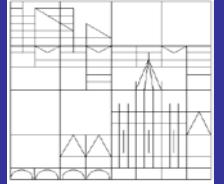




University of Konstanz  
Department of Economics



# **From Planning to Chaos to Market: Ethnic Inequality in Bulgaria**

*Vigile Marie Fabella & Georgi Kocharkov*

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# From Planning to Chaos to Market: Ethnic Inequality in Bulgaria

Vigile Marie Fabella and Georgi Kocharkov\*<sup>†</sup>

University of Konstanz

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## Abstract

We document changes in relative earnings of the ethnic Turkish workers in Bulgaria through the country's transition from planning to markets. Using data from four periods: pre-transition communist era (late 1980s), early transition years (early 1990s), late transition years (early 2000s), and post-transition (late 2000s), we find that the level of raw ethnic inequality (measured as earnings differences between Turkish and Bulgarian workers) increased immediately after the regime change and plateaued throughout the course of transition. Ethnic inequality measures adjusted for observable characteristics follow a similar pattern but post-transitional differences between ethnic groups disappear. Changes over time in the ethnic earnings gaps differ for men and women. The raw and adjusted male ethnic gaps increased steadily during transition years but dropped post-transition, while the raw female ethnic gap fluctuated across the four periods. The adjusted female ethnic gap disappeared completely in the post-transitional years. We identify different sources of the changes in the level of ethnic inequality, such as changes in the labor market characteristics and in the wage structure. Evidence suggests that the decline in the relative earnings of Turkish men was due primarily to the widening of the wage structure. Turkish working women improved their relative standing mainly from more favorable changes in labor market characteristics. These changes were only partially due to a selection in labor force participation.

*JEL Classifications:* J15, J70, P20, P30.

*Keywords:* Earnings Differentials, Ethnicity, Gender, Transition, Bulgaria, Turkish Minority.

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\*Address: Box F145, Department of Economics, University of Konstanz, Universitätsstr. 10, 78457 Konstanz, Germany. Fabella: [vigile.fabella@uni-konstanz.de](mailto:vigile.fabella@uni-konstanz.de); Kocharkov (corresponding author): [georgi.kocharkov@uni-konstanz.de](mailto:georgi.kocharkov@uni-konstanz.de).

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# 1 Introduction

The vast transformation of the economies in Central and Eastern Europe from planning to markets brought changes in the distribution of wages, the overall inequality, and the participation decisions of workers. It also brought about prospects of economic development. The centralized wage determination in these countries was abandoned, and wages were freed from the artificial equalization predominant in the communist era. In the new economic regime, wages were more linked to worker productivity and personal characteristics. Factors such as ethnic identity and gender therefore were also likely influence wages.

In this paper, we define ethnic inequality as the difference in labor earnings between a country's dominant ethnic group and an ethnic minority. [Chua \(2004\)](#) argues that moving from planning to markets and democracy brings about ethnic tensions and potential conflicts in developing societies. In a recent paper, [Alesina et al. \(2016\)](#) document a strong, negative association between ethnic inequality and economic development across countries.<sup>1</sup> To this end, an important question emerges: how does ethnic inequality change over the course of a country's economic development?

We document the evolution of ethnic inequality between ethnic Bulgarians and ethnic Turks in the course of Bulgaria's transition from a planned economy to markets. Ethnic inequality was low at the end of the communist era (*planning*) and rose in the process of market liberalization due to the social turmoil related to the transition process (*chaos*), which is in line with [Chua \(2004\)](#). At the end of the transition period, adjusted earnings gaps disappeared as market forces took over (*market*).

This study investigates two main points: (*i*) the changes in the relative earnings of the ethnic Turks in Bulgaria during the course of the transition, and, (*ii*) the different sources of these dynamics. Using four cross-sectional household surveys in Bulgaria in 1986, 1993, 2001, and 2007, we compare the ethnic earnings gap between pre-transition, early-, late- and post-transitional periods. We find that raw ethnic earnings gap increased during the initial years of the transition but plateaued during and after transition. Despite this plateau, the dynamics of the ethnic earnings gap differed across men and women. The raw ethnic gap for men increased steadily during transition then dropped post-transition. Meanwhile, although there was an initial increase in the raw ethnic gap for women, it is followed by a sharp drop during transition and then an increase post-transition.

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<sup>1</sup>In a more theoretical context, [Dev et al. \(2016\)](#) study the link between ethnic fragmentation and inequality in human capital accumulation.

We argue that the fall in the ethnic gap for women during the Bulgarian transition is a result of Turkish women at the bottom of the income distribution dropping out of the labor force. After correcting for the influence of confounding factors and changes in labor force participation, the adjusted ethnic earnings gap for men follow the same behavior as the raw gap. The adjusted ethnic gap for women follow the same dynamics as the raw ethnic gap during the course of the transition, but tapers off to zero post-transition.

We furthermore use the [Juhn et al. \(1991\)](#) decomposition technique to explore different sources of the changes in the gap such as changes in the labor market characteristics (group-specific factors) and changes in the wage structure. The decomposition suggests that the observed plateau in the overall ethnic gap was due to the opposing forces driving the differing trends for men and women: (i) a widening wage structure, which disadvantaged the Turkish men, and, (ii) an improved valuation of the personal characteristics of Turkish women.

There are numerous studies documenting changes in the gender earnings gaps in various transitional countries<sup>2</sup>, however, research on the effects of transition on the ethnic minority groups in Bulgaria is still scarce. [Giddings \(2002b\)](#) explores the initial change in the ethnic (Turkish-Bulgarian) earnings differential caused by the transition in Bulgaria. [Giddings \(2003\)](#) and [Kroncke and Smith \(1999\)](#) explore mid-transitional effects on the Turkish-Bulgarian differential in Bulgaria, and the Russian-Estonian differential in Estonia.<sup>3</sup> Ethnic minorities in many of the transitional countries of Eastern Europe are less educated and positioned at the lower end of the earnings distribution. In the presence of an increasing wage dispersion and remuneration based on productivity, such workers are therefore likely to experience a decline in relative earnings. Indeed, [Giddings \(2002b\)](#) documents that in 1986 the average ethnic Turkish worker in Bulgaria earned 85% from the monthly earnings of the average ethnic Bulgarian, while in 1993 this ratio reduced to 80%. In mid-transition, further negative movements in the relative earnings of minorities occurred due to the transformation of the labor markets ([Giddings, 2003](#)). We contribute to this literature by comparing ethnic gaps across the full time span, including shortly before, during and shortly after the transition.

The remainder of this paper is organized as follows: Sections 2 and 3 deal with the labor market

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<sup>2</sup>See [Newell and Reilly \(1996\)](#), [Hunt \(1997\)](#), [Ogloblin \(1999\)](#), [Brainerd \(2000\)](#), [Glinskaya and Mroz \(2000\)](#), [Orazem and Vodopivec \(2000\)](#), [Pailhe \(2000\)](#), [Jolliffe \(2002\)](#), [Jurajda \(2003\)](#), [Münich et al. \(2005b\)](#), [Münich et al. \(2005a\)](#), [Light \(2007\)](#), [Dong and Zhang \(2009\)](#) and [Andr n and Andr n \(2015\)](#).

<sup>3</sup>See [Trentini \(2014\)](#) for a thorough discussion on the ethnic differentials in returns to education for Roma and ethnic Bulgarian workers.

institutions in transitional Bulgaria and the role of ethnic Turks in Bulgarian history. Section 4 describes the data and provides selected descriptive statistics. The empirical analysis is presented in section 5, and Section 6 concludes.

