industry ‘crowds’ women or members of a particular racial/ethnic group into certain industries in the economy, thereby decreasing wages (see also Bergmann, 1974). As of 1993, the ethnic Turks continued to be disproportionately represented in agriculture (see Meurs 1998 and Meurs and Giddings 1999) although they began to exit by 1997. In contrast, during the first period the ethnic Bulgarians took advantage of growth in the service and commerce industries to a greater extent than ethnic Turks; industries experiencing increases

in demand as the economy transitions toward the market. These factors contributed to an increase in the ethnic wage gap over the period.

In addition to these factors, the returns to various demographic factors also contributed to widening the ethnic earnings gap. In particular, the returns to economic activity in rural areas contributed to widening the gap in both years by over nine percent (0.0098/0.1051) in 1986 and increasing to over 37 percent (0.0562/0.1486) by 1997. This is not surprising. Evidence suggests that finding employment in large urban areas such as Sofia is easier given more economic opportunities and lower rates of unemployment in the urban regions. Furthermore, rural areas suffer from the problem of having single industries in the region that prior to the fall of communism provided nearly all of the economic opportunities outside of agriculture. In most areas these industries have yet to be replaced by venture capitalists domestic or foreign.

In addition to living in a rural area, the returns to gender varied in each year. In 1986 being female increased the ethnic wage gap whereas by 1997, being female was an asset, diminishing the ethnic gap. Additionally, union status had a different effect in each period. Between 1986 and 1993, participating in a union served to diminish the ethnic wage gap whereas by 1997, it increased the gap.

The Gap Effect The “gap” effect measures the contributions of each year’s ethnic Turkish placement in the ethnic Bulgarian residual wage distribution to the change in the ethnic wage differential between 1986 and 1993. This effect decreased the ethnic pay gap by 0.0320 log points in the early period and increased the ethnic pay gap by 0.0569 log points in the second period. In other words, between 1986 and 1993 the ethnic Turks moved up in the Bulgarian residual wage distribution whereas between 1993 and 1997 ethnic Turk position declined within the Bulgarian residual wage distribution.

Unmeasured Prices The “unmeasured prices” effect served to increase the ethnic wage gap over time in all both periods by 0.0477 between 1986 and 1993 and by 0.0439 between 1993 and 1997. On net, however, controlling for education, experience, demographic characteristics,

sector, and industry, in the full model the “gap” effect and the “unmeasured prices” effect increased the ethnic gap by 0.1730 log points in the early period and by 0.1640 log points in the later period.

Group-specific components in the early period reduced the ethnic earnings gap by 0.0271 log points, while wage-structure factors increased the gap by 0.1530 log points. In the later period, group-specific components also reduced the ethnic earnings gap, but by 0.0724 log points whereas the wage-structure factors increased the gap by 0.1930 log points. Assuming that price changes affected the ethnic Bulgarians and the ethnic Turks similarly, rising inequality in the transition reclaimed more than the gains that the ethnic Turks would have made had the price changes not occurred. In other words, although the Turks were attempting to “swim upstream” by closing the education and experience gap and improving their situation in terms of observed characteristics, they were “swept downstream” by the tide of increasing inequality in the economy. Changes in returns to the observed characteristics that favored the Bulgarians more than counteracted the gains the Turks made over the two periods. In summary, changing returns to schooling, experience, sector and industry in the transition favored the ethnic Bulgarians over the ethnic Turks, causing the ethnic wage differential to increase.

VI. CONCLUSIONS

The ethnic wage gap between the Turks and their Bulgarian counterparts increased as the country began its transition from plan to market and continued to increase into mid-transition. Economists find that differences in personal characteristics such as the amount of education, labor market experience, and participation in certain industries (group-specific factors) are the usual suspects in causing wage differentials. This evidence suggests, however, that differences in the returns to such characteristics and changes in the overall structure of wages (wage-structure factors) explained more of the observed earnings differentials.

Descriptive analyses showed the ethnic Turks closed both the gap in the number of years of education obtained as well as the number of years of labor market experience between 1986

and 1997. In terms of the level of education obtained, however, the ethnic Bulgarians outpaced the ethnic Turks in obtaining the coveted higher education in the transition. Additional evidence showed that those with university-level schooling experienced the greatest nominal earnings gains in the transition.

