The Goodwill Effect? Female Access to the Labor Market Over Transition: A Multicountry Analysis *

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June, 2013

Abstract

This study evaluates quantitatively the context of gender discrimination in transition countries in terms of access to the labor market. Over economic transition female labor market participation has generally weakened. Notwithstanding, transition countries differ in institutional design, structural labor supply patterns, labor demand characteristics and the speed of transition processes. We propose to evaluate the contribution of these effects to the observed extent of gender discrimination. Using estimators of gender discrimination obtained from a panel of micro-datasets covering a possibly large set of transition countries, we seek determinants cross-country variation in gender discrimination in the the labor market. Empirical evidence suggest that while countries with generally higher female labor force participation are characterized by less discrimination, *ceteris paribus*, this pattern does not hold for the transition countries.

Key words: gender wage gap, transition, non-parametric estimates
JEL codes: C24, J22, J31, J71

1 Introduction

In a recent study Nopo et al. (2011) demonstrated large differentiation of gender discrimination world wide. Measures of the extent of discrimination (i.e. indicators accounting already for differences in endowments) ranged from 8% of male income to as much as 48% of male income. Other studies demonstrate as well that the extent of discrimination varies with time, even within one country only (Hoyos et al. (2010), Badel and Peña (2010) for Colombia, Atal et al. (2009) for Latin America in general, Lemieux (2006) for Canada, etc.). Admittedly, changes may follow from the implementation of the anti-discriminatory measures, but many suggest as well composition effects, cohort effects, cultural changes, etc. On the other hand, majority of the so-called transition countries started from a relatively equal position of working females. Over transition female labor market participation has been characterized by segmentation and frequently has also weakened - transition economies gradually observed decline in female labor force participation (FLFP) as well as - at least in some well documented cases - rise in discrimination, Munich et al. (2005a). The objective of this paper is to analyze the reasons for the differentiation in gender discrimination in transition economies.

If labor markets were perfect, differences in wages should reflect differences in productivities. Majority of studies analyzing discrimination - be it gender, racial or age related - rely on this observation attributing the so-called *unexplained* part of the wage differential to discrimination. Consequently, the quality of the *explained* significantly affects the reliability of findings. Various scholarly efforts to keep the explained part as refined as possible given the constraints of particular data sets. There is also an intensifying progress in conceptualizing research on gender inequality and labor markets, accompanied by more and more sophisticated analytical tools employed to adequately and reliably measure the extent

*Karolina Goraus and Joanna Tyrowicz are grateful to Julia Domagalik and Wojciech Hardy for their efforts in the data collection and management process. We gratefully acknowledge the suppor of Global Development Network research grant. Earlier version of this paper has received extremely valuable comments from Randy Filer, Tymon Sloczynski, Anna Baranowska and Joanna Swinska. The remaining errors are ours.

of gender discrimination, cfr. Olivetti and Petrongolo (2008), Picchio and Mussida (2011), Ñopo (2008). However, this makes international comparisons difficult.

We propose to evaluate the contribution of transition as well as other institutional to the observed extent of gender discrimination. Using estimators of gender discrimination obtained from a panel of micro datasets from possibly large set of transition countries over a possibly long horizon, we seek determinants cross-country variation in female access to the labor and in wages. The general objective of this research consists of providing an institutional economics analysis of the determinants of labor market gender inequalities in transition economies. Thus, we propose a two-stage approach, where in the first stage we develop measures of gender discrimination across countries. The second stage focuses on testing the validity of the institutional characteristics in explaining the variation in discrimination measures. While instrumenting would not be feasible in the case of this study, we rely on country fixed-effects estimators in the second stage, thus partially addressing the problem of endogeneity.

This study contributes to the understanding of gender discrimination in the context of transition in three major of ways. First, we offer comparable and reliable measures of gender discrimination and changes thereof in transition countries in terms of labor market participation and wages. Second, we provide evidence for the relevance of the institutional context on how gender discrimination has evolved across time in this region, in addition to human capital, structural and demographic factors. Finally, by comparing the transition countries to other European countries we show how the former still differ in gender discrimination, *ceteris paribus*. In fact, one of the most robust findings of this study suggests, that while Western European employers "get used to" female presence in the labor market, which translates gradually to less discrimination, this effect is virtually absent in Eastern Europe.

The paper is structured as follows. The next section presents some general statistics on females in transition countries labor markets in order to give further motivation to the focus on the institutional aspects. Section 3 discusses the available literature with the objective to present the advantages and disadvantages of various methods of measuring the gender discrimination. We also refer to the findings of a number of meta analyses in that field. In the next section we carefully describe the data and method used in this study. Since we use data from over 20 transition countries from various years, this section is particularly thorough and detailed. Finally, in section 5 we describe both the estimated discrimination indicators and the results of the second stage analyses. In the concluding section we provide some policy-oriented recommendations rooted in the findings of this study.

2 Females labor market position in transition economies

In general, centrally planned economies were characterized by relatively high participation rates, which frequently masked over-employment and inefficient use of labor. On the upside, however, job security implied little conflict of interest between family and professional obligations. Working hours were regular, while overtime was rare and compensated by additional free hours/days. The decline in participation rates was sharp and until today has not recovered in majority of the transition countries, yielding a trend opposite to the developments in Western European countries, Table 1. Indeed, while the trend is clearly growing in industrialized, while participation has been much higher in the transition countries and now the gap between these two groups of countries is widening.

Decrease in participation rate may reflect various processes. One hypothesis would state that centrally planned economies *forced* those unwilling to provide labor. With the collapse of *ancienne regime* households could finally chose preferred labor supply, lowering females' professional engagement. Consistent with this hypothesis would be relatively symmetric adjustment in the participation rates for men and women. Naturally, as evidenced by many studies, overall participation rates decreased as well in transition countries. However, the decrease was substantially stronger for females, at least in the early years of transition, Figure 1. Female labor force participation dropped from on average 85% that of men by roughly 5 percentage points. Subsequent recovery still places the transition countries slightly below the values observed for the advanced economies, while clear divergence in trends suggest that this pattern may continue to hold in the future.

Another hypothesis, consistent with the phenomenon of asymmetric adjustment in the participation rates for men and for women consists of structural change in labor demand. In the case of Germany, as demonstrated by Hunt (2002), decrease in measured gender wage gap occurred mostly due to

Table 1: Time trends in female labor force participation

	Total sample		Advanced European		Transition European	
Time	0.397***	1.002***	0.668***	1.161***	-0.443***	-1.421***
	(0.0365)	(0.149)	(0.0402)	(0.162)	(0.0456)	(0.224)
$Time^2$		-0.0209***		-0.0178***		0.0303***
		(0.005)		(0.006)		(0.007)
Observations	631	631	338	338	203	203
R^2	0.167	0.191	0.465	0.481	0.336	0.400
No of countries	42	42	18	18	15	15

Note: panel fixed effect robust estimator. Constant included. *Data source:* ILO. Transition: Albania, Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian, Slovakia, Slovenia, Ukraine. Advanced: Austria, Belgium, Denmark, Finland, France, E & W Germany , Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

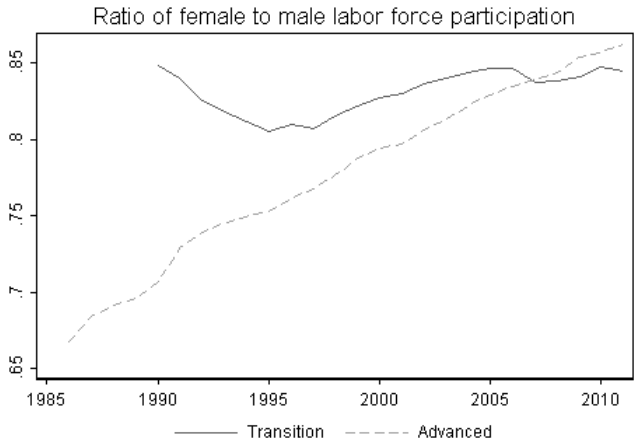

Figure 1: *Data source:* ILO, please refer to Table 1 for details.

composition effects, i.e. reduction in low-skill low-paid jobs for women and a substantial decrease in female participation rates. Massive labor reallocation, change in occupational and industry structure that the transition economies underwent implied need for considerable adjustment both in terms of ability of the workers to adapt to the new expectations of the employers and in terms of changing the way family and professional life are combined. While Hunt (2002) finds no role for the availability of child care facilities when comparing East and West Germany, such result is relatively rare. Brainerd (2000) for example discusses the erosion of the social position of women in a number of Eastern European countries, specifically due to less adaptability and less competitive approach to career. Similar conclusions are given by Adamchik and Bedi (2003), Grajek (2003) for Poland and Jolliffe and Campos (2005) for Hungary. Moreover, relatively high unemployment allows the employers to be more selective about job candidates, suggesting potential trade off between skills and flexibility. In fact, part time employment is generally lower for Central and Eastern European countries (CEECs) than for other EU Member States, while it also rarely serves the flexibility[1].

The changing fertility patterns and cultural norms seem to play an important role, although causality is not unidirectional. Figure 2 displays the patterns across countries and time in female labor force participation against tertiary educational attainment by females, share of households with children under 5 years of age and mean age of professionally active females. While education and aging clearly coincide with higher female LFP, the link to children requiring care is ambiguous and largely depends on a country situation. In fact, very high participation rates may be associated with the same share of households with young children as countries with very low professional activity among women. These correlations, however, give no grounds to inference. In the subsequent analysis, accounting for country

[1]For example, according to the OECD estimates, in Poland on average about 8% of part-time workers declare this form of employment allows to reconcile family and professional life, while over 20% declare they would rather have a full-time job.

fixed effects, which proxy mainly for cultural specificity and other slow changing societal features, we will inquire if these aspects coincide with the changes in the extent of discrimination.

3 Literature review

Our study is by far not the first to look at "gendered institutions" and gender discrimination in a wider selection of countries or across time. The literature in the field is vast and far from consensual on the factors driving gender wage gap differences across countries as well as their changes within country. For example, Blau and Kahn (2003) point to the importance of wage compression and *lowering* female fertility for reducing the wage gap between mid 1980s and mid 1990s, but already Blau and Kahn (2013) find that the *insufficient* expansion of family-friendly policies including parental leave and part-time work entitlements explains about a third of the decrease in US women's labor force participation relative to other industrialized countries. The gradual change in the findings result not only from the potential evolution of gender discrimination, but also from the data and the method. Other cross-country studies - e.g. Mandel and Semyonov (2005) using Luxembourg Income Study data - typically find family-friendly policies conducive to both reduction of gender wage discrimination and increase in female labor force participation, but they exacerbate horizontal segmentation, that is gender occupational inequality. Similar conclusions emerge from a meta-analysis by Weichselbaumer and Winter-Ebmer (2007), who argue that competition and equal treatment laws demonstrate a strong and robust link with the extent of gender discrimination in the labor market, while fertility rates and female activity rates seem to exhibit no robust correlation with the size of the gender wage gap estimates.

