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## When the opportunity knocks: large structural shocks and gender wage gaps

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# When the opportunity knocks: large structural shocks and gender wage gaps

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## Abstract

Undergoing a large structural shock, labor markets may become less inclusive. We test for this thesis analyzing the behavior of adjusted gender wage gaps in a wide selection of transition countries. We estimate comparable measures of adjusted gender wage gaps for a comprehensive selection of transition countries over a period spanning nearly three decades. We combine these estimates with measures of labor market reallocation in transition economies to uncover the relation between worker flows and the gender wage gap. Results indicate that in periods of reallocation, the adjusted wage gaps increase. Distinguishing between flows according to their contribution to structural transformation reveals the distinctive role paid by separations from the state-owned manufacturing sector, usually leading to greater adjusted gaps. The emerging new sectors in the economy tend to be more inclusive in the short run, associated with a lower adjusted gender gap. In the medium run, the adverse effect of greater separations from the old sector is even more pronounced, while the emergence of the new sector is less relevant.

## Keywords:

gender wage gap, transition, non-parametric estimates, worker flows

## JEL Classification

C24, J22, J31, J71

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# 1 Introduction

Gender wage gaps, adjusted for individual characteristics tend to be highly diversified across countries. In a recent study, Ñopo et al. (2012) report unexplained gender wage gaps ranging from a few percent to over a half of men’s wages. Other studies demonstrate as well that the adjusted gaps vary with time, even within one country. Lemieux (2006) argues that gender wage gaps are generally declining in Canada. Stanley and Jarrell (1998), Blau and Kahn (2017) make a similar case for the US, with mixed evidence from other countries.<sup>1</sup> Despite these apparent trends, little is known on *why* gaps adjusted for individual characteristics would narrow down. In a calibrated simulation study, Hsieh et al. (2013) argue that lifting the barriers in access to occupations improved allocation of talents across jobs, thus yielding higher overall productivity. Regardless there is still compelling evidence that in high earning occupations women and minorities remain underpaid, *ceteris paribus* (e.g. Olivetti and Petrongolo 2008, Picchio and Mussida 2011, Christofides et al. 2013, Kassenboehmer and Sinning 2014, Mussida and Picchio 2014, Olivetti and Petrongolo 2014).

The interest in drivers of wage gaps has intensified recently. To name just a few identified “suspects”: Bartolucci (2013), Card et al. (2016) make a case about wage bargaining; Bertrand et al. (2015) emphasize household bargaining, Mandel and Semyonov (2005), Cha and Weeden (2014), Goldin (2014) place attention on working time flexibility. Indeed, the institutions analyzed in the context of gender wage gap range from trade policies (Weichselbaumer and Winter-Ebmer 2007, Oostendorp 2009), through educational policies (Falch and Naper 2013, Strand 2014, Lavy and Sand 2015), welfare state (Mandel and Shalev 2009, Mandel 2012) going as far as meta-features of culture and language (Tyrowicz et al. 2015). Despite this richness of literature, little effort so far was put into analyzing the role of structural change. This literature gap is all the more surprising, given the earlier suggestions from the labor literature. First, skill biased technological change is arguably not gender-neutral (e.g. Juhn et al. 1993, Card and DiNardo 2002, Lemieux 2006, Hansen 2007, Andini 2007, Black and Spitz-Oener 2010). Second, there is some tentative evidence that other factors such as business cycle and unionization may matter for wage equality (e.g. Freeman 1979, Wunnava and Honney 1991, Kandil and Woods 2002). Finally, earlier evidence from large structural shocks is compelling as well. The rise of labor market participation of women was marked in many countries by the permanent structural reallocation of production during the war periods (e.g. Acemoglu et al. 2004, Fernández et al. 2004, Goldin and Olivetti 2013). In the process of economic transition from a centrally planned to a market economy – another example of a large structural shock – employment of women has been characterized by segmentation and frequently has also weakened. This process was accompanied by - as evidenced by some well documented cases - a rise in gender wage gaps (Blau and Kahn 1992, Brainerd 2000, Blau and Kahn 2003, Munich et al. 2005a).