## 2 Labor Markets in Transition

Bulgaria was under a communist leadership from the end of the World War II until 1989. However, reforms towards a market-based economy did not start until the early 1990s, following the wave of changes that occurred in Eastern Europe due to the collapse of the Eastern Bloc.<sup>4</sup> The transition period in Bulgaria lasted for more than a decade. By mid-2000s, Bulgaria no longer resembled centrally-planned economy. In 2007, the negotiations for European Union membership were finalized and Bulgaria became a member-state. This marked an end to the transitional era in modern Bulgarian economic history.

The Bulgarian labor market under communism can be characterized by numerous institutional arrangements which resulted in non-market wage determination. The state owned nearly all productive assets and worker compensation played no essential role in the allocation of resources between agents. Instead, wages were set based on centralized standards by the managers of state-owned firms whose primary objective was to adhere to the productive norms prescribed by the production plan of the government (Ellman, 2014). In such an environment, wages do not reflect the differences in productive characteristics across workers and the wage distribution was therefore artificially compressed. The reforms towards a market economy at the beginning of the 1990s eliminated centralized wage setting by giving firms the authority over production, pricing, and wage determination. In 1991, a new wage-setting system was put in place, which operated through a tripartite commission with representatives from employers, the government, and the unions. According to this system, wage negotiations would taken place at the national, firm, and individual level. By the end of the year, however, the agreement reached by the tripartite commission broke down. The resulting wage setting process for the duration of the Bulgarian transition therefore collapsed into firm-level collective bargaining.

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<sup>4</sup>An exciting historical description of the process of transition to capitalism in Eastern Europe is given by Schleifer and Treisman (2014).

### 3 Ethnic Turks in Bulgaria

The relations between ethnic Bulgarians and ethnic Turks can be traced back to the expansion of the Ottoman Empire to the Balkans at the end of the 14th century when the territories of the medieval Bulgarian state became parts of the empire. When Bulgarian state was reestablished as an independent entity in 1878, many Turks decided to stay in the country. Nowadays, the ethnic Turkish minority accounts for around 10% of the population.<sup>5</sup>

During the period of central planning in Bulgaria, the ethnic Turks faced several forced expulsions from Bulgaria as well as a name changing campaign in the winter of 1984-85. In the 1990s Bulgaria experienced a large share of the active labor force leaving the country, affecting the composition of working-age Bulgarians and Turks.

The changes in Bulgarian labor market institutions are likely to have an impact on both the overall wage structure, and labor market or occupational characteristics (which we shall call *group-specific factors*). The expected widening of the wage structure following the wage decentralization may have penalized ethnic Turkish workers relative to Bulgarians because the Turks occupied the lower part of the distribution. The expected rise in the returns to education in transition may have further penalized the Turks since they are on average less educated. The changes in the wage structure and the liberalization of the labor market as a whole may also have affected the labor market participation of the workers.

### 4 Data and Descriptive Statistics

The paper explores the dynamics of the ethnic earnings differential in Bulgaria using four cross-sectional household surveys: 1986 (pre-transition, communist era), 1993 (early transition years), 2003 (late transition years), and 2007 (post-transition). The analysis is performed on the sub-sample of employed workers.<sup>6</sup> Agricultural and self-employed workers are included in the analysis, while workers less than 17 at the date of the interview are excluded. Moreover, since the study explores the earnings gap between ethnic Bulgarians and ethnic Turks, all non-Turk and non-Bulgarian workers are eliminated from the sample.

The 1986 cross-sectional dataset is the Town and Village Survey (TVC) which was conducted by the Institute of Sociology of the Bulgarian Academy of Sciences in Sofia, Bulgaria. It was

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<sup>5</sup>The 1992 Census reveals that 9.7% of the population is ethnic Turks.

<sup>6</sup>The sub-sample of the unemployed workers and those not in the labor force are used only in Section 5.4.

carried out in conjunction with the national census conducted in the winter of 1985. The sample is therefore random and representative for the entire population. It contains 10,333 observations, of which 5,592 (54.12%) are women, and 918 (8.89%) are ethnic Turks. After removing individuals below 17 years old, those in pension and those with missing variables, the sample of wage earners reduces to 6,030 observations, of which 3,036 (50.35%) are women, and 548 (9.09%) are ethnic Turks.

The 1993 survey, *Social Stratification in Eastern Europe after 1989: General Population Survey (SSEE)* was collected in the summer of 1993 by researchers from the University of California – Los Angeles (UCLA) in collaboration with the Bulgarian National Statistical Institute (NSI). The SSEE survey in Bulgaria was conducted using a two-stage cluster sample technique with stratification by district, municipality, and size of voting section.<sup>7</sup> The sample contains 4,919 fully completed interviews, 2,543 (51.70%) of which are women, and 491 (9.98%) are ethnic Turks. The sub-sample of non-pension wage-earners above 16, who provide information on wages, education, age, gender, urban/rural dwelling, and ethnic background, consists of 2,298 observations, of which 1,090 (47.43%) are women, and 209 (9.09%) are ethnic Turks.

The final two cross-sectional datasets are the 2001 and 2007 Bulgarian Living Standards Measurement Studies (LSMS) which were nationally-representative surveys collected by Gallup International under the supervision of the World Bank. The 2001 survey sample was drawn from the pre-census listing of the 2001 Population Census and has information on 2,500 households and 133 oversampled households from Roma origin. When the Roma over sampled individuals are excluded, the sample consists of 7,099 individuals, of which 3,690 (52%) are women, and 638 (8.99%) are ethnic Turks. The sub-sample of the wage earners has 1,928 observations, of which 927 (48.08%) are women, and 109 (5.65%) are ethnic Turks. The 2007 sample, on the other hand, was drawn from voter listings validated by the General Directorate Civil Registration and Administrative Servicing (CRAS) primarily for the presidential elections held in October 2006. It has information on 4,300 households and 12,212 individuals, of which 5,869 (51.94%) are women and 1,297 (10.62%) are ethnic Turks. In the collapsed sample of wage-earning, working-age Bulgarians and Turks, there are 3,914 individuals, of which 1,688 (43.13%) are women and 380 (9.71%) are ethnic Turks.

The descriptive statistics of the variables in the sample of the wage earners of the four cross-

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<sup>7</sup>This is a mixed sampling procedure that combines advantages of stratified and of cluster sampling.

sectional datasets are presented in Table 1 for both males and females, Table 2 for males, and Table 3 for females.<sup>8</sup> Education between the two ethnic groups in the full sample is unequal in all years. In 1986 the difference in years in schooling is over 38% (10.6 years versus over 7.7 years). In consequent years, the ethnic Bulgarians achieved higher levels of education, which is true also for the ethnic Turks until 2001. The relative educational standing of the Turks is similar in magnitude in the next two available datasets – the difference in years of schooling is 37% (11.8 years versus 8.6 years) in 1993 and 36% (12.4 years versus 9.1 years) in 2001. In 2007, however, the difference in years of schooling jumps to 74%. If we look at the average years of education by gender, things change. The ethnic difference in years of schooling between Bulgarian and Turkish men is around 33% in favor of Bulgarians in 1986 and 1993. By 2001, this difference increases to 40% and by 2007 to 64%. For women, on the other hand, the schooling difference is 44% in 1986, 42% in 1993, decreases to 29% in 2001, but jumps to 91% in 2007. While there is no clear evidence for the source of the decrease in years of schooling for ethnic Turks in 2007, it is plausibly related to the increase in years of experience during the same time period.