In terms of industry participation, during the first period (1986-1993) ethnic Turks began to enter one of the growing industries in the transition, services, but lagged behind in the other growing industries, commerce and transportation. Evidence suggests that commerce enjoyed the greatest gain in nominal wages over the period in question. During the second period (1993-1997) the ethnic Turks were more adept at responding to market signals by entering the growing manufacturing industry. Furthermore, they exited the declining agriculture. However, they did not enter other growing industries such as transportations and communications.

In addition to these personal characteristics, this analysis explored the effect of changes in the wage structure as related to level of education and industry. In other words, how changes in the remuneration to different levels of education and industry affected the ethnic wage gap. The results indicated that shifts in the wage structure favored the ethnic Bulgarians in two ways. The higher levels of education in which ethnic Bulgarians dominated as well as growing industries in which ethnic Bulgarians were over-represented tended to be rewarded more in the transition.

These results imply the need for clear policy responses. Two factors, in particular, would improve the economic well being of the ethnic Turks in Bulgaria. First, the ethnic Turks need access to higher levels of education, specifically more general secondary education and university degrees. This is especially problematic for a country in the midst of such high and sustained levels of unemployment. Bulgarian youth—primarily in rural areas and among minorities—observe such high levels of unemployment and see no short term benefit from schooling. As such, the problem could only worsen in the future as youth may choose to discontinue their schooling.

Second, greater labor mobility would allow the ethnic Turks to move out of the declining agricultural sector and into growing sectors of the economy such as commerce and transportation.

Labor mobility can also be enhanced through effective active labor market policies that encourage labor market participation. These policies include the use of employment agencies to match employers with job seekers, retraining programs and small grants to entrepreneurs. In order to address the problems presented in this paper, such policies need to be targeted to ethnic minorities in the region.

Even though this evidence suggests an improvement in the ethnic Turk's ability to respond to market signals and move toward more lucrative jobs, there may be barriers to entry into the other growing sectors (communications, transportation, or commerce) that are undetected by these surveys. More detailed occupational data is necessary to detect problems ethnic Turks have in gaining access to white-collar jobs as well as to job ladders and promotions within occupations. Labor mobility is further constrained by factors limiting individuals from moving to major urban areas offering greater economic opportunities. One of the major factors contributing to this barrier is the lack of a rental housing market for potential laborers. The rental market in major urban areas needs to be improved in order to allow for greater labor market flexibility.