Gender discrimination seems to demonstrate time trends as well. In a meta-analysis Stanley and Jarrell (1998) find gradual decrease in gender discrimination measures. Similarly, Arulampalam et al. (2007) find lowering of the gender wage gap using European Community Household Panel (ECHP) data for all available EU15 countries, but nonetheless persistent differences across countries. Also Olivetti and Petrongolo (2008) confirm persistent and differentiated gender wage gaps along the whole distribution of earnings, both in Europe and in the US (using ECHP data and Panel Study of Income Dynamics)[2]. Finally, Nopo et al. (2011) employ World Bank micro-data for 63 countries of the world to explore gender wage gaps, finding huge cross-country and cross-continent heterogeneity, but only few common denominators of this heterogeneity.

The meta-analysis byWeichselbaumer and Winter-Ebmer (2007) is about the first study to - so to say - "rank" the relative importance of the so called formal against informal institutions in the context of gender discrimination, but the conclusions are far from satisfactory or sufficient from the policy-making perspective. In fact, authors emphasize that the estimates in the used papers differed in the quality of how rigorously and reliably was the empirical part performed, suggesting that their results should be interpreted with caution.

Studies devoted to particular countries or topics across countries reveal interesting phenomena, relevant from the point of view of gender discrimination in both access to the labor market and wages. For example Van Staveren and Odebode (2007) for Nigeria and Mabsout and Van Staveren (2010) find that informal bargaining power of women in the household is more decisive than actual formal status measures (e.g. educational attainment, wealth of parents, etc.) for determining access to household resources and participation in decision-making. Using data from Global Entrepreneurship Monitor Estrin and Mickiewicz (2011) find that female entrepreneurship aspirations are reduced if "gendered institutions" (e.g. freedom of mobility) are in place, while access to capital is typically reduced for female entrepreneurs, Estrin et al. (2011). In fact, new data set developed by Morrisson and Jutting (2005) demonstrates that from a gender equality perspective formal and informal institutions are often misaligned, while the most important single factor determining women's participation in economic activities outside the household are the social - not economic - institutions.

The context of transition from centrally planned economies to market-oriented ones is specific, Newell and Reilly (1997). In addition to the general concern about the gender discrimination, there are other strong forces affecting the labor market equilibrium. First, in nearly all countries transition was accompanied by an educational boom, with large proportion of (younger) labor force obtaining a

[2]Distribution effects are at the heart of analysis by Picchio and Mussida (2011), but this analysis comprises only Italy.

tertiary degree, Ammermueller et al. (2003), Denny and Orla Doyle (2005), Rutkowski (1996). Second, interplay between transition driven restructuring and globalization had large effects on both ownership and occupations/industries structure, in Eastern European countries. Finally, general trends in demographics and urbanization are under way, affecting both the demand structure and the supply characteristics. Despite seizable country and industry specific effects, Stockhammer and Onaran (2009), the main findings so far suggest unequivocally that inequalities grow, while changes in educational attainment explain considerable part of that change, eg. Garner and Terrell (1998). There is also a strong effect of human capital and factor market imperfections on household decisions regarding labor use and reallocation, Rizov and Swinnen (2004).

Over transition female labor market participation characterized by segmentation and weakened which yields grounds for greater gender discrimination than under planning. Gender differentials *emerge* in transition[3]. Indeed, as demonstrated by Munich et al. (2005a) for Czech Republic, one of the few countres for which the data permitted direct comparison, gender discrimination increased rapidly during transition. In a similar spirit Brainerd (2000) analyses household budget surveys for seven transition economies for the period *directly* before and after the introduction of the major economic reforms, utilizing the *quasi*-panel structure of the HBS data. She finds that while in general inequalities grew in this period, they changes affected women adversely, contributing to the widening of the gender wage gap. Similar evidence was found for Ukraine, Ganguli and Terrell (2005). In addition, some of the studies focusing on later phases of transition tend to find stable or even gradually decreasing gender wage gaps, e.g. Dohmen et al. (2008) for Russia, while the source of the discrimination is mainly sorting of workers (women are predominately assigned to lower-paid jobs) and not that much rewards themselves. In addition to sorting across occupations, also access to the labor market, Lauerova and Terrell (2002). Consequently, it seems that all these studies are likely to suffer from underestimation due to the selection bias.

While changes in gender discrimination have been observed, it is not clear from the theory of economics, why they should vary at all in one country. Typically, the literature in the developing countries suggest the relevance of long-term trends only, among which demographics[4] and skill biased technological change[5]. These changes may be reflected in "price" of education and experience (potentially also other individual characteristics) and not just the "quantity demanded". Thus returns could be altered with the time, while with the sorting of workers across genders one should expect differences in the extent of *unexplained* part of the wage differential after accounting for differences in characteristics. There is also some - though substantially weaker - argument in favor of cyclicality in the estimates of the wage regression. Wunnava and Honney (1991) for example argues that union-nonunion differentials vary across the business cycle, thus affecting the whole wage structure, but more recently Kandil and Woods (2002) advocate that cyclical behavior of aggregate wage owes a lot to the changes in employment composition. In fact, if the two effects cannot be adequately measured, they will result in varying wage regression coefficients, while sorting could lead to changes in gender discrimination. In addition to labor economics arguments, there are also institutional arguments. In particular, many of the analyzed countries, similarly to the developing economies, implemented or at least instated a number of anti-discriminatory measures. While Weichselbaumer and Winter-Ebmer (2007) suggests skepticism as to the effectiveness of such policies, this may be simply evidence that badly designed policies do not work - and not that a well designed policy could not work.

Summarizing, there is abundance of country-level studies which show the growth of gender discrimination in early transition and - at least in some cases - gradual moderation. However, due to methodological differences as well as low comparability of the periods analyzed, it remains unclear whether the phenomenon of moderation is general. Neither is it clear whether growth-decrease pattern

[3]For example of country level analyses see Trapido (2007) for Estonia, Latvia and Russia, Adamchik and Bedi (2003) for Poland, Pastore and Verashchagina (2006) on Belarus, Munich et al. (2005b) for Czech Republic on direct transition effects, Campos and Jolliffe (2002) on Hungary, Orazem and Vodopivec (1997) for Slovenia, Arabsheibani and Mussurov (2006) for Kazakhstan, Gorodnichenko and Sabirianova Peter (2005) compare Russia and Ukraine, Lehmann and Terrell (2006) analyse wage formation patterns for Ukraine.

[4]Cfr. Freeman (1979) and Stapleton and Young (1984).

[5]Cfr. Juhn et al. (1993), Card and DiNardo (2002), Lemieux (2006), Hansen (2007) and Andini (2007) among others. Belzil (2007) surveys empirical literature and finds no trend in education characteristics, but attributes differences across the studies to the dynamic *versus* static approach identified by the specification of the Mincerian equation employed by various researchers. This point is also raised by Blackburn (2007).

results from some form of overshooting in the initial labor markets adjustment. Maybe these are actually some formal or informal institutions that result in these changes. We attempt to answer these questions.

4 Method and data

The extent of discrimination is typically measured by the means of decomposition. The challenge lies in accounting for observable differences adequately, which in itself is not only a data issue, but also a conceptual issue. Namely, if we compared men and women actually "alike" in terms of all relevant observables, including hours effectively worked, commitment, talent, etc - differences in wages would probably still persist but could be considerably lower. Instead, the simplifications necessitated by the availability and the quality of data typically result in upward bias in the estimates of discrimination. This section discusses the reliability of the applied decomposition method and the data used in this study

4.1 How to measure gender discrimination?

Papers by Oaxaca (1973) and Blinder (1973) are among the most cited in labor economics, while the so-called OB decomposition is a standard tool in discrimination studies[6]. This technique requires the linear regression estimation of Mincerian earnings equations for both females and males. Based on the two earning equations - with or without Heckman (1979) correction - one can formulate a counter-factual, *i.e.* how much would one of the groups earn if it were compensated according to the same rules as the other. The difference in average wages between males and females is decomposed into two additive components: one attributable to differences in average characteristics of the individuals, and the other - to differences in the rewards that these characteristics have. This is the *unexplained* part of th wage differential, typically referred to as discrimination.

Inherently to the method, the reliability of the discrimination measure owes to the inclusion of all relevant productivity determinants and to the robustness of the coefficients. For example, a female accountant in a small tax consulting firm brings typically lower marginal revenue per hour worked than a male with the same formal qualifications working at an international consulting company, but the difference is naturally *not* due to genders. On the other hand, some groups of workers may be excluded - due to the discrimination - from some, better paying occupations or industries. Without accounting for the firm size in the first case, the discrimination measure would be biased upwards. However, addressing industries in the second case would result in underestimating the extent of discrimination. The second of the crucial prerequisites for the parametric decomposition to maintain reliability lies in the very structure of the wage regression: it has to be sensible. In a country where labor markets are segmented, discriminated groups may actually never combine the characteristics of others. Also, rewards to some characteristics may be largely unsystematic if the positively or negatively discriminated group is small

[6]A number of refinements was introduced, though. One direction of developments addressed the assumption that the male wage structure prevails also in the absence of discrimination. Decompositions based on different assumed reference wage structures are proposed by Cotton (1988), Neumark (1988), Oaxaca and Ransom (1988, 1994), and Reimers (1983). Neumark (1988) also suggested generalized method where, under certain conditions, the appropriate non-discriminatory wage structure can be obtained by estimating a regression over the pooled male-female sample. Then the observed wage differential can be decomposed into three components. First one is attributed to differences in characteristics between males and females, second component is due to differences between estimated parameters of wage regression for males and the pooled wage regression (this component is called a male advantage or male favoritism component), and the third part of raw wage gap differentials is attributed to differences between the estimated parameters of the pooled wage equation and the female wage equation (called female disadvantage or pure discrimination component). According to Oaxaca and Ransom (1994) vector of coefficients in non-discriminatory wage structure is defined as weighted average of coefficient vectors in male and female wage equations. The second direction of development recognizes that mean is not particularly fortunate in the context of wage regressions due to the skewness of wage distributions. Juhn et al. (1993) propose a decomposition at medians and other positional measures, while the expansion of quantile regressions contributed to even more refined treatment of discrimination along the entire distribution, Machado and Mata (2005), inverse propensity reweighing, DiNardo et al. (1996) or such sophisticated techniques as recentered influence function regressions, Firpo et al. (2007). Third, coefficients from a logit or probit model cannot be used directly in the standard OB decomposition equation. Fairlie (1999, 2005) suggested a method of decomposition, in which estimates from logit or probit models were used. This relatively simple method was described in the analysis of the causes of the black/white gap in self-employment rates. Bauer and Sinning (2008) have generalized the OB decomposition to other non-linear models and demonstrated how it can be applied to models with discrete and limited dependent variables.

and specific. Relying on estimated parameters in such cases may be misleading, thus undermining the reliability of what is then attributed to discrimination.