In all years there is a systematic difference in the residential occupation of the Bulgarian workers and their Turkish counterparts. There were generally fewer Bulgarians than Turks in rural areas, and although the share of ethnic Bulgarians and ethnic Turks living in rural areas declined during the transition years, the share continued to drop for Bulgarians in the late 2000s while the share increased for ethnic Turks in this period. The decline in rural residence is particularly impressive in the case of the ethnic Turkish women in 2001, from which only 42.5% lived in rural areas, a drop from 69% in 1993.

## 5 Empirical Analysis

### 5.1 Ethnic Inequality

The purpose of the study is to shed some light on the evolution of the ethnic earnings differentials between Bulgarians and Turks in Bulgaria. In this section we shall explore first the raw ethnic earnings gap, which we will then compare with the adjusted earnings gaps that are corrected for labor market characteristics.

The unadjusted level of ethnic inequality in terms of log earnings differentials between the two

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<sup>8</sup>Earnings used in the analysis are constructed as the previous-month's wages, which are not adjusted for hours of work which are only available in the 1993 and 2001 datasets.



Table 1: Descriptive Statistics for Males+Females

	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks
	1986	1986	1993	1993	2001	2001	2007	2007	2007	2007
Gross Monthly Labor Earnings	213.879 (76.468)	182.279 (65.623)	2,441.168 (1,720.028)	1,856.459 (1,362.326)	189.880 (103.664)	157.564 (110.663)	408.776 (296.871)	408.776 (296.871)	408.776 (296.871)	347.076 (331.160)
Age	37.949 (10.457)	33.555 (10.246)	40.107 (10.092)	39.115 (10.331)	40.129 (10.385)	36.697 (10.485)	41.452 (11.536)	41.452 (11.536)	41.452 (11.536)	40.103 (11.223)
Years of Schooling	10.610 (3.119)	7.681 (2.558)	11.770 (3.032)	8.598 (2.502)	12.418 (2.701)	9.101 (2.972)	12.839 (3.601)	12.839 (3.601)	12.839 (3.601)	7.374 (4.842)
Experience (Years)	21.338 (11.627)	19.874 (11.743)	22.337 (11.069)	24.517 (11.633)	21.711 (10.836)	21.596 (11.781)	22.613 (12.163)	22.613 (12.163)	22.613 (12.163)	26.729 (12.973)
Rural	0.301 (0.459)	0.737 (0.441)	0.214 (0.411)	0.670 (0.471)	0.173 (0.378)	0.514 (0.502)	0.158 (0.365)	0.158 (0.365)	0.158 (0.365)	0.645 (0.479)
Total Household Income	533.682 (228.129)	491.637 (194.835)	5,557.585 (5,320.634)	4,195.694 (2,395.776)	609.599 (1,209.525)	455.044 (464.208)	1,070.033 (887.251)	1,070.033 (887.251)	1,070.033 (887.251)	968.008 (915.526)
N	5,482	548	2,089	209	1,819	109	3,534	3,534	3,534	380

Note: Standard errors are in parentheses in all tables.

Table 2: Descriptive Statistics for Males

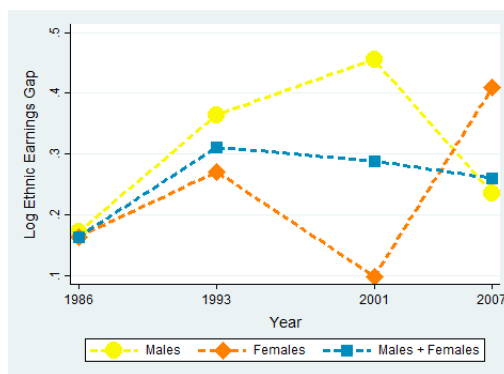
	1986		1993		1993		2001		2007		2007	
	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks
Gross Monthly Labor Earnings	245.832 (81.695)	207.667 (69.330)	2,759.447 (2,047.543)	1,951.220 (1,517.621)	218.528 (112.261)	162.087 (112.317)	464.228 (347.289)	404.266 (379.649)				
Age	38.878 (10.998)	35.516 (10.851)	40.897 (10.929)	40.268 (10.934)	40.965 (10.841)	38.188 (10.313)	40.879 (11.880)	39.453 (11.400)				
Years of Schooling	10.522 (3.142)	7.918 (2.679)	11.528 (3.085)	8.675 (2.390)	12.171 (2.660)	8.696 (2.997)	12.428 (3.637)	7.559 (4.784)				
Experience (Years)	22.356 (12.057)	21.599 (12.479)	23.369 (11.968)	25.593 (12.252)	22.793 (11.124)	23.493 (11.423)	22.451 (12.419)	25.895 (13.003)				
Rural	0.327 (0.469)	0.713 (0.453)	0.232 (0.422)	0.650 (0.479)	0.183 (0.387)	0.565 (0.499)	0.163 (0.369)	0.660 (0.475)				
Total Household Income	540.720 (199.643)	484.058 (197.835)	5,627.095 (5,247.701)	4,089.431 (2,531.436)	630.411 (1,301.687)	422.405 (462.282)	1,083.178 (928.725)	930.525 (678.299)				
N	2,715	279	1,085	123	932	69	1,970	256				

Table 3: Descriptive Statistics for Females

	1986		1993		1993		2001		2001		2007		2007	
	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks	Ethnic Bulgarians	Ethnic Turks
Gross Monthly Labor Earnings	182.527 (55.251)	155.948 (49.361)	2,097.211 (1,183.154)	1,720.930 (1,097.389)	2,097.211 (1,183.154)	1,720.930 (1,097.389)	159.779 (83.889)	149.762 (108.714)	159.779 (83.889)	149.762 (108.714)	338.929 (196.262)	338.929 (196.262)	338.929 (196.262)	229.008 (135.066)
Age	37.037 (9.814)	31.520 (9.163)	39.254 (9.029)	37.465 (9.213)	39.254 (9.029)	37.465 (9.213)	39.251 (9.814)	34.125 (10.405)	39.251 (9.814)	34.125 (10.405)	42.174 (11.049)	42.174 (11.049)	42.174 (11.049)	41.444 (10.769)
Years of Schooling	10.696 (3.094)	7.435 (2.407)	12.031 (2.954)	8.488 (2.665)	12.031 (2.954)	8.488 (2.665)	12.678 (2.721)	9.800 (2.830)	12.678 (2.721)	9.800 (2.830)	13.355 (3.489)	13.355 (3.489)	13.355 (3.489)	6.992 (4.956)
Experience (Years)	20.340 (11.101)	18.086 (10.659)	21.223 (9.893)	22.977 (10.566)	21.223 (9.893)	22.977 (10.566)	20.573 (10.410)	18.325 (11.811)	20.573 (10.410)	18.325 (11.811)	22.818 (11.833)	22.818 (11.833)	22.818 (11.833)	28.452 (12.791)
Rural	0.275 (0.447)	0.762 (0.427)	0.195 (0.397)	0.698 (0.462)	0.195 (0.397)	0.698 (0.462)	0.161 (0.368)	0.425 (0.501)	0.161 (0.368)	0.425 (0.501)	0.152 (0.359)	0.152 (0.359)	0.152 (0.359)	0.613 (0.489)
Total Household Income	526.777 (252.828)	499.499 (191.726)	5,482.468 (5,399.955)	4,347.674 (2,192.754)	5,482.468 (5,399.955)	4,347.674 (2,192.754)	587.802 (1,105.108)	511.347 (467.963)	587.802 (1,105.108)	511.347 (467.963)	1,053.489 (832.117)	1,053.489 (832.117)	1,053.489 (832.117)	1,045.392 (1,272.755)
N	2,767	269	1,004	86	1,004	86	887	40	887	40	1,564	1,564	1,564	124