REFERENCES

- Atkinson, A. B. and Micklewright, J. (1993). 'The Distribution of Income in Eastern Europe', in Casson, M. and Creedy, J. (eds.), *Industrial Concentration and Economic Inequality: Essays in Honor of Peter Hart*, Brookfield VT: Edward Elgar.
- Beleva, I. Jackman, R. and Nenova-Amar, M. (1995). 'Bulgaria', in Commander, S. and Coricelli, F. (eds.), *Unemployment, Restructuring, and the Labor Market in Eastern Europe and Russia*, Washington: Economic Development Institute of the World Bank.
- Blau, F. D. and Kahn, L. M. (1992). 'The Gender Earnings Gap: Learning from International Comparisons', *American Economic Review*, 82: 533-538.
- Blau, F. D. and Kahn, L. M. (1995). 'The Gender Earnings Gap: Some International Evidence', in Freeman, R. and Katz, L. (eds.), *Differences and Changes in Wage Structures*, Chicago: University of Chicago Press.
- Blau, F. D. and Kahn, L. M. (1996). 'Wage Structure and Gender Earnings Differentials: an International Comparison', *Economica*, 63: S29-S62.
- Blau, F. D. and Kahn, L. M. (1997). 'Swimming Upstream: Trends in the Gender Wage Differential in the 1980s', *Journal of Labor Economics*, 15: 1-42.
- Blau, F. D. and Kahn, L. M. (1999). 'Understanding International Differences in the Gender Pay Gap', presented at the annual meetings of the American Economic Association, New York.
- Blau, F. D. and Kahn, L. M. (2000). 'Gender Differences in Pay', *Journal of Economic Perspectives*, 14: 75-99.
- Blinder, A. (1973). 'Wage Discrimination: Reduced Form and Structural Estimates', *Journal of Human Resources*, 8: 436-455.
- Bird, E.J., Schwarze, J. and Wagner, G. (1994). 'Wage Effects of the Move Towards Free Markets in Germany', *Industrial and Labour Relations Review*, 47: 390-400.
- Bobeva, D. (1997). 'Employment Policies and Programmes in Bulgaria', in Godfrey, M. and Richards, P (eds.), *Employment Policies and Programmes in Central and Eastern Europe*, Geneva: International Labour Office.
- Brainerd, E. (1998). 'Winners and Losers in Russia's Economic Transition', *American Economic Review*, 88: 1094-1115.
- Brainerd, E. (2000). 'Women in Transition: Changes in Gender Wage Differentials in Eastern Europe and the Former Soviet Union.' *Industrial and Labor Relations Review*, 54: 138-162.
- Brown, C. and Corcoran, M. (1997). 'Sex-Based Differences in School Content and the Male/Female Wage Gap', *Journal of Labor Economics*, 15: 431-65.
- Commission of the European Communities. (2001). *Regular Report on Bulgaria's Progress Towards Accession*, Brussels: Commission of the European Communities.
http://europa.eu.int/comm/enlargement/report2001/bu_en.pdf. Site last visited: April 1, 2003.

- Crampton, R. J. (1997). *A Concise History of Bulgaria*, London: Cambridge University Press.
- Garner, T., Lubyova, M. and Terrell, K. (1995). 'Changes in Expenditure and Income Inequality in the Czech and Slovak Republics, 1989 vs. 1992', in Svejnar, J. (ed.), *The Czech Republic and Economic Transition in Eastern Europe*, New York: Academic Press.
- Giddings, L. A. (2000). 'Does the Shift to Markets Impose Greater Hardship on Women and Minorities? Three Essays on Gender and Ethnicity in Bulgarian Labor Markets', Ph.D. Dissertation, Washington: American University.
- Giddings, L. A. (2002a). 'Changes in Gender Earnings Differentials in Bulgaria's Transition to a Mixed-Market Economy', *Eastern Economic Journal*, 28: 481-497.
- Giddings, L. A. (2002b). 'Has the Shift Toward Markets Hurt Ethnic Minorities? Changes in Ethnic Earnings Differentials in Bulgaria's Early-transition', *The International Journal of Manpower*, 23: 9-31.
- Gill, A. M. (1994). 'Incorporating the Causes of Occupational Differences in Studies of Racial Wage Differentials', *The Journal of Human Resources*, 29: 20-41.
- Gill, A. M. and Leigh, D. E. (2000). 'Community College Enrollment, College Major, and the Gender Wage Gap', *Industrial and Labor Relations Review*, 54: 163-181.
- Glinskaya, E. and Mroz, T.A. (2000). 'The Gender Gap in Wages in Russia from 1992 to 1995', *Journal of Population Economics*, 13: 353-386.
- Gradev, G. (1999). 'Bulgarian Trade Unions in Transition: Between Free-Range Hedgehog and TV Tiger?' Unpublished manuscript, ISTUR.
- Gustafsson, B. and Li, S. (2000). 'Economic Transformation and the Gender Earnings Gap in Urban China', *Journal of Population Economics*, 13: 305-329.
- Hubner, S., Maier, F. and Rudolph, H. (eds.). (1991). *Women's Employment in Central and Eastern Europe: Status and Prospects*. Manuscript from ILO/OECD Technical Workshop: Evolving Labour Markets, Social Policy and Industrial Relations in Eastern Europe.
- Hunt, J. (1998). 'The Transition in East Germany: When is a Ten Point Fall in the Gender Wage Gap Bad News?' National Bureau of Economic Research, Inc. Working Paper Number 6167.
- Iankova, E. A. (2000). 'Multi-Level Bargaining During Bulgaria's Return to Capitalism', *Industrial and Labor Relations Review*. 54: 115-137.
- Institute of Sociology. (1986). *Town and Village Study Survey Data*. Sofia: Bulgarian Academy of Sciences.
- Jackman, R. and Pages, C. 1993. 'Wage Policy and Inflation in Eastern Europe', Paper prepared for World Bank Conference, 7-8 October.
- Jolliffe, D. (2002). 'The Gender Wage Gap in Bulgaria: A Semiparametric Estimation of Discrimination', *Journal of Comparative Economics*, 30:276-295.