A partial solution to both problems has been proposed by Ñopo (2008), who employs one-to-one matching to address the segmentation and unreliability of estimated parameters. Comparisons of matched individuals allow to assure that only "similar" individuals are compared (male to female accountants of similar age, education, residence and family situation in small accounting firms separately from an international consulting company)[7]. The contribution of Ñopo (2008), however, was giving the interpretation outside what is typically called *common support*[8]. This decomposition allows to measure directly what part of the observed raw wage differential could be attributed to male workers being *different* from female workers.

In fact, Ñopo (2008) decomposition technique divides the gap into four additive elements, two of which are analogous to the elements of the Oaxaca (1973) and Blinder (1973) decomposition. The typical parametric decomposition requires $\bar{y}^F = \hat{\beta}^F \bar{x}^F$ and $\bar{y}^M = \hat{\beta}^M \bar{x}^M$, where $\bar{x}$ stands for average/median/percentile characteristics of respectively females and males, $\bar{y}$ denotes the same measure of wages, whereas $\hat{beta}$ refers to the rewards of individual characteristics. Raw gap $(\bar{y}^M - \bar{y}^F)$ may then be decomposed to $\bar{y}^M - \bar{y}^F = \hat{\beta}^M(\bar{x}^M - \bar{x}^F) + (\hat{\beta}^M - \hat{\beta}^F)\bar{x}^F$ or *vice versa*, depending on the wages of which group are supposed to be a *numeraire*: $\bar{y}^F - \bar{y}^M = \hat{\beta}^F(\bar{x}^F - \bar{x}^M) + (\hat{\beta}^F - \hat{\beta}^M)\bar{x}^M$. It is the observation that there are actually four components of the differential is what distinguishes Ñopo (2008) decomposition from an interpretation point of view. Relying on exact matching Ñopo identifies:

- the difference that prevails between the compensations of two groups of males: those whose characteristics can be matched to female characteristics and those who cannot (Δ_M)[9];
- the difference that prevails between the compensations of two groups of females: those whose characteristics can be matched to male characteristics and those who cannot (Δ_F)[10];
- part of the wage gap that can be explained by differences in the distribution of characteristics of males and females over the common support (Δ_X), which corresponds to $\hat{\beta}^M(\bar{x}^M - \bar{x}^F)$ limited to the common support; and
- part of the raw wage gap that remains unexplained by differences in characteristics of the individuals and is typically attributed to a combination of both the existence of unobservable characteristics that the labor market rewards and the existence of discrimination (Δ_A), identified to be the actual adjusted wage gap and consistent with $(\hat{\beta}^M - \hat{\beta}^F)\bar{x}^F$ but only within the common support.

Three components in Ñopo decomposition can be attributed to the existence of differences in individuals' characteristics that labor market rewards $(\Delta_M, \Delta_F, \Delta_X)$. The final component (Δ_A) differs from zero if and only if the remaining three are unable to capture the wage differentials, i.e. discrimination and potentially identification (i.e. all the variables that should affect labor market performance of men and women differently but cannot be observed or measured adequately). This interpretation is consistent with the traditional OB decomposition.

Despite the obvious advantages, Ñopo decomposition has also clear disadvantages. For example, the choice of exact matching - as justified as it is - implies that the inclusion of large number of "explanatory" variables may swing the results considerably between Δ_A and $\Delta_M + \Delta_F$. This is illustrated by an example from one of the analyzed countries, Table 2. Depending on how many variables *at the same time* are taken into consideration, the percentage of males and females for whom a match was not found is substantially increased. While there is little change in the key measure of interest (Δ_A), the sign and the size of $\Delta_M + \Delta_F$ vary considerably.

[7]The assumption of Rosenbaum and Rubin (1983) about the "ignorability of treatment" required for propensity score matching is not likely to be satisfied in case the gender is perceived as "treatment". Thus matching individuals in Ñopo is based on characteristics, not propensity scores.

[8]Ñopo (2008) was not the only to use propensity score matching to measure discrimination. For example, Pratap and Quintin (2002) employed PSM to measure wage differences between the formal and informal sectors in Argentina.

[9]Technically, computed as the difference between the expected male wages out of the common support minus the expected male wages in the common support, weighted by the probability measure (under the distribution of characteristics of males) of the set of characteristics that females do not reach.

[10]Computed as the difference between the expected female wages in the common support minus the expected female wages out of the common support, weighted by the probability measure (under the distribution of characteristics of females) of the set of characteristics that males do not reach.

Table 2: Choice of variables and results - example

Controls	Δ	Δ_A	Δ_M	Δ_F	Δ_X	% M matched	% F matched
Demographic variables	10%	20%	0%	0%	-10%	99%	97%
+ **Occupation category**	10%	20%	0%	0%	-10%	96%	93%
+ **Industry category**	10%	20%	-1%	-1%	-9%	92%	92%
+ **Private employer**	10%	21%	0%	-1%	-10%	99%	95%
+ **Tenure above median**	10%	21%	0%	-1%	-10%	99%	95%
All variables at once	10%	19%	-2%	-1%	-6%	**65%**	**74%**

Note: Computations for annual data sets from Polish LFS data. Demographic variables comprise age, education and residence. Occupation coded following ISCO. Industry coded following NACE. Private employer dummy for non-public ownership of the firm. Tenure above median dummy for overall tenure above the median in the sample in each year.

Ñopo (2008) decomposition thus allows to quantify the role structural mismatch between occupational and industry structure between genders in the gender wage gap. The actual measure of discrimination is taken "net" of these effects. Hence, it is superior to a number of parametric approaches, which - at best - account for differences in the participation correction following Heckman (1979). Yet, the measure of discrimination remains partially susceptible to the choice of matching variables. As is customary in the empirical analyses, it is only as reliable *ceteris paribus*. We can never be sure that - for example - women do not seek on average jobs characterized by lower wages and higher job security or other in-work benefits which are not reflected in wages. In the next section we describe carefully the data sets and the variables, justifying some choices necessary to maintain international comparability of the results.

4.2 Data

The objective of this study is to cover the process of economic transition from centrally planned to a market economy. We thus aimed to collect data for as many as possible countries from Central and Eastern Europe and former Soviet Block. Acquiring reliable data sets for early transition is not an easy task, though. Most of these countries had no reliable labor force surveys (LFS) in the first years since transition. In addition, LFS data frequently do not comprise data on compensation and household structure. While the former prevents computation of wage gap only, allowing to obtain estimates of the participation gap, the latter poses a more important obstacle. Namely, without the information on small children in the household, understanding whether female inactivity is the matter of choice or necessity is less reliable.

We use data from national censuses (acquired from Integrated Public Use Microdata Series International), International Social Survey Program, Living Standard Measurement Surveys of The World Bank and national labor force surveys. In order to provide a benchmark for transition countries, we also include data from European Community Household Panel. Finally, data for some of the transition countries come also from the European Union Labor Force Survey. Table 3 describes in detail the source of data and period for each of the analyzed countries.

National Labor Force Surveys and EU LFS. As evidenced by Stanley and Jarrell (1998), studies based on LFS type of data are characterized by lower publication bias. Availability of relatively high quality data on hours actually worked implies hourly wages may be computed with higher precision, thus resulting in lower bias due to inadequate treatment of part-time or overtime. However, without access to household roster, accounting for the household structure is impossible, which prevents taking good account of asymmetric labor supply decisions by men and women in the presence of small children in the household. We use LFS data for Croatia for years 1997-2008[11] and for Poland for years 1995-2010. In the case of Poland children and their age may be accounted for in the matching procedure. In addition, for Germany we also use German Socio-Economic Panel data for 1985-2008.

EU LFS is a data set compiled by the Eurostat on the basis of Member States LFS. The definitions for key variables are standardized across countries, but in that process self-reported wages are removed

[11] In 1999 the data for wages are missing.

from the data sets and replaced by coding for the deciles of the income distribution. While household structure is available in the EU LFS, this data may only be used for the analyses of the participation gap. The advantage of the EU LFS data is that it comprises data for UE Member States even prior to their joining. For example the data for countries like Romania and Bulgaria, which only joined the EU in 2007, are comprised in the EU LFS already for 1995.

Census data. Integrated Public Use Microdata Series International project at the University of Minnesota aims to collect data such as census for many countries of the year and make it available for research in possibly standardized form. Currently it comprises data for abut 63 countries from roughly 200 censuses. While these are large population data sets, they rarely comprise information about income and actually none of the transition countries available in IPUMS-I has posed income questions in their censuses. Nonetheless, this data is rich in information about household structure, thus permitting high quality analysis of the participation gap. We use IPUMS-I as source of data for Armenia, Belarus, Hungary and Romania (both even prior to the transition) as well as Slovenia.

Living Standards Measurement Survey. Developed by The World Bank, LSMS is a standardized a household budget survey with a number of modules in the questionnaire relating to the household structure, demographics, educational history, labor market status and wages. While LSMS is coordinated by The World Bank, it is usually implemented by statistical offices from the beneficiary countries. This implies some doubts concerning both the quality of the data (e.g. many missing values) and representativeness of the sample. Notwithstanding sample sizes for small countries benefiting from the LSMS program comprise about 10 000 observations, while in some cases the number of observations exceeds 30 000 individuals. LSMS data were used for Albania, Azerbaijan, Bosnia, Bulgaria, Kyrgyzstan, Serbia and Tajikistan. For Bulgaria data from LSMS are cross-checked with the EU-LFS data.