This paper provides evidence on the role of structural change and reallocation in gender wage gaps after adjusting for individual characteristics. The adjustment for individual characteristics

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<sup>1</sup>E.g. Hoyos et al. (2010), Badel and Peña (2010) for Colombia, Atal et al. (2012) for Latin America in general.

is especially relevant in this context as periods of labor reallocation involve changes in labor demand, thus adjusting the prices for specific skills and abilities in the first stage as well as incentivizing changes in the labor supply subsequently. We focus on gender wage gaps as gender equality is relevant for each economy, whereas not all countries have sufficient representation (and data coverage) of e.g. minorities. We will build on the earlier insights from transition countries, but provide a number of innovations. First, we develop comparable estimates of gender wage gaps for 14 transition countries over the first two decades after transition. The large collection of micro data sets for transition countries has been coupled with a set of estimates for advanced European countries to use as a benchmark. Second, we utilize a new and rich data set on gross worker flows in transition economies to develop indicators of labor market churning among men for each country and year. Exploiting the richness of this data, we are able to distinguish between the overall churning in the economy and the importance of labor flows driven by transition to a market economy and the importance of labor flows driven by global trends. Moreover, we construct a measure that helps to identify years with relatively large flows within each transition economy.

In order to provide a better understanding of the relation between structural shocks and the gender wage gap, we study independently cohorts born before 1965, i.e. who were 25 years old or older in 1989, and younger cohorts. Distinguishing these cohorts is motivated by the different stages of careers of these workers at the time of transition. Cohorts that joined the labor market earlier acquire skills that may be outdated after liberalization. By contrast, younger workers had up-to-date skills, but enter the labor market in a period of instability. The effects of reallocation are expected to be different among these two groups.

This study contributes to the understanding of gender inequality in the context of large structural shocks in three ways. First, we offer comparable and reliable measures of adjusted gender wage gaps and changes thereof in transition countries for the first two decades of transition. This is the largest collection of such estimates.<sup>2</sup> Second, accounting for demographic processes and human capital we provide evidence for the role of labor market churning. Exploiting common trends and country-specific starting points, we are able to show that more churning is associated with larger estimates of the adjusted gender wage gap, particularly for those cohorts that were more exposed to the transformation, that is for cohorts working before the onset of transition; whereas among cohorts born after 1965, and who entered the labor market after the beginning of transition, effects were negligible.

The paper is structured as follows. We begin by presenting the relevant literature – with a focus on two main points: the previous empirical findings and properties of methods to adjust for individual characteristics in estimating the wage gaps. In the following section we carefully describe the data and method used in this study. Since we use various types of data from over 14 countries over two decades, this section is detailed. In addition to a description of each database, this section provides a first insight at gender wage gaps in transition economies and how databases compare to each other. This section also introduces the database used to

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<sup>2</sup>Nopo et al. (2012) report results for a broader selection of countries, but at one given point in time. Our full selection together with documentation may be downloaded from [LINK](#)

measure gross worker flows in transition economies: the Life in Transition Survey, and discusses properties of the estimated flows. Finally, in section 4 we characterize the estimated adjusted gender wage gaps and the correlates. In the concluding section we provide some policy-oriented recommendations rooted in the findings of this study.

## 2 Structural change and wage gaps - insights from literature

Typically, recessions as well as technological shocks are swift to propagate. Moreover, they may propagate through both wages and employment, thus immediately affecting the relative position of women or minorities. In a recent study, Biddle and Hamermesh (2013) argue that relative wages of women and minorities follow business cycle in the US. They attribute the volatility in unadjusted relative wages to higher cyclicalities of wages among movers as opposed to those who do not change jobs. Greater job mobility among minorities generates cyclical fluctuations observed in wage gaps. Hirsch and Winters (2014) argue that the gaps have narrowed for Hispanics but not for Blacks in the US, especially once accounting for annual hours worked. Also in the UK, an adverse economic shock is associated with an increase of racial prejudice, yielding lower hiring rates for minorities (Johnston et al. 2014). Both results suggest that discrimination should intensify during periods of exogenously larger churning (procyclicality).

For women cyclicalities of unadjusted wage gap is weaker and cannot be explained by separations and search effort. Despite weaker cyclicalities, there are important long-term trends in relative wages of women. In a meta-analysis, Stanley and Jarrell (1998) find gradual decrease in adjusted gender gaps measures over time. Blau and Kahn (2017) argue that the overall gender wage gaps have fallen in the US, although adjustment for human capital is systematically less powerful in explaining wage differences between men and women. Building on earlier insights, Blau and Kahn (2017) explain these findings with admittedly asymmetric flexibility in working hours (see also Cortes and Pan 2013, Goldin 2014, Cortes and Pan 2016). Exploiting data from Canada, Lemieux (2006) provides a similar argument. The narrowing of the wage gap reflected the closing of the human capital gap. This convergence in human capital was reinforced by the skill-biased technological change, which reduced returns to occupations where men may have a comparative advantage (e.g. those that require physical strength and/or endurance). Similarly, Arulampalam et al. (2007) find lowering of the gender wage gap in EU15 countries, despite persistent differences between these countries in terms of wage setting institutions and industrial composition.