- Jones, D. C. and Kato, T. (1997). 'The Nature and the Determinants of Labor Market Transitions in Former Communist Economies: Evidence from Bulgaria', *Industrial Relations*, 36: 229-254.
- Jones, D. C. (1991). 'The Bulgarian Labour Market in Transition', *International Labour Review*, 130 231-248.
- Jones, D. C. (1992). 'The Transformation of Labor Unions in Eastern Europe: The Case of Bulgaria', *Industrial and Labor Relations Review*, 45: 452-470.
- Jones, D. C. and Ilayperuma, K. (1994). 'Wage Determination Under Plan and Early Transition: Evidence from Bulgaria', Working paper No. 94/7 Department of Economics, Hamilton College, Clinton, New York.
- Jurajda, S. (2001). 'Gender Wage Gap and Segregation in Late Transition', Discussion Paper No. 2952, Center for Economic Policy Research.
- Juhn, C., Murphy, K. M. and Pierce, B. (1991). 'Accounting for the Slowdown in Black-White Wage Convergence', in Kosters, M.H. (ed.), *Workers and Their Wages*, Washington DC: American Enterprise Institute Press.
- Karapat, K. H. (1990). 'Introduction: Bulgarian Way of Nation Building and the Turkish Minority', in Karapat, K. H. (ed.), *The Turks of Bulgaria: The History, Culture and Political Fate of a Minority*, Istanbul: The Isis Press.
- Kroncke, C. and Smith, K. (1999). 'The wage effects of ethnicity in Estonia', *Economics of Transition*, 7: 179-199.
- Kroupova, A. (1990). 'Women, Employment and Earnings in Central and East European Countries', Tripartite Symposium on Equality of Opportunity and Treatment for Men and Women in Employment in Industrialized Countries, unpublished manuscript, Prague.
- Krueger, A. B. and Pischke, J. S. (1995). 'A Comparative Analysis of East and West German Labor Markets: Before and After Unification', in Freeman, R. B. and Katz, L. F. (eds.), *Differences and Changes in Wage Structures*, Chicago and London: University of Chicago Press.
- Kunev, K. (1992). 'Etniceskite predrasudoci i etnokulturnata situacija', in Kunev, K. (ed.), *Etnokulturnata Situacija v Bulgarija*. Sofia.
- Laporte, B. and Ringold, D. (1997). 'Trends in Education Access and Financing during the Transition in Central and Eastern Europe', World Bank Technical Paper No. 361, Washington, DC: The World Bank.
- Liu, Pak-Wai, Meng, X. and Zhang, J. (2000). 'Sectoral Gender Wage Differentials and Discrimination in the Transitional Chinese Economy', *Journal of Population Economics*, 13: 331-352.
- Meurs, M. (1998). 'Imagined and Imagining Equality in East Central Europe: Gender and Ethnic Differences in the Economic Transformation of Bulgaria', in Pickles, J. and Smith, A. (eds.), *Theorizing Transition: The Political Economy of Post-Communist Transformations*, London and New York: Routledge: 330-372.

Meurs, M. and Giddings, L. (1999). 'When the Margin Becomes the Core: Occupational Stratification and the Impact of the Economic Transition in Bulgaria on Women and Ethnic Minorities', Paper presented at the annual meetings of the International Association for Feminist Economics, Ottawa, Canada.

Milanovic, B. (1998). *Income, Inequality and Poverty during the Transition from Planned to Market Economy*, Washington, DC: The World Bank.

Milanovic, B. (1999). 'Explaining the Increase in Inequality during the Transition', *Economics of Transition*, 7: 299-341.