ethnic groups is presented graphically in Figure 1. During the pre-transition era, ethnic inequality was relatively low (0.163 in terms of log earnings difference) and similar for males and females. The raw ethnic earnings gap then increased from 0.163 in 1986 to 0.311 in 1993.<sup>9</sup> This result is consistent with previous evidence by Giddings (2002b), Giddings (2003). This jump of over 90% represents the effect of the initial market-oriented reforms in the early 1990s. The increasing ethnic inequality in the early years of transition is present in both the sub-samples of men and women but is more pronounced for men (from 0.171 to 0.364 for men, and from 0.164 to 0.271 for women). Figure 1 also reveals that ethnic inequality for the whole sample declined at a slow rate from the early 1990s to the late 2000s (0.311 to 0.288 to 0.259). However, this overall stabilization of ethnic inequality in the course of marketization conceals the divergence in ethnic earnings gaps for working men and working women. In the course of transition, male ethnic inequality further increased (from 0.364 in 1997 to 0.456 in 2001) while female ethnic inequality decreased from 0.271 in 1993 to 0.098 in 2001). In the post-transition period however, the picture reversed. The ethnic inequality among working men significantly decreased (from 0.456 to 0.234), while the ethnic inequality among working women increased by a substantial amount (from 0.098 to 0.405). This fact presents an interesting observation on the dynamics of the ethnic earnings differentials based on gender. At first glance, the earnings gap did not change much beyond an initial transitional jump but when ethnic inequality is conditioned on gender, hidden dynamics emerge. Changes in earnings of the two major ethnic groups in the Bulgarian labor market thus seem to be related to gender, perhaps through differing trends in labor market characteristics, participation and returns.

Figure 1: Ethnic Inequality for Males+Females, Males, and Females (1986-2007)



A look at the unadjusted ethnic earnings gap at different percentiles of income can shed some

<sup>9</sup>Detailed results for the size of the ethnic earnings differentials for the whole sample, for males only, and females only, are presented in the Appendix.

light on the source of the changes in the differentials. Figure 2 presents the case for the full sample of men and women. The initial increase of ethnic inequality from 1986 to 1993 came from the upper part of the income distribution. In subsequent years, however, the pattern is reversed; ethnic inequality was generated mostly at the bottom of the income distribution (see years 2001 and 2007). In the case of men (Figure 3), we observe a similar pattern. The increase in ethnic inequality was initially generated from the upper part of the distribution, but subsequently came predominantly from the bottom. This suggests that, apart from the initial rise in ethnic inequality at the top of the distribution, male ethnic inequality coming from the bottom of the distribution intensified, leading to a higher level of male ethnic gap in the later part of the transition. This pattern of high inequality at the bottom half of the distribution remained consistent until the post-transition era, despite subsequent reductions in male ethnic inequality across all percentiles of the distribution. In the case of women, figure 4 suggests that ethnic inequality increased substantially during the early stages of the transition across the whole distribution. In the late-transition period, the gap remained unchanged for the 40th-60th percentiles, but fell substantially at the tails of the distribution (at the 20th and 80th percentiles), explaining the observed drop in the overall ethnic earnings gap of women in the early 2000s (Figure 1). Such a pattern of high income gaps in the middle of the distribution carries over to the post-transition era, despite having increased ethnic inequality across the whole female distribution.

Figure 2: Log Ethnic Earnings Gaps for Males+Females by Percentiles

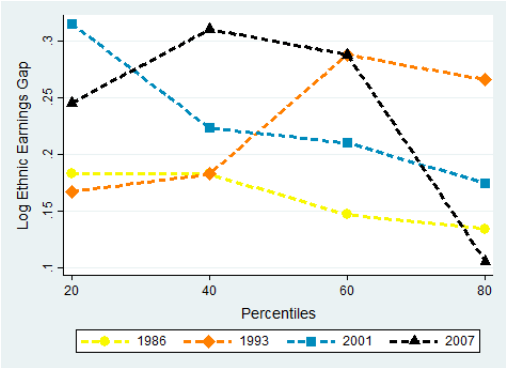


Figure 3: Log Ethnic Earnings Gaps for Males by Percentiles

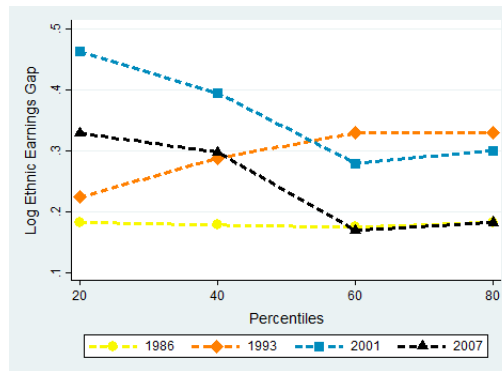
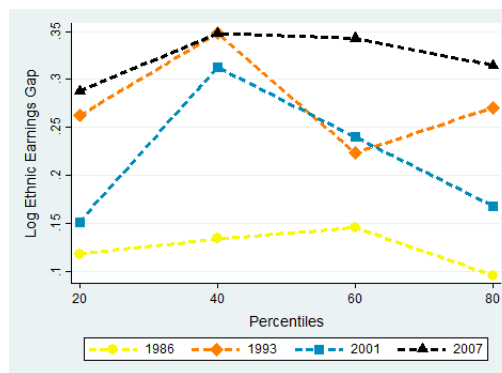


Figure 4: Log Ethnic Earnings Gaps for Females by Percentiles



So far we have only looked at the raw ethnic earnings gaps without adjusting for other individual-specific factors, such as education, work experience and location, that may have an influence individual wages. Looking at the conditional log ethnic earnings gaps, controlling for these observable individual factors may also reveal interesting patterns in ethnic inequality. Table 4 reports the estimated coefficients of simple OLS regressions on the earnings equations for the years 1986, 1993, 2001, and 2007. The variables of interest are the dummies for being Turkish or female and their interaction. The controls include years of schooling, years of potential experience and its square, as well as a dummy for rural occupation. These controls were chosen to reflect the individual worker characteristics that may also have an influence on wage.

Table 4: Earnings Equations for 1986, 1993, 2001 and 2007

	Dependent Variable: Log Earnings			
	1986	1993	2001	2007
Turk	-0.059** (0.019)	-0.18*** (0.049)	-0.26*** (0.066)	0.031 (0.035)
Female	-0.29*** (0.0080)	-0.27*** (0.022)	-0.33*** (0.024)	-0.30*** (0.017)
Turk*Female	0.042 (0.026)	0.13 (0.072)	0.34** (0.10)	-0.11* (0.056)
Years of Schooling	0.032*** (0.0015)	0.050*** (0.0041)	0.046*** (0.0046)	0.036*** (0.0023)
Experience (years)	0.025*** (0.0013)	0.028*** (0.0036)	0.026*** (0.0042)	0.019*** (0.0023)
Experience Squared	-0.00040*** (0.000028)	-0.00064*** (0.000075)	-0.00053*** (0.000095)	-0.00042*** (0.000049)
Rural	-0.049*** (0.0088)	-0.074** (0.026)	-0.093** (0.031)	-0.16*** (0.021)
Constant	4.83*** (0.024)	6.98*** (0.067)	4.47*** (0.076)	5.42*** (0.040)
R-Squared	0.306	0.201	0.159	0.203
N	6030	2298	1928	3914
Joint test for Turk & Turk*Female (p-val)	.00613	.00083	.00024	.13334

\*\*\* denotes 1% significance level, \*\* 5% significance level, and \* 10% significance level.