Due to shortage of quality data, direct evidence on the adjusted gender wage gaps for the 1940s and 1950s is unavailable, but the literature finds some evidence for cohort effects (Card and DiNardo 2002). An analysis that encompasses possibly the longest period of time was provided thus far by Hsieh et al. (2013), who develop a calibrated structural model of frictions in occupational choice. Observing the allocation of women and minorities across occupations they conclude that the barriers in choice of occupation prior to elimination of segregation and the Equal Opportunity Act must have been substantial. Yet, nothing suggests that the removal of these barriers was sudden – educational choices and hence occupational choices have

adapted gradually, thus yielding a substantial structural change spread fairly evenly over four decades. Also, the setting by Hsieh et al. (2013) is more suitable for explaining employment gaps and segregation than wage gaps adjusted for individual characteristics. Given that shocks are typically abrupt and may be reflected in wages, more analysis is needed to understand better the effects of structural change on labor market equality. The transition from a centrally planned to a market economy may serve as a good example for a number of reasons. First, the shock was sudden and thorough. The average GDP drop in 1992 relative to pre-1989 level amounted to as much as 20%. Second, the shock was exogenous to the extent to which labor market participants at that time could not account for the onset of transition in their educational, nor occupational choices (clearly, subsequent labor market flows were partially endogenous). Third, former socialist countries were characterized by different starting points in terms of economic structure and human capital, which affected the ability to adapt to new conditions.

In general, centrally planned economies were characterized by relatively high participation rates, also among women. Job security implied little conflict of interest between family and professional obligations. Working hours were regular, while overtime was relatively rare and compensated by additional free hours or days. Notwithstanding, there has been compelling evidence for overmanning and inefficient use of labor force prior to the transition. The subsequent decline in employment rates was sharp and until today in many of the transition countries employment rates have not recovered. The downward adjustment was larger for women, which yields a trend opposite to the developments in Western European countries (Blau and Kahn 1996).

Consistent with the phenomenon of asymmetric adjustment in the participation rates for men and for women is structural change in labor demand. In the case of Germany, as demonstrated by Hunt (2002), decrease in measured raw gender wage gap occurred mostly due to composition effects, i.e. reduction in low-skill low-paid jobs for women and a substantial decrease in female participation rates. While Hunt (2002) finds no role for the availability of child care facilities when comparing East and West Germany, such a 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 their career. Similar conclusions are given by Adamchik and Bedi (2003), Grajek (2003) for Poland and Jolliffe and Campos (2005) for Hungary. These trends seem to be observed also in advanced market economies. For example, Mandel and Shalev (2009) argue that regulation of labor market reinforces the unequal position of women by molding it with class dispersion.

In addition to changing position of women, the very context of transition from central planning to market system indeed constitutes a large structural shock (see Newell and Reilly 1999, for evidence from a comparative study). In addition to change of ownership structure and altering the incentives in the economy, other strong forces affected 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 tertiary degree (Ammermüller et al. 2005, Denny and Doyle 2010, Rutkowski 1996). Second, transition driven restructuring has been coupled with

intensive globalization and increasing role of global value chains, which largely affected the specialization in the Eastern European countries. Finally, general trends in demographics and urbanization intensified, affecting both the demand structure and the supply characteristics. Despite sizable country and industry specific effects (Stockhammer and Onaran 2009) the main findings so far suggest unequivocally that inequality grows, while changes in educational attainment explain considerable part of that change (e.g. Garner and Terrell 1998). There was also a strong effect of human capital and factor market imperfections on household decisions regarding labor use and reallocation (Rizov and Swinnen 2004).

Gender differentials emerged or increased in the process of transition.<sup>3</sup> Indeed, as demonstrated by Munich et al. (2005a) for Czech Republic, one of the few countries for which the data permitted direct comparison, gender gaps increased rapidly during transition. In a similar spirit Brainerd (2000) analyses household budget surveys (HBS) 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 inequality grew in this period, changes affected women more adversely, which contributed to the widening of the gender wage gap. Similar evidence was found for Ukraine (Ganguli and Terrell 2006). 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 inequality 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, access to the labor market became more restricted (Lauerova and Terrell 2002). Consequently, it seems that all these studies are likely to suffer from underestimation due to the selection bias.