European Community Household Panel. Developed by the Eurostat, ECHP was a European level equivalent of the household budget surveys in Member States. In principle it contains high quality data on both household structure and earnings, but some relevant data are missing (e.g. coding for urban/rural residence in some countries). This study was done among the EU Member States between 1994 and 2001 and was subsequently replaced by European Union Statistics on Income and Living Conditions as of 2003 for only six Member States, with other countries joining in later years. Since the focus of our study is on transition countries, many of whom were already EU Member States by the moment of joining EU-SILC, this last data set was not acquired for our study. ECHP provides about 110 data points for the "benchmark" group of 15 EU Member States in the 1990s.

International Social Survey Program. It is a voluntary initiative for countries world wide to collect data for social sciences research. The focus of this study is on attitudes and beliefs, but the survey contains an internationally comparable roster with demographic, educational, labor market and household structure information. While it is not customary to use such data in labor market analyses, these particular data sets have numerous advantages. First, they are available for transition countries already in early years after the collapse of the centrally planned system. For some of the transition countries it is available already pre-transition, whereas Poland, Russia and Slovenia may be acquired as of 1991. Sample sizes in ISSP are much lower than in labor force or household surveys, LSMS, let alone census data. However, ISSP data was already used for gender discrimination analyses, cfr. Blau and Kahn (2003).

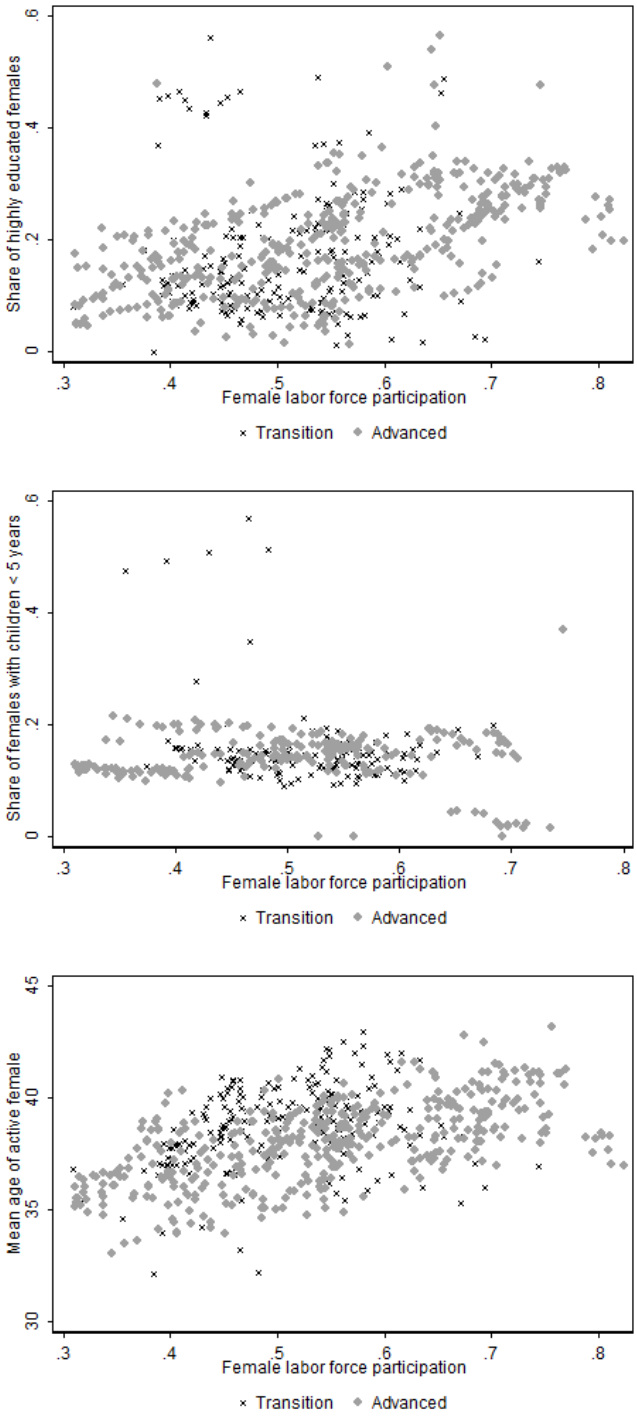

Figure 2: Correlates of female labor force participation rates. *Data source:* please refer to Table 3 for details.

Table 3: Countries and periods covered with data sources

Country	LFS	EU LFS	Census	LSMS	ECHP	ISSP
	Transition countries					
Albania				2002-2005		
Armenia				2001		
Belarus			1999			
Bosnia & Herzegovina				2001-2004		
Bulgaria		2000-2008		1995, 1997, 2001, 2003		1993-1995
Croatia	1997-2008					
Czech Republic		1998-2008				1993-1995
Estonia		1997-2008				1992-1995
Hungary		1997-2008	1970, 1980, 1990, 2001			1989-1995
Kyrgyzstan				1993, 1996-1998		
Latvia		1998-2008				1995
Lithuania		1998-2008				1995
Poland	1995-2010	1997-2008				1987, 1991-1995
Romania		1997-2008	1977, 1992, 2002			
Russia						1991-1995
Serbia				2002-2004, 2007		
Slovakia		1998-2008				1995
Slovenia		1996-2008	2002			1991-1995
Tajikistan				1999, 2003, 2009		
	Benchmark countries					
Austria		1995-2008			1995-2001	1989-1995
Belgium		1992-2008			1994-2001	
Denmark		1992-2008			1994-2001	
Finland		1995-2008			1996-2001	
France		1993-2008			1994-2001	
Germany	1985-2008*	2002-2008			1994-2001	1989-1995
Greece		1992-2008			1994-2001	
Ireland		1999-2008			1994-2001	1989-1995
Italy		1992-2008			1994-2001	1989- 1995
Netherlands		1996-2008			1994-2001	1989-1995
Norway		1996-2008				1989-1995
Portugal		1992-2008			1994-2001	
Spain		1992-2008			1994-2001	1993-1995
Sweden		1995-2008			1997-2001	1994-1995
Switzerland		1996-2008				1987
UK		1992-2008			1994-2001	1989-1995

* identifies German Socio-Economic Panel.

In total, we acquired over 600 data points (countries/source/years) of which about 200 are for transition countries and the reminder form a control group of Western Europe over the past 40 years. Indeed, female labor force participation is highly dispersed in our sample, with values ranging from about 20% to as much as 80%, Figure 3. The discrepancies for the participation rates between data sources do not exceed 2 percentage points and are consistent with the range of discrepancies reported by International Labor Organization in the Key Labor Market Indicators database. Typically, participation rates for both genders are higher in the census data than in other surveys, which may suggest that active individuals are underrepresented in labor force or household budget surveys as well as other types of survey studies.

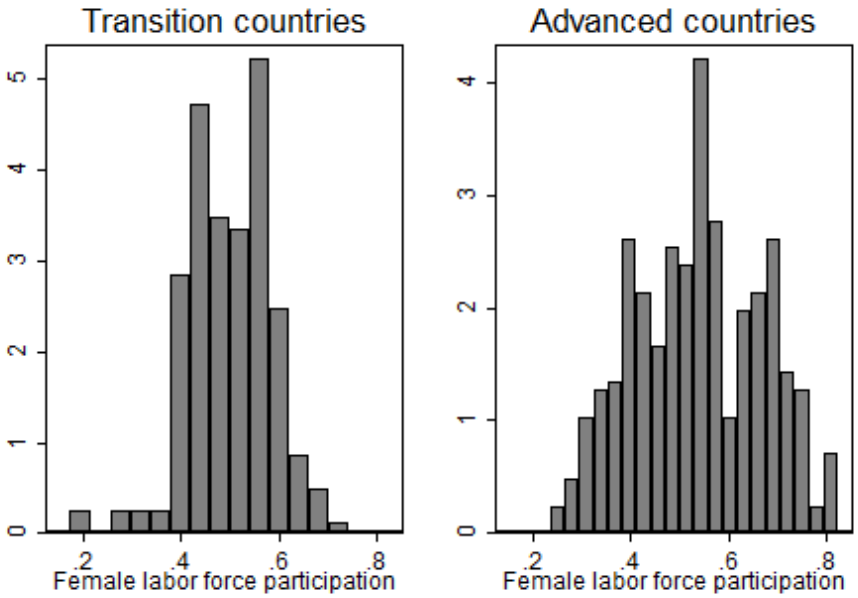

Figure 3: *Data source:* please refer to Table 3 for details.

Given the multiplicity of the data sources, some compromise was necessary as to which variables are used for matching. Ñopo (2008) suggests age, education, marital status and urban/rural identification are sufficient to adequately capture gender wage gap in the matching procedure. There is two arguments in support of this choice. First, industry of employment is much more of a "choice" variable than demographics, already acquired education and residence. One could expect them to be much more labile and to the same extent influencing the gap as being influenced by them. Second, as evidenced by Table 2 the inclusion of job specific characteristics in itself does not change substantially the adjusted wage gap (the unexplained part of the wage gap), while it lowers substantially the share of population that falls into the common support. This does not undermine the reliability of the gender gap measure, but hazards its external validity.

We extend the selection of variables suggested by Ñopo (2008) to comprise additionally information on children under the age of entering into the compulsory educational system in the household as well as occupation. The rationale for such choice is the following. First, it is typically females' obligation to take care of children until the school age, while the availability of kinder-gardens or other forms of institutionalized care is typically lower in transition countries than in Western Europe. This implies that presence of children may affect both participation and wage expectations of men and women differently even after the phase in which it is biologically justified. Second, for occupation, transition constituted a considerable shock for majority of population. Educational and occupational choices were made under the centrally planned system. Training system was not developed in majority of these countries, while educational boom in some of the transition countries was oriented on young cohorts rather than re-skilling. Thus, occupational mobility required considerable individual effort and could be considered much less labile than in the case of mature market economies.

Following Ñopo (2008) and Huber et al. (2010), all continuous variables were recoded to categorical variables. This concerns age (age groups were formed) and residence (multiple categories with different reference levels were universally recoded to urban/rural dummy). Also, when available, years of education are recoded to a categorical variable with three levels: tertiary or above, primary and below and any secondary. This choice was dictated by data availability - more refined categorization would not be feasible for some countries. Marital status used in matching takes two values (in relationship and single, regardless of reason). As described by Ñopo (2008), all these categorical variables are in fact interacted because this procedure allows exact matches only.