Table 4 suggests that, at least for 1986, 1993 and 2001, the male Turkish minority had lower wages compared to Bulgarians with the same level of education, experience and location, as seen from the negative and significant coefficient of the variable *Turk*.<sup>10</sup> These estimates, when the sign is reversed, are the adjusted ethnic earnings gap of men, conditional on labor market characteristics. The adjusted male ethnic earnings gap increases monotonically in the course of the transition (from 0.059 in 1986 to 0.18 in 1993, and to 0.26 in 2001) but disappears in the post-transition era. The conditional ethnic earning gap for females is the sum of the coefficients of *Turk* and *Turk\*Female*, with reversed signs.<sup>11</sup> In 1986, the female ethnic gap is 0.017 in favor of Bulgarians, then it increases to 0.05 in 1993, and then it goes down to -0.08 in 2001 (that is, Turkish working females are better off than Bulgarians working females). This pattern is consistent with the behavior of

<sup>10</sup> This aligns with the findings of Pirani et al. (1992) and Lindley (2002).

<sup>11</sup> The p-value for the test of joint significance of the variables *Turk* and *Turk\*Female* are provided at the bottom of each regression.

the unadjusted ethnic inequality in Figure 2. The female earnings gap however, disappears in 2007<sup>12</sup>. This suggests that the high unadjusted female earnings gap observed in Figure 2 in the post-transition years could be driven by observed labor market factors that are controlled for in the regression, such as years of schooling, experience or rural location.

At this point it is instructive to explore what drives these dynamics in the unadjusted and adjusted ethnic earnings gap. Two possible sources of the observed changes in ethnic inequality are exogenous changes in personal characteristics (group-specific factors) and changes in the wage distribution (wage-structure factors). Changes in ethnic inequality may also arise due to entry or exit from the labor market. Such movements in labor participation can alter the observed characteristics of workers and the overall wage distribution. This argument gives rise to two distinct questions about the evolution of the ethnic earnings gap in Bulgaria. First, what changes in the wage structure and in personal characteristics lead to the observed ethnic earnings differentials dynamics during transition? Second, how do changes in labor participation decisions of individuals influence the dynamics of the ethnic earnings differentials? The succeeding sections attempt to answer these two questions.

## 5.2 Wage Structure

The overall wage structure in the economy can affect ethnic earnings differentials (Blau and Kahn (1992), Blau and Kahn (1996), Blau and Kahn (1997) and Blau and Kahn (2000)). Such wage structure factors may be related to the way different characteristics are rewarded or to the changes in the overall level of inequality in the economy. The position of median and mean Turk in the Bulgarian distribution in the years under consideration is presented in Tables 5-7. This measure indicates the percentile rank in the Bulgarian distribution that is associated with the mean (median) income of a Turkish worker, and is therefore not contaminated by the changes of the Bulgarian wage distribution. A rise in the position of the mean or median Turk may reflect relative improvements in Turk-measured labor skills and/or declines in the unexplained ethnic gap. In the case of the whole sample (Males+Females), the mean Turk fell at start of the transition (from 36th to 33th centile) but climbed back somewhat in the later years (from 33th to 37th to 34th centile). The overall decline of the median Turk's position was larger and it kept its magnitude after transition (29th centile in 1986 to 22th centile in 2007). The forces behind the fall of the mean, and especially the

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<sup>12</sup>*Turk* and *Turk\*Female* are jointly insignificant in the 2007 dataset



median Turk in 2007 can be traced by looking at the sub-samples of women and men. The median Turkish man fell only slightly in transition (from 27th to 25th centile) and kept his position until post-transition (24th centile), while the median Turkish woman improved slightly in transition (from 27th to 28th centile) but then fell to the 14th centile in post-transition. When it comes to the position of the means, the average Turkish male fell from 34th in 1986 to 31th in 1993 and 2001, and bounced back to 36th centile in 2007. The average Turkish female climbed from 34th in 1993 to 38th in 2001, but subsequently went back to the 23th centile. Tables 5-7 shows that the median Turk lost some economic ground, while the mean Turk's position was more stable. The declining position of the median Turk over the period came predominantly from the declining relative standing of Turkish women. These two facts indicate some intense inequality and female labor force participation dynamics in Bulgaria over time.

Table 5: Centile Position of Mean and Median Turk in the Bulgarian Wage Distribution (in %, Males+Females)

Year	Centile Position in Bulgarian Distribution:	
	Mean Turk	Median Turk
1986	36	29
1993	33	23
2001	37	26
2007	34	22

Table 6: Centile Position of Mean and Median Turk in the Bulgarian Wage Distribution (in %, Males)

Year	Centile Position in Bulgarian Distribution:	
	Mean Turk	Median Turk
1986	34	27
1993	31	25
2001	32	25
2007	36	24

Table 7: Centile Position of Mean and Median Turk in the Bulgarian Wage Distribution (in %, Females)

Year	Centile Position in Bulgarian Distribution:	
	Mean Turk	Median Turk
1986	34	27
1993	34	28
2001	38	28
2007	23	14

Table 8 presents inequality measures for the wage distribution by sub-samples. The 90-10 percentile log earnings differential measures of overall earnings dispersion, while the 50-10 percentile log differential and the 90-50 percentile log differential measure the changes in earnings dispersion that occurred predominantly in the lower or upper part of the distribution, respectively.

The overall earnings inequality in Bulgaria rose from 0.84 in 1986 to 1.29 in 1993, then decreased back to 1.26 in 2001 and continued its rise to 1.33 in 2007. The overall widening of the wage structure in the two decades under inspection comes as a consequence of rising inequality among all demographic groups. An additional factor that generated inequality in this case is the rising dispersion at the bottom of the female Turkish distribution. The most pronounced increase in inequality is observed within the group of Bulgarian women and the group of Turks. The rise in inequality among Bulgarian women comes from both the bottom and the top of the distribution. The log 90-50 and 50-10 measures increase at a similar pace for this group. In particular, the 90-50 log ratio increases from 0.40 in 1986 to 0.85 in 2007, while the 50-10 log ratio goes up from 0.43 to 0.84. The rise in inequality among ethnic Turks comes also from both parts of the distribution.