Mincer, J. (1974). *Schooling, Experience and Earnings*, Boston: National Bureau for Economic Research.

Newell, A. and Barry Reilly, B. (1996). 'The Gender Wage Gap in Russia: Some Empirical Evidence', *Labor Economics*, 3: 37-356.

Oaxaca, R. (1973). 'Male-Female Wage Differences in Urban Labor Markets', *International Economic Review*, 14: 693-709.

Ogloblin, Constantin G. 1999. "The Gender Earnings Differential in the Russian Transition Economy." *Industrial and Labor Relations Review*. Vol. 52(4): 602-627.

Orazem, P. F. and Vodopivec, M. (2000). 'Male-female Differences in Labor Market Outcomes During the Early Transition to Market: The Cases of Estonia and Slovenia', *Journal of Population Economics*, 13: 283-303.

Orazem, P. F. and Vodopivec, M. (1999). 'Male-Female Differences in Labor Market Outcomes during the Early Transition to Market: The Case of Estonia and Slovenia', Policy Research Working Paper 2087, Washington DC: The World Bank.

Orazem, P. F. and Vodopivec, M. (1995). 'Winners and Losers in Transition: Returns to Education, Experience and Gender in Slovenia', *World Bank Economic Review*, 9: 201-230.

Pailhé, A. (2000). 'Gender Discrimination in Central Europe during the Systemic Transition', *Economics of Transition*, 8: 505-535.

Paternostro, S. and Sahn, D. (1999). 'Wage Determination and Gender Discrimination in a Transition Economy: The Case of Romania', Policy Research Working Paper No. 2113. Washington, DC: The World Bank.

Petkov, K. and Thirkell, J. (1991). *Labor Relations in Eastern Europe: Organizational Design and Dynamics*, London and New York: Routledge.

Petkov, K. and Gradev, G. (1995). 'Bulgaria', in Thirkell, J., Scase, R. and Sara Vickerstaff, S. (eds.), *Labor Relations and Political Change in Eastern Europe: A Comparative Perspective*, Cornell University, Ithaca, New York: ILR Press.

Poulton, H. (1989). 'Minorities in the Balkans', Minority Rights Group. Report No. 82.

Rutkowski, J. J. (1996). 'Labor Markets and Poverty in Bulgaria: A Background Paper Prepared for the Bulgaria Poverty Assessment Study of the World Bank', Unpublished manuscript, Washington, DC: The World Bank.

Sicilian, P. and Grossberg, A. J. (2001). 'Investment in Human Capital and Gender Wage Differences: Evidence from the NLSY', *Applied Economics*, 33: 463-471.

Svejnar, J. (1999). 'Labor Markets in the Transitional Central and East European Economies', in Ashenfelter, O. and Card, D. (eds.), *Handbook of Labor Economics*, Elsevier Science B.V.: 2810-2857.

Szelenyi, I. and Treiman, D.J. (1994). 'Social Stratification and Mobility in Eastern Europe After 1989: General Population Survey', (computer file). Los Angeles, CA.: University of California, Los Angeles, Department of Sociology, Eastern European Group (producer); Los Angeles, CA.: University of California, Los Angeles, Institute for Social Science Research, Social Science Data Archive (distributor).

Thirkell, J. and Tseneva, E. A. (1992). 'Bulgarian labour relations in transition: Tripartism and collective bargaining', *International Labour Review*, 131: 355-366.

Thirkell, J. Scase, R. and Vickerstaff, S. (eds.), (1995). *Labour Relations and Political Change in Eastern Europe*. London: UCL Press.

Thirkell, J. E., Petkov, M. K. and Vickerstaff, S. A. (1998). *The Transformation of Labour Relations: Restructuring and Privatization in Eastern Europe and Russia*, Oxford and New York: Oxford University Press.

Torrey, B. B. and Smeeding, T. M. (1992). 'Vulnerable Populations in Eastern Europe', Paper presented at the annual meeting of the Population Association of America.

United Nations Development Program (UNDP). (1998). *National Human Development Report: Bulgaria 1998: The State of Transition and Transition of the State*, Sofia.