Given the complexity of the processes, any analysis of adjusted gender wage gaps in the context of transition needs to be cautious about the method employed. Adjusted gender gaps are typically measured by means of decomposition – the challenge lies in accounting adequately for possibly relevant objective differences, which is not only a data issue but also a conceptual one. Namely, for obtaining the adequate measures of adjusted gender wage gaps one needs to compare men and women actually “alike” in terms of all relevant observables, including hours effectively worked, commitment, talent, etc.

The simplifications necessitated by the availability (and the quality) of data typically bias the estimates of adjusted gaps without much intuition on the size of this bias (see Fortin et al. 2011, for a thorough overview of decomposition methods in economics). Indeed, Goraus et al. (2017) show that the estimates of adjusted gender wage gap using the same data may range from 8% to as much as 26%, depending on controls for selection effects, on the decomposition method employed and on the set of covariates included. They argue that Ñopo (2008) provides

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<sup>3</sup>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 (2003) 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) analyze wage formation patterns for Ukraine, while Newell and Reilly (1999) analyze the adjusted gender wage gap along quantiles for 11 transition countries in mid-1990s. Using data for a few selected years, Madalozzo and Martins (2007) finds decreasing adjusted gender wage gaps for Brazil and Chi and Li (2008) finds the opposite for China.

the most reliable estimate when data limitations prevent the inclusion of rich set of covariates, with the additional advantage of informing about the size and sign of the bias. This advantage stems from the fact that unlike majority of the parametric approaches,  $\tilde{\text{Nopo}}$  (2008) provides estimates of adjusted wage gaps based on non-parametric exact matching procedure. Hence, the method is able to utilize the information about unmatched men and women in the sample to infer the sign and size of the bias.<sup>4</sup>

The exact matching decomposition has also some disadvantages. First, it is not particularly suitable for distributional analyses.<sup>5</sup> However, in the case of our research question the dispersion of adjusted gender wage gaps along the income distribution is of secondary importance. Second, if the characteristics of employed men and women differ substantially,  $\tilde{\text{Nopo}}$  (2008) will blindly attribute wage disparity to the differences in characteristics. Here, parametric decompositions would be less prone to err, because they are able to provide actual point estimates for the role of each characteristic in determining wages for men and women alike, leaving it to the researcher to judge the credibility of these estimates and improve the model specification to reflect standard intuitions. However, this weakness is partially compensated by the fact that  $\tilde{\text{Nopo}}$  (2008) produces two separate estimates in addition to the adjusted gender wage gap. The first one is the difference that prevails between the compensations of two groups of women: those whose characteristics can be matched to characteristics of men and those who cannot. It is computed as the difference between the expected wages of women in the common support minus the expected wages of women out of the common support, weighted by the probability measure (under the distribution of characteristics of women) of the set of characteristics that men do not have. The second one is the difference that prevails between the compensations of two groups of men: those whose characteristics can be matched to characteristics of women and those who cannot (computed analogously). Thus, the risk of falsely attributing the wage gaps to differences in characteristics is mitigated.

### 3 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 Bloc. Acquiring reliable data sets for early transition is a challenging task. Most of these countries lacked any labor force surveys (LFS) in the first years since transition. When available, LFS data frequently do not comprise information on compensation and household structure simultaneously. Finally, LFS is usually recovered from a rotating panel, which makes it impossible to obtain reliable measures of structural change in

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<sup>4</sup> $\tilde{\text{Nopo}}$  (2008) was not the only to use matching for identifying adjusted wage gaps. For example, Pratap et al. (2006) employed it to measure adjusted wage differences between the formal and informal sectors in Argentina. 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 of gender (it should not be perceived as “treatment”). Hence, matching on characteristics should provide more reliable estimates than matching on propensity scores.

<sup>5</sup>Indeed, mean is not particularly fortunate in the context of wage regressions due to the skewness of wage distributions (see Juhn et al. 1993, DiNardo et al. 1996, Machado and Mata 2005, Firpo et al. 2009, Olivetti and Petrongolo 2008, Picchio and Mussida 2011).

the labor market. While one can compute the measures of net change in employment (e.g. growth in service sector employment and decline in manufacturing employment), micro-level information is needed to know how many worker flows were actually needed to accomplish a given change.