The outcome variables in this study comprise participation and hourly wage. Participation is computed as a dummy for all working individuals. Hourly wage is available for less countries/source/years, but has a much clearer interpretation: if individuals work, it is unlikely that they *want to* earn less due to gender, *ceteris paribus*. With the natural constraint that economists generally *attribute* to discrimination whatever part of variation that cannot be explained by the model, it is straight forward to assume that any wage gap adjusted for differences in endowments indicates discrimination. On the other hand, individuals may actually be unwilling to supply more work or any work at all. Then, lower female labor supply does not necessarily imply more discrimination in access to the labor market but a choice to remain inactive. However, the scope of this analysis comprises transition countries, where participation rates generally dropped and unemployment grew rapidly. Considerable body of empirical evidence suggest that at least in some countries unemployment hit females adversely more heavily than males, while female labor force participation rates decreased by more than those of males. These observations seem to suggest that, at the very least, a part of the observed not-working was involuntary.

5 Results

Our approach in this study consists of two steps. First, we compute comparable measures of gender discrimination in terms of labor market participation and in terms of wages (Δ_A). These estimates are obtained by the means of the Ñopo (2008) decomposition. Subsequently, participation gap estimates and wage gap estimates are used as explained variables, whereas country characteristics play the role of the explanatory variables. This way we aim to identify the correlates (better yet: determinants) of the stark differentials in measured Δ_A. To exclude the role of the cultural issues we employ country fixed effects. On the other hand, as discussed earlier, data sources differ substantially across countries and periods. To make sure that the results are not driven by these differences, we include also fixed effects for data sources.

The multiplicity of data sources allows to cross check the reliability of the estimates for participation and wage gaps. Should the estimates for the same year and the same country differ substantially depending on the source, we could get some intuition on the bias in respective data sources. This is not the case. In fact, the correlation between the estimates of the gender gap and its components for a country in a given year is high across the data sources. This observation is true even for extremely high or extremely low values of the gaps. For example, Spain in mid 1990s is characterized by a raw participation gap of over a 100%, but these estimates are consistent across all three sources of micro-data sets for this country.

Over more than 600 country/source/year sets we analyzed, mean percentage of matched men amounts to 99% for the participation gap and 71% for the wage gap. Similar values are achieved for females, Table 4 summarizes the estimated gender gaps. However, there are some cases where the percentage of matched males and females was extremely low. This is a consequence of including occupation in the matching procedure. In fact, it seems that there are few exceptional cases, where occupations held by males and females are strikingly different, Figure 4. These are Albania and Tajikistan as well as a number of countries in the ISSP data sets. The case of ISSP follows from the fact that in some years occupation question was open to the interviewees and subsequently recoded. It seems reasonable that individuals gave diverging answers for the same occupations, regardless of gender. Instead of removing these observations from the sample we decided to run two separate specifications: for a total sample and for a sample where percentage of individuals matched exceeds 30%, which in fact implies matches exceeding 60% in most cases.

Figure 5 demonstrates further the differentiation in the adjusted gaps for both participation rates

Table 4: Summary statistics of the matching

	% matched males	% matched females	raw gap	Δ_M	Δ_F	Δ_A	Δ_X
	Participation gap, N=628						
Mean	99%	99%	34%	0.2%	0.2%	16%	-1%
Minimum	81%	60%	-7%	-14%	-26%	0.5%	-16%
Maximum	100%	100%	138%	25%	7%	43%	36%
	Wage gap, N=187						
Mean	71%	77%	18%	2%	1%	15%	0.3%
Minimum	2%	3%	-6%	-60%	-55%	-90%	-37%
Maximum	99%	99%	138%	111%	74%	62%	51%

Note: Raw gap signifies the percentage of raw wage differential (not accounting for differences in endowments). Δ_M denotes the difference that prevails between the compensations of two groups of males: those whose characteristics can be matched to female characteristics and those who cannot. Δ_F denotes the difference that prevails between the compensations of two groups of females: those whose characteristics can be matched to male characteristics and those who cannot. Δ_X denotes part of the wage gap that can be explained by differences in the distribution of characteristics of males and females over the common support. Finally, Δ_A part of the raw wage gap that remains unexplained by differences in characteristics of the individuals and is typically attributed to a combination of both the existence of unobservable characteristics that the labor market rewards and the existence of discrimination.

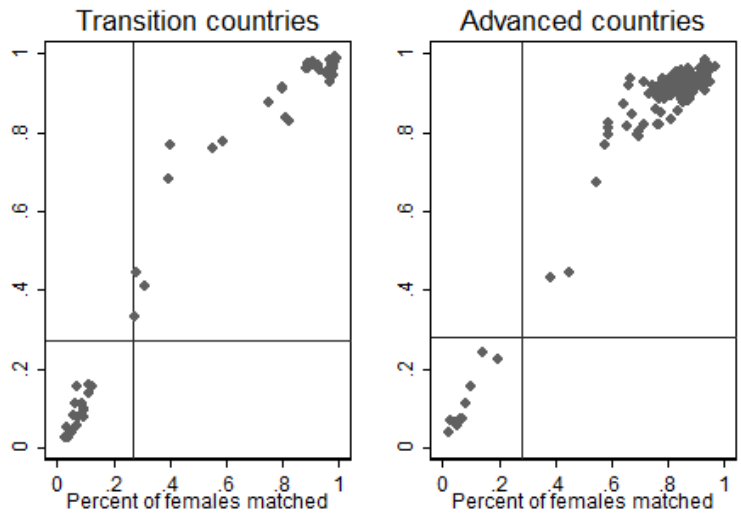

Figure 4: The percentage of individuals matched for the wage gap in each sample.

(left) and wages (right). Indeed, the distributions are wide spread, but display also that adjusted participation gaps are in fact lower in transition countries than in the advanced European economies. On the other hand, adjusted wage gaps seem lower and more condensed around 10% in the benchmark countries. Since the density distributions do not display time effects, there is no discrepancy between these graphs and the results of Table 1 and Figure 1. In fact, as suggested by Figure 6, there seems to be a clear negative correlation between FLFP and the adjusted participation gap, whereas there is no such link for the adjusted wage gap[12].

In analyzing the determinants of the differentiation in the gender participation gap as well as gender wage discrimination we will focus on the transition context. To this end, we will use three types of measures. The first one is just a measure of years from transition. It is blind to the way transition processes were implemented across countries. For the advanced European economies "zero" time was set to 1945. For the transition countries, the exact date of transition was chosen based on the formal change in government, usually identified with originating the new state. The detailed list of these dates is presented in Table 5. The second measure relies on the EBRD Reform Index. This measure consists of a

[12]Please, note that adjusted participation gap is measured actually in percentage points, so the absolute participation rate plays no role for establishing the extent of discrimination.

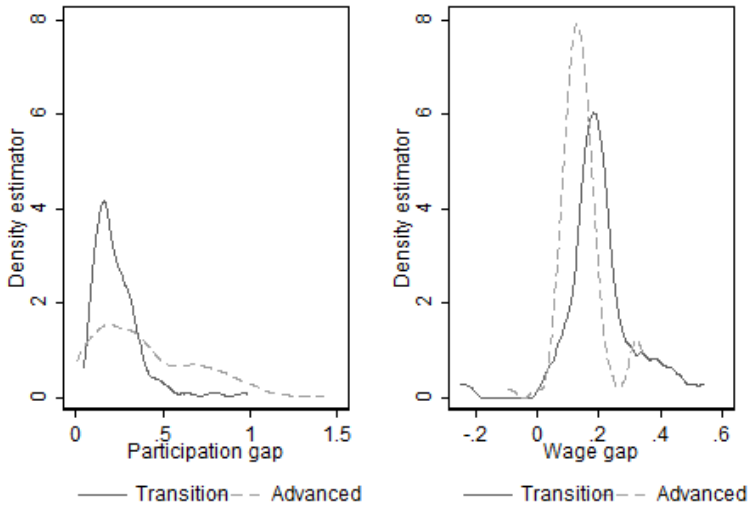

Figure 5: Adjusted participation gaps (left) and wage gaps (right)

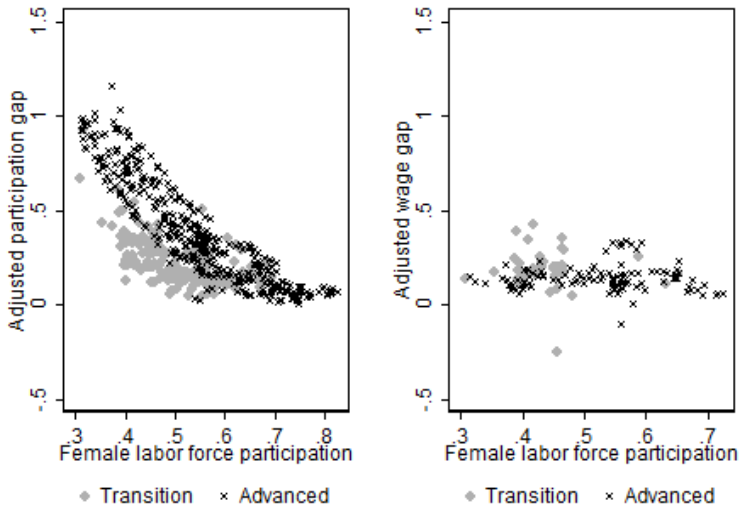

Figure 6: Female participation rates and adjusted gaps.

number of indicators measured on a scale from 1 (little or no progress in reform) to 4 (major advances). We chose the aspects of transition relevant for the labor market, i.e. privatization and enterprise restructuring. Finally, as a third measure we use Women's Economic Rights index and Women's Social Rights index of the Cingranelli-Richards (CIRI) Human Rights Dataset. These indicators measure a country's gender-related social and economic (wecon) policy contexts. Each country-year is coded from 0 (no rights for women in law and systematic discrimination based on gender may have been built into law) to 3 (all or nearly all of women's rights were guaranteeed by law and the government fully and vigorously enforced these laws in practice).