### 5.3 Decomposition of the Changes in the Ethnic Earnings Gap

Earnings differentials between two ethnic groups can occur because of differences in human capital or occupational characteristics, which we refer to as group-specific factors. In addition, changes in the wage structure can also affect earnings differentials. Such wage structure factors may be related to the way different characteristics are rewarded or to changes in the overall level of inequality in the economy. We utilize the well-known [Juhn et al. \(1991\)](#) decomposition which improves on other similar methods in its ability to decompose the residual of the wage functions. Suppose the

Table 8: Changes in the Wage Structure by Ethnicity and Sex

	log(90-10)			log(90-50)			log(50-10)					
	1986	1993	2001	1986	1993	2001	1986	1993	2001	2007		
All	0.836	1.291	1.261	1.329	0.405	0.693	0.620	0.754	0.431	0.598	0.641	0.575
Males	0.847	1.322	1.253	1.377	0.420	0.716	0.598	0.689	0.427	0.606	0.655	0.688
Females	0.734	1.131	1.139	1.022	0.386	0.544	0.511	0.511	0.348	0.588	0.629	0.511
Bulgarians	0.838	1.204	1.231	1.253	0.422	0.693	0.609	0.722	0.416	0.511	0.623	0.531
Turks	0.774	1.204	1.350	1.609	0.425	0.693	0.731	0.875	0.349	0.511	0.619	0.734
Male Bulgarians	0.783	1.374	1.250	1.386	0.420	0.723	0.560	0.693	0.363	0.651	0.690	0.693
Female Bulgarians	0.836	1.162	1.910	1.684	0.405	0.629	0.588	0.847	0.431	0.533	1.322	0.836
Male Turks	0.734	1.036	1.139	1.022	0.357	0.490	0.511	0.511	0.377	0.547	0.629	0.511
Female Turks	0.781	1.239	1.304	1.253	0.405	0.693	0.937	0.560	0.376	0.546	0.367	0.693

estimated earnings equation for an ethnic Bulgarian worker  $i$  at time  $t$  is

$$Y_{it}^b = X_{it}^b \beta_t + u_{it}^b$$

where  $Y_{it}^b$  is the log monthly earnings,  $X_{it}^b$  is a vector containing the observable characteristics of an individual ethnic Bulgarian worker,  $\beta_t$  represents the estimated coefficients on the characteristics in year  $t$ , and  $u_{it}^b$  is the residual, that is, the difference between the fitted and the actual values of the dependent variable. Denote the standard deviation of the residual of the ethnic Bulgarian earnings function in year  $t$  as

$$\sigma_t^b = \left( \sum_{i=1}^{n^b} (u_{it}^b)^2 - \left( \sum_{i=1}^{n^b} u_{it}^b \right)^2 \right)^{1/2},$$

where the sample size of Bulgarian workers is  $n^b$ . Then  $\theta_{it}^b = \frac{u_{it}^b}{\sigma_t^b}$  is the “standardized” residual of the ethnic Bulgarian regression with mean 0 and variance 1.  $\theta_{it}^b$  is the percentile the individual occupies in the residual distribution, and changes in the spread of the residual distribution ( $\sigma_t^b$ ) reflect changes in within-group inequality for Bulgarians.

The average earnings of Bulgarian workers at time  $t$  can be calculated as

$$Y_t^b = \frac{1}{n^b} \sum_{i=1}^{n^b} Y_{it}^b = \underbrace{\left( \frac{1}{n^b} \sum_{i=1}^{n^b} X_{it}^b \right)}_{X_t^b} \beta_t + \sigma_t^b \underbrace{\frac{1}{n^b} \sum_{i=1}^{n^b} \theta_{it}^b}_{\theta_t^b \equiv 0}.$$

Using the estimates  $\beta_t$ , we can recover the implied Turkish worker  $j$  residual at time  $t$  ( $u_{jt}^k$ ) in the following way:

$$Y_{jt}^k = X_{jt}^k \beta_t + u_{jt}^k,$$

where  $Y_{jt}^k$  is the log monthly earnings of the  $j$ -th Turkish worker, and  $X_{jt}^k$  are the observable characteristics. The “standardized” residual is  $\theta_{jt}^k = \frac{u_{jt}^k}{\sigma_t^k}$ . It represents the position of the Turkish worker  $j$  residual in the Bulgarian residual distribution. Then, the average earnings of Turkish workers at time  $t$  can be represented as

$$Y_t^k = X_t^k \beta_t + \sigma_t^k \theta_t^k,$$

and the actual earnings differential between ethnic Bulgarians and ethnic Turks at time  $t$  is

$$\Delta Y_t = Y_t^b - Y_t^k = \underbrace{(X_t^b - X_t^k)}_{\Delta X_t} \beta_t + \sigma_t^b \underbrace{(\theta_t^b - \theta_t^k)}_{\Delta \theta_t}.$$

Using this formulation, the earnings difference between year  $t$  and year  $s$  can be written as

$$\Delta Y_s - \Delta Y_t = (\Delta X_s - \Delta X_t)\beta_t + \Delta X_s(\beta_s - \beta_t) + (\Delta\theta_s - \Delta\theta_t)\sigma_t^b + \Delta\theta_s(\sigma_s^b - \sigma_t^b). \quad (1)$$

The first term on the right-hand side of equation (1) is known as the “*Observed Xs*” effect, which reflects changes in the earnings differential due to changes in the measured characteristics (such as schooling and experience). The second term (the “*Observed Prices*” effect) signifies changes due to changes in the prices paid to ethnic Bulgarians for those measured characteristics. The third term, the “*Unobserved Characteristics*” effect, also known as the “*Gap*” effect, represents contribution of changes in the relative position of ethnic Turks in the ethnic Bulgarian residual wage distribution. Turks will move up in the distribution if their market skills improve or discrimination against them declines. The fourth term (the “*Unobserved Prices*” effect) measures changes in the earnings gap due to the widening (narrowing) of the ethnic Bulgarian earnings residual distribution, holding constant the gap in the unmeasured skills. In other words, this term accounts for the widening of the ethnic Bulgarian earnings distribution, holding constant the mean ethnic Turk ranking in the Bulgarian distribution.

The results from the [Juhn et al. \(1991\)](#) decomposition are presented in Tables [9a-9c](#). The observable characteristics used in the Bulgarian regression are years of schooling, years of potential experience, years of potential experience squared, a dummy variable for urban/rural occupation, and a dummy variable for gender in the estimation for the whole sample (Males+Females). These variables are chosen because they reflect the basic personal characteristics of workers.

Positive numbers in Tables [9a-9c](#) indicate factors that increase the ethnic earnings gap, while negative numbers indicate factors that reduce the ethnic earnings gap. In the case of the whole sample (Males+Females) the change in the ethnic earnings gap between 1986 and 1993 is 0.148, and is due mainly to the changing wage structure which worked against the ethnic Turks (Column 2+4). Despite the fact that changes in experience, schooling and other observable characteristics reduced the gap slightly (Column 1), changes in the returns to these factors (Column 2) counteracted this effect. In the second period, 1993-2001, the level of the ethnic gap fell slightly due to the changes in the group-specific labor market factors (Column 1+3). Observable characteristics improved (Column 1) complemented by the more favorable returns to these characteristics (Column 2) driven mostly by the men, as well as the improving position of Turks in the Bulgarian wage distribution (Column 3) driven mostly by the women. All three factors moved in favor of the Turks, thereby dominating the effect of the widening Bulgarian residual earnings distribution (Column

Table 9: Decomposition Results for 1986, 1993, 2001 and 2007

(a) Decomposition Results (Males+Females)									
Period	Total Change in Gap	Observed Xs (1)	Observed Prices (2)	Gap (3)	Unobserved Prices (4)	Sum of Group-specific (1+3)	Sum of Wage Structure (2+4)	Explained (1+2)	Unexplained (3+4)
1986-1993	0.148	-0.030	0.094	0.047	0.038	0.016	0.132	0.063	0.084
1993-2001	-0.023	-0.014	-0.016	-0.039	0.046	-0.053	0.030	-0.030	0.007
2001-2007	-0.029	0.117	-0.013	-0.101	-0.032	0.016	-0.045	0.103	-0.133