To address these issues we pursue two parallel strategies. First, to obtain internally consistent measures of the gender wage gaps, we collect a large number of micro-datasets from transition and advanced economies. We utilize the sources available online and contacted statistical offices in all transition countries to obtain individual level data. Second, to obtain measures of structural change and labor market adjustment we utilize a novel dataset developed by the European Bank for Reconstruction and Development, *Life in Transition survey* (LiT). This survey was conducted in 2006 and 2010 in 29 countries, including most of the European transition economies; missing only Turkmenistan from the former USSR and Kosovo. However, only the 2006 edition contains retrospective information on labor market status and, hence, it is our main source on this issue. We describe the data in detail below.

### 3.1 Collection of individual and household level data

We use data from International Social Survey Program, Living Standard Measurement Surveys of the World Bank and national labor force surveys. Data for some of the transition and benchmark countries come also from the Structure of Earnings Survey. In order to provide a benchmark for transition countries, we also include data from European Community Household Panel. Table A1 describes in detail the source of data and period covered for each of the analyzed countries.<sup>6</sup>

**International Social Survey Program.** It is a voluntary initiative for countries world wide to collect data for social sciences research. This study focuses 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 alternative sources, such as the household budget surveys (LSMS) or national labour force surveys. However, ISSP data was already used for gender discrimination analyses (e.g. Blau and Kahn 2003).

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<sup>6</sup>In addition to the above, there exist alternative sources of data. For example, Integrated Public Use Microdata Series International project at the University of Minnesota aims to collect data such as census for many countries in similar years and make them available for research in possibly standardized form. Currently it comprises data for about 63 countries from roughly 200 censuses. While these are large population data sets, they rarely comprise information about income. In fact, none of the transition countries available in IPUMS-I has posed income questions in their censuses. The Wage Indicator Project is an alternative dataset. It is operated by Wage Indicator Foundation and comprises self-reported online survey data on wages for 80 countries; however, data from transition countries is only available since the late 2000's, which omits the transition period.

**Living Standards Measurement Survey.** Developed by The World Bank, LSMS is a standardized 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 feature might raise 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.

**National Labor Force Surveys.** 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 Serbia for years 1995-2002 and for Poland for years 1995-2006. In addition to these LFS, we also employ a similar database for Russia, the Longitudinal Monitoring Survey. Collected since the onset of transition, the database has been used extensively in research before, e.g. Zohoori et al. (1998), Gregory et al. (1999) as well as many public health studies.

**Structure of Earnings Surveys.** This database collects information on workers' individual characteristics, hours worked and wages from employers. While it is collected in the form of a survey it is quasi-administrative data. In many countries firms have a legal obligation to report individual wage data for all workers or a representative sub-sample of workers. In comparison to the alternative sources, the SES is the most reliable database in terms of hours worked and compensations of different form (normal hours, additional hours, premia and similar). However, SES database lacks information on household structure and is only collected from the enterprise sector; in some countries, the sample is restricted further to cover only part of the enterprise sector, excluding e.g. small firms with less than 10 employees.

We use SES data for Hungary for years 1994-2012, as SES was not collected in earlier years. In addition, we also utilize EU-SES data, which is a harmonized data set over all EU Member States, available every fourth year since of 2002.

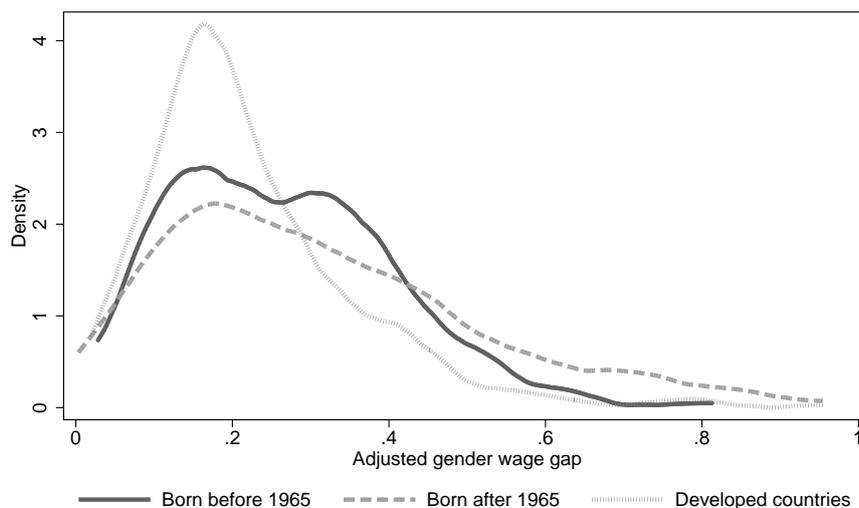
In total, we acquired over 150 data points (countries/source/years) from transition countries. Indeed, gender wage gap estimates are highly dispersed in our sample, with values ranging from almost nil differences to as much as 95% of men wages. Such extreme cases correspond to Slovenia 1999 and Bulgaria 1993, respectively. In both cases, the source is ISSP. On average, cohorts active before transition exhibit lower gender wage gaps than entrants, but only by a