Clearly, components of the EBRD Reform Index and CIRI womens' economic and social rights indices are correlated, which prohibits parallel inclusion in the regression. Apparent multicolinearity undermines the reliability of the standard errors. Indeed, the correlation between womens' economic and social rights amounts to 71% in our sample, whereas for the privatization and restructuring it is 84% for large privatization and restructuring and additionally 86% between small scale privatization and restructuring, all highly statistically significant. Thus, we include these variables one by one. This choice has also an advantage of maintaining the sample size possibly large. EBRD and CIRI data are

Table 5: Transition timing

	Year of transformation	No. of country/sets
Albania	1992	4
Armenia	1991	1
Bosnia & Herzegovina	1993	4
Bulgaria	1991	16
Croatia	1992	13
Czech Republic	1989	14
Estonia	1991	12
Hungary	1989	25
Kyrgistan	1992	4
Latvia	1991	12
Lithuania	1991	11
Poland	1989	32
Romania	1990	15
Russia	1991	4
Serbia	1993	3
Slovakia	1989	12
Slovenia	1991	18
Tajikistan	1992	3

Data source: please refer to Table 3 for details.

only available for a limited number of countries - including them all at the same time would reduce the sample size to less than 200 observations, contributing to lowering even further the power of all the $t-tests$.

Table 6 discusses the results for the **adjusted participation gap**.In the first column we compare OLS with fixed effects for the countries and data sources to an estimation where countries and data sources fixed effects are separate. The absorption regression specification absorbs country fixed effects while in the model includes characteristics for the type of the data source (these are specific sample size and the percentage of matched individuals, both men and women). The panel fixed effects specification assumes in fact that ECHP in Belgium and in Portugal are inherently different effects, while the absorption regression allows for common estimation of effect of sample size and sample quality. Given that the obtained results are qualitatively and quantitatively consistent, absorption regression is a more efficient one and thus is preferred in the subsequent estimations.

The adjusted participation gaps seem to decrease with the time, and the effect is stronger among the transition economies, *ceteris paribus*. However, overall this rate is increasing, while it "goes back" to linear among the transition countries. This finding has relatively clear interpretation in the context of the changes in the participation *per se* as discussed in Table 1 and Figure 1. The observed divergence in trends seem to be associated with structural factors much more than labor market preferences and/or access to the labor market by females in the transition economies Clearly, our data set has more observations for more recent periods in the transition countries - in many cases early transition could not be captured due to the lack of data. These findings seem to suggest, however, that these are the gradual structural factors that stand behind the changes in the female labor force participation.

Consistent with this interpretation, EBRD measures for the speed of reform in privatization and enterprise restructuring remain insignificant. Because EBRD only publishes the values of its Reform Index for a selection of countries, sample size is reduced to about 200 observations. However, the standard errors are in fact large when compared to the estimated coefficients, so this result does not seem to be driven by lower sample size.

As we discussed earlier, this gap does not have an immediate discriminatory interpretation because lower female labor supply may reflect preferences rather than constraints. In fact, countries with greater educational attainment, consistent with higher aspirations among females, are typically characterized by slightly lower adjusted output gaps (note, that the gap adjustment accounts for potential differences in the education between men and women). The size of this effect estimated with country/set fixed effects in a panel robust OLS is smaller than when country and data source fixed effects are accounted for separately. Lower participation among young women combined with aging tends to be associated with higher adjusted participation gap but this effect disappears in transition countries, while it does

not seem to be the problem of test power only - the estimated coefficient is about half smaller than in the estimations where all countries are considered. Also intensity of having small children leads to higher gap in a total sample, but is statistically insignificant among the transition countries. This variable has been defined as a share of females who report at least one child under the age of 5. Thus, in fact it distinguishes women having any children requiring immediate care from those who can be more flexible. While insignificance among the transition countries seems counter-intuitive, it does not seem to be a statistical artifact - it is the size of the estimated coefficient which gets substantially reduced, not the sample size problem.

The results are different for the gender wage discrimination, as presented in Table 7. As discussed earlier, there specifications are more reliable if only the cases where percentage of matched individuals is high. The first three columns compare the stability of the results to the inclusion of the observations with low match. Indeed, qualitatively results are similar, but the precision of the estimations as well as the R^2 increase if the less reliable cases are excluded. We thus treat that as our preferred specification (Table 8 in the Appendix presents the estimations for the whole sample). Similarly to the case of participation gap, also for the wage discrimination we compare the OLS with the fixed effects for the country and data source to an absorption regression with country fixed effects and controls for the sample characteristics. Again, qualitatively the results are consistent, while the absorption specification is characterized by more precision.

In general discrimination, as measured by the **adjusted gender wage gap**, decreases with time at a decreasing rate. This effect does not hold for the transition countries, though. The point estimators for the interaction between the transition dummy and time are almost exactly the opposite to the estimators for the whole sample. This would suggest that the discrimination is fairly stable during the transition. Educational attainment is insignificant, unlike in the participation gap estimation. This could suggest that education is a proxy for the willingness to be active at all, but once active, has little or no effect on the differentiation in wage discrimination. Mean age of active females is only statistically significant in a specification with all the variables, including the cases were few individuals were matched. On the contrary, the presence of small children drives the gender wage gap up significantly and considerably. The point estimator 4, which would translate the change from having on average 1 child to having on average two children to about 4 percentage point increase in the gender wage gap, *ceteris paribus*. Given that the average discrimination score is about 17%, that would imply a 25% increase. Please, note that matching was performed on wages adjusted for hours so this large result is not part-time employment in disguise.

High female labor force participation rates tend to be associated in general with substantially lower discrimination. We refer to this as the "good will effect". For one thing it is harder to effectively discriminate against a relatively larger group. For another, the higher the female participation rates in general, the more employers have actual experience of employing women at different positions. This experience could result in lowering taste discrimination. Finally, more employed women implies also more women deciding about wages of the others. Assuming women are characterized by less taste discrimination against women, the negative, statistically significant and large result is expectable. In fact, inclusion of this variable boosts the R^2 by as much as 10 percentage points. However, this effect is opposite and of even larger magnitude in transition economies. What is even more, this result does not disappear with the inclusion of additional control variables, including womens' economic and social rights indicators by CIRI. In fact, it is increasing, suggesting that CIRI indicators may be less adapted to actually capture the situation in the transition countries. The point estimators for the interaction between the transition dummy and the female labor force participation actually increase in the specifications which account for the EBRD reform index, but the decrease in the precision of the estimates is reduced substantially, yielding large but insignificant coefficient.

The role of the reforms seems to be consistent with what the earlier literature suggested. In fact, more intensive privatizations are associated with higher discrimination. Indeed, it seems that "markets value females less than central planners" as suggested by Munich et al. (2005a). Surprisingly, higher female empowerment is associated with more discrimination. This result is puzzling. Countries with more discrimination and higher educational attainment tend to be the front-runners in terms of designing and implementing legal solutions effectively preventing higher discrimination. For example, Sweden and the Netherlands have decided to implement a number of new features in labor codes facilitating

greater female labor force participation and less discrimination. These countries actually exhibit negative adjusted wage gaps for women in some years. Perhaps, the answer could come from inadequate design of "gendered institutions", especially in transition countries. One such example could be the treatment of the maternity leaves. In majority of the Nordic countries, maternity leave is in fact parental leave implying that both men and women will be absent from work. This makes employers less prone to preferring male workers for rational reasons. In many of the transition countries, though, parental leave is in fact a maternity leave, creating another reason why rational employer may prefer male workers.

Table 6: Adjusted participation gap

Adjusted participation gap (in pp)	FE OLS	AREG	Positive gap only	EBRD evaluated			All	All	EBRD evaluated
Year from transition	-0.0034***	-0.005***	-0.005***	-0.005*	-0.007***	-0.008***	-0.006***	-0.004**	-0.002
	(0.0007)	(0.0007)	(0.0007)	(0.0031)	(0.0030)	(0.0026)	(0.0022)	(0.0023)	(0.0038)
squared	0.0002***	0.0002***	0.0002***	0.0002**	0.0002***	0.0002***	0.0002***	0.0002*	0.000
	(0.00001)	(0.00001)	(0.00001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
x Transiton	-0.0037***	-0.007***	-0.007***	-0.011	-0.003	-0.000	-0.007***	-0.008***	-0.011
	(0.0015)	(0.0013)	(0.0013)	(0.0314)	(0.0301)	(0.0305)	(0.0025)	(0.0026)	(0.0334)
squared x Transition	-0.0002***	-0.0002***	-0.0002***	-0.0002	-0.0002	-0.0002	-0.0002**	-0.0002	-0.0002
	(0.00003)	(0.00003)	(0.00003)	(0.0003)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0003)
% of females with tertiary education	0.1650***	0.163***	0.132***	0.124*	0.138**	0.126*	0.161***	0.177***	0.079
	(0.0533)	(0.0498)	(0.0500)	(0.0801)	(0.0818)	(0.0816)	(0.0522)	(0.0522)	(0.0920)
Mean age of active females	-0.0029***	0.004***	0.004***	0.002	0.002	0.002	0.004***	0.004***	0.002
	(0.0014)	(0.0013)	(0.0013)	(0.0020)	(0.0020)	(0.0020)	(0.0013)	(0.0013)	(0.0020)
% of HH with children <5	0.0273*	-0.115***	-0.120***	-0.004	-0.002	-0.002	-0.119***	-0.127***	-0.048
	(0.0173)	(0.0159)	(0.0158)	(0.0354)	(0.0354)	(0.0353)	(0.0163)	(0.0164)	(0.0389)
EBRD - large scale privatization				-0.007					-0.014
				(0.0077)					(0.0098)
EBRD - small scale privatization					-0.002				-0.005
					(0.0064)				(0.0100)
EBRD - governance and enterprise restructuring						0.003			0.008
						(0.0083)			(0.0102)
CIRI - womens' economic rights							-0.010		0.009
							(0.0070)		(0.0109)
CIRI - womens' social rights								-0.010***	-0.010
								(0.0040)	(0.0068)
Constant	0.6254***	0.622***	0.585***	0.480***	0.450***	0.445***	0.630***	0.613***	0.448***
	(0.0963)	(0.0916)	(0.0912)	(0.1531)	(0.1509)	(0.1519)	(0.0966)	(0.0961)	(0.1616)
Observations	628	628	625	207	207	207	589	586	199
R-squared	0.387	0.898	0.900	0.804	0.803	0.803	0.899	0.901	0.813

*Note:*participation gap adjusted for the differences in endowments and structural mismatch between men and women is the LHS variable. Included and not reported controls for the size of the set, percentage of men matched and percentage of women matched. Absorption regression with country fixed effects. Standard errors in parentheses, $***p < 0.05, **p < 0.1, *p < 0.15$.