(b) Decomposition Results (Males)									
Period	Total Change in Gap	Observed Xs (1)	Observed Prices (2)	Gap (3)	Unobserved Prices (4)	Sum of Group-specific (1+3)	Sum of Wage Structure (2+4)	Explained (1+2)	Unexplained (3+4)
1986-1993	0.193	-0.011	0.119	0.025	0.061	0.013	0.180	0.107	0.086
1993-2001	0.091	0.014	-0.038	0.038	0.077	0.052	0.039	-0.024	0.116
2001-2007	-0.222	0.080	0.010	-0.262	-0.050	-0.182	-0.040	0.090	-0.312

(c) Decomposition Results (Females)									
Period	Total Change in Gap	Observed Xs (1)	Observed Prices (2)	Gap (3)	Unobserved Prices (4)	Sum of Group-specific (1+3)	Sum of Wage Structure (2+4)	Explained (1+2)	Unexplained (3+4)
1986-1993	0.107	-0.016	0.054	0.073	-0.004	0.058	0.049	0.038	0.069
1993-2001	-0.172	-0.011	0.008	-0.161	-0.008	-0.172	-0.001	-0.003	-0.169
2001-2007	0.307	0.170	-0.034	0.195	-0.023	0.364	-0.057	0.135	0.172

4). In the third period, 2001-2007, the ethnic inequality continued to go down, despite the adverse change in observed labor market factors (Column 1) for both men and women. What contributed to the lower change in the gap were the enhanced labor market factors (Column 2) primarily for women, the improving relative position of Turks, particularly male Turks, in the Bulgarian distribution (Column 3), as well as the general narrowing of the Bulgarian residual wage distribution (Column 4).

The sub-samples of men and women show a different pattern for the evolution of the ethnic earnings gap. The gap increased for men in the period 1993-2001 despite the small positive effect of the changes in the prices that the labor market attached to observed skills for male Turks (Column 2). The factor that contributed most to the gap was the “Unobserved prices” caused by the widening of the residual wage distribution of Bulgarians (Column 4). The male gap, however, decreased substantially between 2001-2007, mainly from the unobserved labor market characteristics (Column 4). The female ethnic earnings gap, on the other hand, reduce in the early transition period to levels even lower than the pre-transition values. This significant improvement came predominantly from Turkish women climbing up in the residual Bulgarian female wage distribution (Column 3).<sup>13</sup> This remarkable improvement in the position of the Turkish female in the female Bulgarian wage distribution suggests that either Turkish women were subject to less discrimination than before, or that their unobserved market skills improved during the period. The improvement in unobserved market skills of Turkish women may have occurred due to reduction of labor participation at the bottom of the distribution which improves the average status of Turkish working women relative to Bulgarian female workers. Post-transition however, the gap went back up, caused primarily by the deterioration in labor market factors (Columns 1+3). This deterioration might also have to do with ethnic Turks at the bottom of the distribution returning to the labor market once the economic transition was complete.

#### **5.4 Changes in Labor Force Participation and Corrected Differentials**

The results of the decomposition in the previous section suggests that the stable levels of the overall ethnic earnings gap in transition (1993-2001) are due to the widening wage distribution at the bottom for the male Turks and the improved position of the female Turks in terms of valuation of their observed and unobserved labor market characteristics. A factor that may possibly contribute

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<sup>13</sup>In this period Turkish women also exhibit improved levels of their personal characteristics ( $X$ s) which slightly narrows the gap (-0.01). This improvement is mainly due to years of schooling.

to these changes is movements in the labor force participation rates for different demographic categories. For instance, an increase in participation of male Turks at the lower half of the wage distribution could account for the observed higher inequality at the bottom of the Turkish male wage distribution. Alternatively, a drop in participation of females at the bottom of the wage distribution could account for the improved status of the average Turkish female in 2003.

Table 10 presents participation rates for different demographic categories by ethnicity and gender in 1993, 2001 and 2007. The 1986 Town and Village Survey is excluded because labor participation under communism was obligatory, resulting in reported rates of 100%.

Table 10: Participation Rates for 1993, 2001 and 2007 by Ethnicity and Gender

	Participation		
	1993	2001	2007
All	0.658 (0.008)	0.599 (0.009)	0.715 (0.006)
Males	0.644 (0.011)	0.604 (0.012)	0.749 (0.008)
Females	0.675 (0.012)	0.594 (0.012)	0.675 (0.009)
Bulgarians	0.672 (0.008)	0.630 (0.009)	0.735 (0.006)
Turks	0.549 (0.026)	0.329 (0.026)	0.574 (0.019)
Male Bulgarians	0.650 (0.012)	0.629 (0.013)	0.760 (0.008)
Female Bulgarians	0.591 (0.034)	0.392 (0.037)	0.674 (0.024)
Male Turks	0.697 (0.012)	0.631 (0.013)	0.705 (0.010)
Female Turks	0.497 (0.038)	0.258 (0.035)	0.440 (0.030)

Overall labor force participation declined between 1993 and 2001 (0.66 to 0.60) and increased again in 2007 (to 0.72). Participation rates for males and females follow a similar trend during this period. Turks have consistently lower rates than Bulgarians across all years. Although the decrease in participation rates were larger in women compared to that of men for both ethnic groups, the substantial drop in Turks participation in 2001 is particularly notable, which is driven by the large reduction in female Turkish participation during this period. This could explain the significantly lower unadjusted and adjusted earnings gaps in 2001 that we observed in Section 5.1.



Table 11 presents regression results from a linear probability model (LPM) and a probit model on labor force participation, using as regressors the dummies for ethnicity and gender (and their interaction), marital status, number of children in the household, schooling, experience, rural occupation. We also include variables for residual household income (total household income net of labor earnings) and its interactions with gender and ethnicity.

Table 11: Participation Equations for 1993, 2001 and 2007

	1993		2001		2007	
	LPM	Probit	LPM	Probit	LPM	Probit
Turk	-0.051 (0.037)	-0.16 (0.11)	-0.086* (0.040)	-0.22 (0.11)	0.026 (0.025)	0.071 (0.086)
Female	-0.39* (0.19)	-1.27* (0.58)	-0.061 (0.092)	-0.17 (0.27)	-0.084 (0.076)	-0.28 (0.27)
Turk*Female	-0.36 (0.42)	-1.18 (1.21)	-0.68*** (0.20)	-2.44*** (0.71)	-0.37* (0.18)	-0.81 (0.61)
Years of Schooling	0.011*** (0.0031)	0.035*** (0.0097)	0.034*** (0.0034)	0.098*** (0.0100)	0.022*** (0.0016)	0.071*** (0.0057)
Experience (years)	0.035*** (0.0026)	0.10*** (0.0080)	0.018*** (0.0030)	0.048*** (0.0085)	0.026*** (0.0017)	0.081*** (0.0057)
Experience Squared	-0.00078*** (0.000049)	-0.0022*** (0.00015)	-0.00030*** (0.000067)	-0.00082*** (0.00019)	-0.00040*** (0.000034)	-0.0012*** (0.00012)
Rural	0.0039 (0.019)	0.0067 (0.059)	-0.11*** (0.020)	-0.30*** (0.057)	-0.063*** (0.015)	-0.24*** (0.052)
Log Res Household Income	-0.13*** (0.015)	-0.39*** (0.047)	-0.045*** (0.011)	-0.13*** (0.030)	0.0055 (0.0077)	0.040 (0.028)
Female*Log Res Household Income	0.047* (0.023)	0.15* (0.072)	0.011 (0.016)	0.028 (0.047)	0.0012 (0.012)	-0.0012 (0.043)
Turk*Female*Log Res Household Income	0.030 (0.053)	0.11 (0.15)	0.11** (0.037)	0.40** (0.13)	0.033 (0.029)	0.065 (0.096)
Married	0.11*** (0.025)	0.30*** (0.073)	0.072** (0.023)	0.20** (0.066)	0.069*** (0.016)	0.24*** (0.056)
Children	0.0022 (0.0099)	0.0048 (0.030)	-0.020 (0.011)	-0.055 (0.032)	-0.019* (0.0085)	-0.075* (0.031)
Constant	1.19*** (0.13)	2.17*** (0.40)	0.25*** (0.077)	-0.70** (0.22)	0.18** (0.055)	-1.20*** (0.20)
R-Squared	0.156		0.121		0.178	
Pseudo R-Squared	0.124		0.094		0.155	
N	3105		3077		5056	
Joint test for Turk & Turk*Female (p-val)	.23803		.00006		.09678	
	.19381		.00015		.33439	

\*\*\* denotes 1% significance level, \*\* 5% significance level, and \* 10% significance level.