small margin (22% to 20% at the median). For comparative purposes, we compute adjusted gender wage gaps using the same methodology also for the advanced European economies. For these countries, we use mostly SES, ISSP, European Community Household Panel and national LSF, whenever available, as discussed in Table A1.

The discrepancies for the gender wage gaps between data sources do not exceed 10 percentage points and are consistent with the range of discrepancies reported by International Labor Organization in the Key Labor Market Indicators database. Typically, wage gaps are lower in data with larger number of observations (such as SES or LFS) than in other surveys, which may suggest that wage gaps are not the only dimensions of gender inequality in the labor markets.<sup>7</sup> Moreover, variance of the estimates appears to be lower in SES and LFS than in ISSP, consistent with the evidence from the description of the adjusted gender wage gap.

Figure 1 shows the distribution of the gender wage gap estimates for cohorts active before transition and for cohorts that entered afterwards. A third line presents estimates from advanced economies that can be used as a benchmark.

Figure 1: Estimates of the gender wage gap



*Data source:* please refer to Table A1 for details on sources.

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. Three arguments support this choice. First, industry of employment and occupation are much more of a “choice” variable than demographics and already acquired education. One could expect them to be much more labile and to the same extent influencing the gap as possibly being influenced by them. Second, as evidenced by Figure A1 in the Appendix, the inclusion of job specific characteristics in itself does not change substantially the estimates of the adjusted wage gap (the unexplained part of the wage gap), while it lowers substantially the

<sup>7</sup>In a companion paper we analyze gender employment gaps. Quality of data on occupations prevents reliable identification of occupational sorting.

share of population that falls into the common support.<sup>8</sup> Smaller common support does not undermine the reliability of the adjusted gender wage gap measure, but hazards its external validity. Finally, from an empirical standpoint, the inclusion of additional covariates is not always possible. Information on relevant firm characteristics, such as ownership type, the size, or the industry are usually absent from the databases we collected<sup>9</sup>.

Following Ñopo (2008) and Huber et al. (2013), all continuous variables were recoded to categorical variables. This concerns age (5 year age groups were formed) and residence (multiple categories with different reference levels were universally recoded to urban/rural dummy, where the threshold is around 20 thousand. people). Also, when only data on years of education are available, we produced a categorical variable with three levels: tertiary or above, primary and below and any secondary. Such broad characterization was dictated by data availability - a 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 variable in this analysis is hourly wage.

### 3.2 Measuring labor market flows

The index of structural change developed by Lilien (1982) is a frequently used indicator of the labor reallocation. It conveniently synthesizes the changes in employment structure. However, it is not sufficient to capture the scale of churning in the labor market at a given point in time. Hence, instead of computing the Lilien index utilizing the aggregate data, we utilize data from the LiT survey to obtain measures of flow intensity in a given year. The LiT database contains individual retrospective surveys on a representative sample from the population of almost every transition economy. In each country, 1000 individuals were interviewed. The sampling procedure reflects different stratification levels, including sub-national departments and cities. The questionnaire consisted of two parts. The first, answered by any member of the household, asks about the general characteristics of the household. The second, individual, part inquires about current employment and employment history for a randomly selected household member. Only the 2006 survey provides retrospective data on employment, and therefore is our main source of information on reallocation.

The LiT database is rich. In addition to basic socio-economic variables (age, gender, education, household composition) it also provides information on the jobs held by workers in each year. This characteristic permits a direct identification of gross worker flows. However, given the retrospective nature of the survey, the interviewee might not perfectly remember all the positions held since the onset of the transition. Moreover, and even though the sample is representative for 2006 in each country, it is likely that older workers in early transition were underrepresented for purely demographic reasons. Finally, taking up a new job is not necessarily

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<sup>8</sup>The example is built using Polish LFS data, as it contains the largest number of covariates.