Table 7: Adjusted wage gap

Adjusted wage gap	All	% matched >30		All	% matched >30	% matched >30, EBRD evaluated			% matched >30	
Years from transition	0.072***	0.122***	0.106***	0.100***	0.062	0.039	0.084	0.108	-0.0001	0.022
	(0.036)	(0.0463)	(0.0470)	(0.0348)	(0.0450)	(0.1315)	(0.0916)	(0.1339)	(0.0441)	(0.0451)
squared	-0.003***	-0.004**	-0.003*	-0.004***	-0.001	-0.001	-0.006	-0.002	0.002	0.002
	(0.002)	(0.0019)	(0.0019)	(0.0015)	(0.0019)	(0.0061)	(0.0045)	(0.0065)	(0.0019)	(0.0019)
x Transition	-0.061	-0.117***	-0.069	-0.078**	-0.033	9.375	4.897	0.357	0.078	0.097**
	(0.046)	(0.0561)	(0.0530)	(0.0422)	(0.0523)	(11.0341)	(7.3705)	(11.0925)	(0.0544)	(0.0561)
squared x Transition	0.003**	0.003**	0.003	0.004***	0.001	-0.090	-0.044	-0.003	-0.003	-0.003**
	(0.002)	(0.0019)	(0.0019)	(0.0015)	(0.0019)	(0.1075)	(0.0718)	(0.1080)	(0.0019)	(0.0019)
% of females with tertiary education	-0.513	-0.325	-1.100	-0.631	-0.672	4.970	21.863***	-0.447	-0.342	-0.562
	(0.865)	(0.9993)	(0.8986)	(0.7991)	(0.8489)	(11.2638)	(8.7870)	(11.5959)	(0.7725)	(0.7904)
Mean age of active female	0.045***	-0.034	-0.021	0.069***	-0.003	-0.058	0.068	-0.056	0.018	0.002
	(0.022)	(0.0319)	(0.0301)	(0.0219)	(0.0292)	(0.1014)	(0.0765)	(0.1074)	(0.0268)	(0.0271)
% of HH with children < 5	0.626**	4.411***	3.018***	0.867***	3.021***	5.932***	13.399***	4.577*	7.253***	7.592***
	(0.336)	(1.5320)	(1.2931)	(0.3461)	(1.2163)	(2.8513)	(2.5122)	(2.9900)	(1.6902)	(1.7312)
Female participation rate				-1.472***	-3.984***	-3.514***	-2.290**	-3.957***	-7.373***	-7.425***
				(0.7429)	(0.9029)	(1.7181)	(1.2658)	(1.8100)	(1.1104)	(1.1344)
x Transition				2.535***	5.052***	35.309	27.701	5.862	7.512***	7.847***
				(1.0092)	(1.2196)	(44.8532)	(31.1209)	(47.3125)	(1.2782)	(1.3919)
EBRD - large scale privatization						0.676**				
						(0.3577)				
EBRD - small scale privatization							2.614***			
							(0.4538)			
EBRD - governance and enterprise restructuring								-0.131		
								(0.4477)		
CIRI - womens' economic rights									0.341***	
									(0.1191)	
CIRI - womens' social rights										0.128**
										(0.0773)
Constant	-1.673***	1.388	0.450	-2.948***	0.220	-37.186	-32.481	1.608	-1.797*	-0.375
	(0.837)	(1.2106)	(1.1810)	(0.8577)	(1.1951)	(46.3010)	(31.1332)	(46.5176)	(1.1598)	(1.2762)
Observations	196	163	163	196	163	54	54	54	160	160
R-squared	0.118	0.154	0.415	0.383	0.505	0.570	0.775	0.518	0.601	0.390

Note: wage gap adjusted for the differences in endowments and structural mismatch between men and women is the LHS variable. Included and not reported controls for the size of the set, percentage of men matched and percentage of women matched. Absorption regression with country fixed effects. Standard errors in parentheses, $***p < 0.05, **p < 0.1, *p < 0.15$.

6 Conclusions

Gender wage discrimination has attracted considerable attraction of the researchers world wide. Despite the multiplicity of the studies, comparative studies are rare. For one thing, such analyses require micro-data sets which are relatively hard to acquire and of diverse quality. For another, the profession has focused on developing more reliable measures of discrimination than on the comparative analyses. Our paper aimed to partially fill this gap. We employed a relatively new and robust non-parametric technique developed by Ñopo (2008) to provide comparable estimates for over 600 adjusted gender participation gaps and nearly 200 for gender wage discrimination.

A careful examination of the empirical studies uncovers two major limitations of the literature findings. First, excessively simplistic econometrics in most of the literature, as most of the older studies employ Oaxaca-Blinder or Juhn-Murphy-Pierce decomposition, not always tackling of the self-selection effects, Weichselbaumer and Winter-Ebmer (2007). Second, the focus was mostly on developed, industrialized countries (predominantly the US and the EU). Recently, a new wave of literature has sprung, addressing the first of the two caveats. It has been already forcefully argued that the sample selection into the workforce is crucial for assessing gender wage gaps, Olivetti and Petrongolo (2008). Moreover, cross-country comparisons are considerably flawed if the self-selection issue is not properly tacked, **?**. Finally, also the comparisons across time are not valid without adequate selection correction, Machado and Mata (2005). Picchio and Mussida (2011) suggest even that the parametric estimators are bound to underestimate the extent of gender discrimination, especially the wage gap. Our objective in this study was to avoid these methodological problems and seek the correlates of the differentiation across time and countries in the extend of gender discrimination. The focus of the paper was to compare transition and advanced economies.

Estimates on the gender gap in employment suggest a gradual decreasing trend, with important role for educational aspirations and demographics, but little or no role for the family decisions, economic transition or womens' economic or social rights. In fact, time and country specific effects explain majority of the differentiation. However, wage discrimination of females is much less prone to economic processes. We find that despite the time trend, employers tend to discriminate less if they employ more women in the advanced economies, while the opposite is true in the transition countries. This "goodwill effect" is robust to the inclusion of other control variables in both groups of countries, leaving significant room for further research into the mechanisms of this process. Reforms *per se* tend to increase gender wage discrimination slightly, but the key element seems to be privatization.

7 Appendix: Additional results

Table 8: Adjusted wage gap - supplementary specifications

Adjusted wage gap	All EBRD evaluated			All		All EBRD evaluated
Years from transition	0.059	0.024	0.146*	0.107***	0.110***	0.031
	(0.090)	(0.0925)	(0.0876)	(0.0363)	(0.0395)	(0.1291)
squared	-0.003	-0.001	-0.006*	-0.005***	-0.005***	-0.001
	(0.003)	(0.0037)	(0.0033)	(0.0015)	(0.0016)	(0.0054)
x Transition	2.379	0.029	-0.602	-0.080**	-0.095**	0.109
	(10.736)	(10.3053)	(10.5703)	(0.0442)	(0.0492)	(11.3311)
squared x Transition	-0.021	0.001	0.010	0.004***	0.004***	-0.000
	(0.105)	(0.1006)	(0.1034)	(0.0016)	(0.0017)	(0.1105)
% of females with tertiary education	0.138	-0.153	-0.420	-0.076	-0.358	1.178
	(3.342)	(3.1750)	(3.2918)	(0.8458)	(0.8742)	(9.5453)
Mean age of active female	0.057	0.049	0.068	0.063***	0.064***	0.086
	(0.053)	(0.0526)	(0.0522)	(0.0224)	(0.0234)	(0.0722)
% of HH with children < 5	3.759***	3.510***	3.521***	0.766***	0.699**	4.752***
	(1.485)	(1.4165)	(1.4613)	(0.3538)	(0.3769)	(2.3228)
Female participation rate	-2.065*	-1.680	-2.123*	-1.146	-0.957	-2.478
	(1.404)	(1.4137)	(1.4197)	(0.8241)	(0.8678)	(2.0277)
x Transition	10.209	2.889	0.554	1.943**	2.253***	-0.981
	(44.174)	(43.0658)	(44.2558)	(1.0371)	(1.0735)	(45.5776)
EBRD - large scale privatization	0.222					0.230
	(0.242)					(0.3002)
EBRD - small scale privatization		0.290				0.405
		(0.2090)				(0.3344)
EBRD - governance and enterprise restructuring			-0.115			-0.522*
			(0.2289)			(0.3197)
CIRI - womens' economic rights				0.408***		0.457
				(0.1395)		(0.4170)
CIRI - womens' social rights					0.155**	0.257
					(0.0886)	(0.3189)
Constant	-9.725	-2.739	-0.632	-3.665***	-3.285***	-4.849
	(32.744)	(31.4361)	(32.2510)	(0.9195)	(0.9819)	(38.0738)
Observations	73	73	73	190	188	66
R-squared	0.439	0.452	0.431	0.418	0.396	0.537

Note: wage gap adjusted for the differences in endowments and structural mismatch between men and women is the LHS variable. Included and not reported controls for the size of the set, percentage of men matched and percentage of women matched. Absorption regression with country fixed effects. Standard errors in parentheses, $***p < 0.05, **p < 0.1, *p < 0.15$.

References

Adamchik, V. A. and Bedi, A. S.: 2003, Gender Pay Differentials During the Transition in Poland, *The Economics of Transition* **11**(4), 697–726.

Ammermueller, A., Heijke, H. and Woessmann, L.: 2003, Schooling Quality in Eastern Europe: Educational Production During Transition, *IZA Discussion Papers 746*, Institute for the Study of Labor (IZA).

Andini, C.: 2007, Returns to Education and Wage Equations: A Dynamic Approach, *Applied Economics Letters* **14**(8), 577–579.

Arabsheibani, G. R. and Mussurov, A.: 2006, Returns to Schooling in Kazakhstan: OLS and Instrumental Variables Approach, *IZA Discussion Papers 2462*, Institute for the Study of Labor (IZA).

Arulampalam, W., Booth, A. L. and Bryan, M. L.: 2007, Is there a glass ceiling over europe? exploring the gender pay gap across the wage distribution, *Industrial and Labor Relations Review* pp. 163–186.

Atal, J. P., Nopo, H. and Winder, N.: 2009, New century, old disparities: Gender and ethnic wage gaps in latin america, *Technical report*, Inter-American Development Bank, Research Department.

Badel, A. and Peña, X.: 2010, Decomposing the gender wage gap with sample selection adjustment: Evidence from colombia, *Revista de Analisis Economico–Economic Analysis Review* **25**(2), 169–191.

Bauer, T. K. and Sinning, M.: 2008, An extension of the blinder–oaxaca decomposition to nonlinear models, *AStA Advances in Statistical Analysis* **92**(2), 197–206.

Belzil, C.: 2007, The Return to Schooling in Structural Dynamic Models: A Survey, *European Economic Review* **51**(5), 1059 – 1105.