In 1993, the coefficient of the *Turk* dummy and the interaction term *Turk\*Female* are insignificant in both specifications. Therefore, at the start of the transition there is no clear difference between the participation of Turks and the Bulgarians. However, the results show that under both specifications there is a significant reduction in the participation rates for Turkish women in 2001. This can be seen from the negative and jointly significant coefficients of *Turk* and *Turk\*Female*.

Towards the later part of the Bulgarian transition, in the late 2000s, there does not appear to be a statistically significant difference in participation rates between ethnic Bulgarians and ethnic Turks.

Another interesting observation is the differential responsiveness to residual household income across gender and ethnicity groups. From the point estimates of the variables *Log Res Household Income* and its interaction with *Female*, it appears that in 1993, females were less responsive than men in increasing participation when income falls. Indeed in 2001, the sum of the significant coefficients on residual income and its interaction with female Turks suggest that there was a small positive income effect for Turkish females. Given the declining status of Turkish males in 2001 which would have affected residual income of females, this positive income effects may have contributed to the decline of the Turkish female labor force participation during this period.

Using the probit estimated participation equations in Table 11, conduct a sample selection correction of the earnings equation estimations using the two-step Heckman (1979) procedure. The uncorrected and corrected conditional ethnic earnings gaps are presented in Table 12.

Table 12: Corrected Earnings Equations for 1993, 2001 and 2007

	Uncorrected			Corrected		
	1993	2001	2007	1993	2001	2007
Turk	-0.181*** (0.049)	-0.259*** (0.066)	0.0311 (0.035)	-0.212*** (0.055)	-0.303*** (0.071)	0.0226 (0.036)
Female	-0.269*** (0.022)	-0.326*** (0.024)	-0.304*** (0.017)	-0.284*** (0.025)	-0.321*** (0.026)	-0.290*** (0.022)
Turk*Female	0.132* (0.072)	0.344*** (0.10)	-0.111** (0.056)	0.0784 (0.083)	0.304*** (0.11)	-0.0901 (0.066)
Years of Schooling	0.0496*** (0.0041)	0.0460*** (0.0046)	0.0355*** (0.0023)	0.0550*** (0.0047)	0.0586*** (0.0089)	0.0341*** (0.0048)
Experience (years)	0.0282*** (0.0036)	0.0259*** (0.0042)	0.0188*** (0.0023)	0.0516*** (0.0069)	0.0339*** (0.0065)	0.0154*** (0.0059)
Experience Squared	-0.000643*** (0.000075)	-0.000529*** (0.000095)	-0.000417*** (0.000049)	-0.00114*** (0.00015)	-0.000653*** (0.00013)	-0.000362*** (0.000097)
Rural	-0.0736*** (0.026)	-0.0934*** (0.031)	-0.164*** (0.021)	-0.0551* (0.029)	-0.137*** (0.040)	-0.150*** (0.025)
Mills $\lambda$				0.336*** (0.084)	0.237* (0.14)	-0.0704 (0.13)
R-Squared	0.201	0.159	0.203			
Observations	2298	1928	3914	3105	3077	5056
No. of censored observations				1119	1257	1328
Joint test for Turk & Turk*Female (p-val)	.00083	.00024	.13334	.00017	.00009	.39553

\*\*\* denotes 1% significance level, \*\* 5% significance level, and \* 10% significance level.

The coefficients of the Mills ratio  $\lambda$  are significant in both 1993 and 2001, but not in 2007. Therefore, a selection into labor participation is very likely during the transition period, but selec-

tion diminishes post-transition. The positive signs of the  $\lambda$ -coefficients suggest that the error terms in the selection equation and the primary earnings equations are positively correlated. The unobserved factors contributing to participation would therefore be associated with higher earnings. Given the dramatic reduction in participation of the Turks in 1993 and 2001, the correction procedure is likely to magnify the conditional ethnic earnings differentials. Indeed, the corrected conditional ethnic earnings differentials seem to be larger than the uncorrected. However, these increases are not so large. In the case of males, the ethnic earnings differentials between Bulgarians and Turks rose by 3 percentage points in 1993 and 4 percentage points in 2001 after the correction. Since *Turk* and *Turk\*Female* are still jointly significant for the years 1993 and 2001 after the correction, the pattern in the corrected female ethnic earnings gap follows a downward trend which is in line with the results from Table 4: from an ethnic earnings differential of 0.13 in the early years transition years, to an almost negligible (but statistically significant) value of -0.001 in the late transition years and then to zero after the transition.

## 6 Conclusions

The unadjusted ethnic earnings differentials in Bulgaria almost doubled after the end of communism from 0.163 in 1986 to 0.311 in 1993. It plateaued towards the end of the transitional period when market forces became dominant. The dynamics of ethnic inequality adjusted for observable characteristics were similar, except in the post-transition period when the adjusted ethnic inequality disappeared. It appears that this was caused by better observable characteristics of working Turkish women. The large reductions in labor participation of female Turks seem to only partially account for these better characteristics.

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## Appendix: Details on the Ethnic Earnings Gaps

Table 13: Changes in Log Ethnic Earnings (Males+Females)

	Log of Bulgarian Earnings	Log of Turk Earnings	Ethnic Gap
1986	5.306 (0.005)	5.143 (0.015)	0.163
1993	7.648 (0.012)	7.337 (0.045)	0.311
2001	5.114 (0.013)	4.826 (0.077)	0.288
2007	5.861 (0.009)	5.601 (0.034)	0.259

Table 14: Changes in Log Ethnic Earnings (Males)

	Log of Bulgarian Earnings	Log of Turk Earnings	Ethnic Gap
1986	5.453 (0.006)	5.282 (0.020)	0.171
1993	7.750 (0.017)	7.386 (0.057)	0.364
2001	5.260 (0.018)	4.805 (0.113)	0.456
2007	5.977 (0.012)	5.743 (0.043)	0.234

Table 15: Changes in Log Ethnic Earnings (Females)

	Log of Bulgarian Earnings	Log of Turk Earnings	Ethnic Gap
1986	5.162 (0.006)	4.998 (0.020)	0.164
1993	7.538 (0.014)	7.268 (0.072)	0.271
2001	4.961 (0.016)	4.863 (0.077)	0.098
2007	5.714 (0.011)	5.309 (0.045)	0.405

**UNIVERSITY OF KONSTANZ**

Department of Economics

Universitätsstraße 10  
78464 Konstanz  
Germany

Phone: +49 (0) 7531-88-3713

Fax: +49 (0) 7531-88-3130

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