<sup>9</sup>Information on occupations was coded more often, hence we iterated our estimations on measures of the gender wage gap that include controls for occupations. Results, presented in Table A8 are not exempt of the criticism discussed in the main text.

*job* creation (the position may be assumed after someone whose contract was terminated or the previous worker retired) and separation is not necessarily *job* destruction (the position may be immediately filled by someone else). However, identifying *worker flows* in gross terms for such a long period of time and wide selection of countries is a unique feature of the LiT survey; and hence, these data are used to compute country and time specific measures of structural change in the labor market.

LiT data provides an identification for job spells, we can observe the years in which the respondent work in a given position.<sup>10</sup> Moreover, LiT also includes information on firm, including the industry and the ownership structure at the time of employment.<sup>11</sup> Given this information, we are able to recover worker flows, both in general, and those that reflect trends from globalization, i.e. the growing importance of the service sector, and from transition, i.e. the decline of state owned enterprises in total employment.

We employ this information to construct several measures of workers' reallocation during transition. We focus on flows realized by male workers. The restriction was set to mitigate concerns over endogeneity of total labor market flows, which might be particularly relevant if women were to experience stronger discouraging effects than men. Implicitly, this approach assumes that in absence of asymmetric incentives, men and women should experience similar patterns of hirings and separations.

First, we provide general estimates of movements in the labor market, both into and out of jobs. These flows correspond to hirings and separations, and are both expressed as a percentage of workers. **Hirings** is defined as the ratio between the number of new matches in a given year and the number of employees in the previous year. New matches refer both to movements out of non-employment and to job-to-job flows. **Separations** refer to the probability of a ending a match, which could occur either because a worker find a better position (job-to-job flows) or because the worker became non-employed.<sup>12</sup> Hirings then indicate the proportion of new matches, whereas separations indicates the proportion of matches that are dissolved.

$$\text{Hirings} = \frac{\text{Flow}_{N \rightarrow E} + \text{Flow}_{Ei \rightarrow Ej}}{E_{t-1}} \quad \text{and} \quad \text{Separations} = \frac{\text{Flow}_{E \rightarrow N} + \text{Flow}_{Ei \rightarrow Ej}}{E_{t-1}},$$

where Ei and N refer to employment in position  $i \neq j$  and non-employment respectively.

We complement these measures with three additional indicators of labor market movements. First, a measure of gross reallocation, which depicts how much the labor market has changed, is defined as the sum of hirings and separations. In order to avoid counting the same flows twice, we subtract the job to job flows share in total employment. Second, a measure of net job creation, is computed as the difference between hirings and separations. Finally, we measure

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<sup>10</sup>A small fraction of LiT participants report multiple contemporaneous jobs. We identify the main occupation in a given year using the lowest ISCO code which corresponds to the highest skill level. "Nested" jobs, that is jobs that begin and end while an individual has another occupation are excluded from the analysis.

<sup>11</sup>Respondents are also asked about the year in which the firm began to operate, which could be used as a proxy for whether the firm was privatized or is a new private firm; however, we do not exploit the distinction between privatized and new firms

<sup>12</sup>The distinction between unemployed and inactive is hard to recover in LiT database, as workers were not asked about their search behavior during non-employment spells. This consideration also affected our decision to measure hirings as a percentage of the workforce instead of as the probability of finding employment.

excess reallocation as the difference between gross reallocation and the absolute value of net job creation. This difference measures the flows additional to those needed to adjust the workforce to the new conditions.

Table 1 displays the descriptive statistics of worker flows for the cohorts born before and after 1965. In this table we report measures averaged over the countries and only for the years for which we have matching samples allowing estimation of the adjusted gender wage gap. Table A3 extends the sample to cover all years for the same list of countries.

Table 1: Labor market flows for selected cohorts

	Hirings	Separations	Net	Gross	Excess
Cohorts born before 1965	0.05 (0.03)	0.08 (0.03)	-0.03 (0.03)	0.10 (0.04)	0.06 (0.04)
Cohorts born after 1965	0.17 (0.08)	0.09 (0.04)	0.08 (0.06)	0.20 (0.09)	0.12 (0.06)
N	117	117	117	117	117

*Data:* LiT survey. *Note:* Table presents non-weighted means of different worker flows, standard deviations in parentheses. *Hirings* is the ratio of new matches to employment; *separations* is the ratio of dissolved matches to employment; *net* is the difference between separations and hirings; *gross* is the sum flows to employment, out of employment and between jobs; *excess* is the difference between gross and the absolute value of net. Sample restricted country year pairs for which we can recover the gender wage gap. See Table A3 for averages for a complete sample countries and years available in LiT survey.