Blackburn, M. L.: 2007, Estimating Wage Differentials Without Logarithms, *Labour Economics* **14**(1), 73–98.

Blau, F. D. and Kahn, L. M.: 2003, Understanding international differences in the gender pay gap, *Journal of Labor Economics* **21**(1).

Blau, F. D. and Kahn, L. M.: 2013, Female labor supply: Why is the united states falling behind?, *American Economic Review* **103**(3), 251–56.

Blinder, A. S.: 1973, Wage discrimination: Reduced form and structural estimates, *Journal of Human Resources* **8**(4), 436–455.

Brainerd, E.: 2000, Women in transition: changes in gender wage differentials in eastern europe and the former soviet union, *Industrial and labor relations review* pp. 138–162.

Campos, N. F. and Jolliffe, D.: 2002, After, Before and During: Returns to Education in the Hungarian Transition, *William Davidson Institute Working Papers Series 475*, William Davidson Institute at the University of Michigan Stephen M. Ross Business School.

Card, D. and DiNardo, J. E.: 2002, Skill-Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles, *Journal of Labor Economics* **20**(4), 733–783.

Cotton, J.: 1988, On the decomposition of wage differentials, *The Review of Economics and Statistics* pp. 236–243.

Denny, K. and Orla Doyle, P.: 2005, Returns to Basic Skills in Central and Eastern Europe - A Semi-Parametric Approach, *Working Papers 200507*, School Of Economics, University College Dublin.

DiNardo, J., Fortin, N. M. and Lemieux, T.: 1996, Labor market institutions and the distribution of wages, 1973-1992: A semiparametric approach, *Econometrica* **64**(5), 1001–44.

Dohmen, T., Lehmann, H. and Zaiceva, A.: 2008, The gender earnings gap inside a russian firm: first evidence from personnel data - 1997 to 2002, *Zeitschrift fur ArbeitsmarktForschung - Journal for Labour Market Research* **41**(2/3), 157–179.

Estrin, S., Korosteleva, J. and Mickiewicz, T.: 2011, Which institutions encourage entrepreneurs to create larger firms?

Estrin, S. and Mickiewicz, T.: 2011, Institutions and female entrepreneurship, *Small business economics* **37**(4), 397–415.

Fairlie, R. W.: 1999, The absence of the african-american owned business: An analysis of the dynamics of self-employment, *Journal of Labor Economics* **17**(1), 80–108.

Fairlie, R. W.: 2005, An extension of the blinder-oaxaca decomposition technique to logit and probit models, *Journal of Economic and Social Measurement* **30**(4), 305–316.

Firpo, S., Fortin, N. and Lemieux, T.: 2007, Decomposing wage distributions using recentered influence function regressions.

Freeman, R. B.: 1979, The effect of demographic factors on Age-Earnings profiles, *The Journal of Human Resources* **14**(3), 289–318.

Ganguli, I. and Terrell, K.: 2005, Wage ceilings and floors: The gender gap in ukraine's transition, *IZA Discussion Papers 1776*, Institute for the Study of Labor (IZA).

Garner, T. I. and Terrell, K.: 1998, A gini decomposition analysis of inequality in the czech and slovak republics during the transition, *CEPR Discussion Papers 1897*, C.E.P.R. Discussion Papers.

Gorodnichenko, Y. and Sabirianova Peter, K.: 2005, Returns to Schooling in Russia and Ukraine: A Semiparametric Approach to Cross-country Comparative Analysis, *Journal of Comparative Economics* **33**(2), 324–350.

Grajek, M.: 2003, Gender Pay Gap in Poland, *Economics of Planning* **36**(1), 23–44.

Hansen, J.: 2007, Human capital and welfare dynamics in canada, *The B.E. Journal of Economic Analysis & Policy* **7**(1).

Heckman, J. J.: 1979, Sample selection bias as a specification error, *Econometrica* **47**(1), 153–61.

Hoyos, A., Nopo, H. and Pena, X.: 2010, The persistent gender earnings gap in colombia, 1994-2006, *Technical report*, Inter-American Development Bank, Research Department.

Huber, M., Lechner, M. and Wunsch, C.: 2010, How to control for many covariates? reliable estimators based on the propensity score, *IZA Discussion Papers 5268*, Institute for the Study of Labor (IZA).

Hunt, J.: 2002, The transition in east germany: When is a ten-point fall in the gender wage gap bad news?, *Journal of Labor Economics* **20**(1), 148–169.

Jolliffe, D. and Campos, N. F.: 2005, Does market liberalisation reduce gender discrimination? econometric evidence from hungary, 1986–1998, *Labour Economics* **12**(1), 1–22.

Juhn, C., Murphy, K. M. and Pierce, B.: 1993, Wage Inequality and the Rise in Returns to Skill, *Journal of Political Economy* **101**(3), 410.

Kandil, M. and Woods, J. G.: 2002, Employment Composition and the Cyclical Behaviour of the Aggregate Real Wage, *Applied Economics* **34**, 689–708.

Lauerova, J. S. and Terrell, K.: 2002, Explaining gender differences in unemployment with micro data on flows in post-communist economies, *IZA Discussion Papers 600*, Institute for the Study of Labor (IZA).

Lehmann, H. and Terrell, K.: 2006, The Ukrainian Labor Market in Transition: Evidence From a New Panel Data Set, *Journal of Comparative Economics* **34**(2), 195–199.

Lemieux, T.: 2006, Increasing residual wage inequality: Composition effects, noisy data, or rising demand for skill?, *American Economic Review* **96**(3), 461–498.

Mabsout, R. and Van Staveren, I.: 2010, Disentangling bargaining power from individual and household level to institutions: Evidence on women's position in ethiopia, *World Development* **38**(5), 783–796.

Machado, J. A. and Mata, J.: 2005, Counterfactual decomposition of changes in wage distributions using quantile regression, *Journal of applied Econometrics* **20**(4), 445–465.

Mandel, H. and Semyonov, M.: 2005, Family policies, wage structures, and gender gaps: Sources of earnings inequality in 20 countries, *American sociological review* **70**(6), 949–967.

Morrisson, C. and Jutting, J. P.: 2005, Women's discrimination in developing countries: A new data set for better policies, *World Development* **33**(7), 1065–1081.

Munich, D., Svejnar, J. and Terrell, K.: 2005a, Is women's human capital valued more by markets than by planners?, *Journal of Comparative Economics* **33**(2), 278–299.

Munich, D., Svejnar, J. and Terrell, K.: 2005b, Returns to Human Capital Under The Communist Wage Grid and During the Transition to a Market Economy, *Review of Economics and Statistics* **87**(1), 100–123.

Neumark, D.: 1988, Employers' discriminatory behavior and the estimation of wage discrimination, *Journal of Human Resources* pp. 279–295.

Newell, A. and Reilly, B.: 1997, Rates of Return to Educational Qualifications in the Transitional Economies, *Discussion Papers in Economics 03/97*, Department of Economics, University of Sussex.

Ñopo, H.: 2008, Matching as a tool to decompose wage gaps, *The review of economics and statistics* **90**(2), 290–299.

Nopo, H., Daza, N. and Ramos, J.: 2011, Gender earnings gaps in the world, *Technical report*, Institute for the Study of Labor (IZA).

Oaxaca, R.: 1973, Male-female wage differentials in urban labor markets, *International Economic Review* **14**(3), 693–709.

Oaxaca, R. L. and Ransom, M. R.: 1988, Searching for the effect of unionism on the wages of union and nonunion workers, *Journal of Labor Research* **9**(2), 139–148.

Oaxaca, R. L. and Ransom, M. R.: 1994, On discrimination and the decomposition of wage differentials, *Journal of Econometrics* **61**(1), 5–21.

Olivetti, C. and Petrongolo, B.: 2008, Unequal pay or unequal employment? a cross-country analysis of gender gaps, *Journal of Labor Economics* **26**(4), 621–654.

Orazem, P. F. and Vodopivec, M.: 1997, Value of Human Capital in Transition to Market: Evidence from Slovenia, *European Economic Review* **41**(3-5), 893–903.

Pastore, F. and Verashchagina, A.: 2006, Private Returns to Human Capital Over Transition: A Case Study of Belarus, *Economics of Education Review* **25**(1), 91–107.

Picchio, M. and Mussida, C.: 2011, Gender wage gap: A semi-parametric approach with sample selection correction, *Labour Economics* **18**(5), 564–578.

Pratap, S. and Quintin, E.: 2002, Are labor markets segmented in argentina? a semiparametric approach, *Working Papers 0202*, Centro de Investigacion Economica, ITAM.

Reimers, C. W.: 1983, Labor market discrimination against hispanic and black men, *The Review of Economics and Statistics* **65**(4), 570–579.

Rizov, M. and Swinnen, J.: 2004, Human capital, market imperfections, and labor reallocation in transition, *Journal of Comparative Economics* **32**(4), 745–774.

Rosenbaum, P. R. and Rubin, D. B.: 1983, The central role of the propensity score in observational studies for causal effects, *Biometrika* **70**(1), 41–55.

Rutkowski, J.: 1996, High Skills Pay Off: the Changing Wage Structure During Economic Transition in Poland, *Economics of Transition* **4**(1), 89–112.

Stanley, T. D. and Jarrell, S. B.: 1998, Gender wage discrimination bias? a meta-regression analysis, *Journal of Human Resources* pp. 947–973.

Stapleton, D. C. and Young, D. J.: 1984, The Effects of Demographic Change on the Distribution of Wages, 1967-1990, *The Journal of Human Resources* **19**(2), 175–201.

Stockhammer, E. and Onaran, E.: 2009, National and Sectoral Influences on Wage Determination in Central and Eastern Europe, *European Journal of Industrial Relations* .

Trapido, D.: 2007, Gendered transition: Post-Soviet trends in gender wage inequality among young Full-Time workers, *European Sociological Review* **23**(2), 223–237.

Van Staveren, I. and Odebode, O.: 2007, Gender norms as asymmetric institutions: A case study of yoruba women in nigeria, *Journal of Economic Issues* **41**(4), 903–925.

Weichselbaumer, D. and Winter-Ebmer, R.: 2007, The effects of competition and equal treatment laws on gender wage differentials, *Economic Policy* **22**(50), 235–287.

Wunnava, P. V. and Honney, J. K.: 1991, The Union-Nonunion Wage Differential Over the Business Cycle: Evidence from PSID, *Economics Letters* **37**(1), 97 – 103.