Table 1 reveals the capital importance of distinguishing between cohorts. Cohorts born after 1965 are characterized by higher hiring rates, relative to cohorts born before 1965. Such result is related to school-to-work transitions observed for the cohort born after 1965 in the years of LiT availability. By contrast, separations appear to be quite similar across cohorts, which results in the negative net changes for cohorts born before 1965, some of them related to retirement. Values of excess suggest that cohorts born after 1965 experienced more fluctuations in career patterns. Such observation might indicate that workers from earlier cohorts tended to remain in more stable sectors and industries, e.g. public administration, and mostly left employment to retire.

A drawback of measures reported in Table 1 is that although they reflect general labor market trends, they do not allow to capture which flows are related to globalization and/or transition. To address this point, we additionally estimate the **probability of leaving state owned enterprises** (SOE)<sup>13</sup> and the ratio of hirings in the private sector with respect to the total number of hirings, as proxies for the effect of transition. Second, we estimate the probability of leaving firms in the manufacturing sector and the ratio of flows into service sector over all hirings, as proxies for the effect of globalization.

$$\text{Inflow}_i = \frac{\text{Hirings}_{t,i}}{\sum_i \text{Hirings}_{t,i}} \quad \text{and} \quad \text{Outflows}_j = \frac{\text{Flow}_{E_j \rightarrow N} + \text{Flow}_{E_j \rightarrow E}}{E_{t-1,j}},$$

where  $i$  refers to either private sector or the service industry and  $j$  identifies SOE and manufacturing industry. Two clarifications are needed. First, sectors and industries are not mutually

<sup>13</sup>We identify workers in SOEs as those who are employed in public owned firms (self-reported) and who are not working in administration, education and health sectors.

exclusive. Flows from manufacturing in an SOE to a service firm in the private sector contribute to the four indicators: they are inflows to both services and private firms, and outflows from both manufacturing and the SOE. These flows, however, are rare. Second, these measures reflect changes in hiring and separation patterns, which do not necessarily affect total employment in each sector. If only firms in the private sector hire workers, the value of inflows equals one. Moreover, if all hirings represent job-to-job flows, then the net changes for private sector will be zero.<sup>14</sup>

The advantage of using these measures, as opposed to net changes in employment, is that the latter do not reflect fully the nature of labor market churning. The use of outflows could be considered as a better measure of the risk of losing employment than net changes, particularly when unemployment spells shorter than a year are not recorded, as it is the case with LiT. Inflows, on the other hand, emphasize the relative demand for labor in private and SOE, and in manufacturing and service industries. Table 2 presents the descriptive statistics of these measures of worker reallocation.

Table 2: Reallocation measures for two cohorts

	Outflows		Inflows	
	Manufactures	SOE	Services	Private
Cohorts born before 1965	0.08 (0.06)	0.14 (0.08)	0.49 (0.27)	0.60 (0.27)
Cohorts born after 1965	0.10 (0.1)	0.15 (0.14)	0.54 (0.2)	0.62 (0.23)
N	117	117	117	117

*Note:* Table presents unweighed means across countries and years for the utilized measures of labor market flows, standard deviations in parentheses. The measures are computed separately for two cohorts of workers: those born before and after 1965.  $Outflows_i$  is the ratio of dissolved matches to employment in sector  $i$ .  $Inflows_i$  is the proportion of hirings in sector  $i$  over all hirings. Sample restricted country year pairs for which we can recover the gender wage gap. Sample restricted country year pairs for which we can recover the gender wage gap. See Table A4 for averages for a complete sample countries and years available in LiT survey.

In spite of the differences in terms of labor market flows, there appears to be less evidence that cohorts born before and after 1965 differed in their transition patterns. Point estimates indicate that cohorts born after 1965 were more likely to experience reallocation to the new sector: they had a greater probability of leaving the old sectors (manufacturing and SOE) and flows to the new sectors represented a larger proportion of hirings. Differences, however, are only statistically significant among those that entered services. Table A4 indicate that these results do not depend on the period selected: when all years and all countries are included the means only change slightly.

A last question concerns to what extent data on flows in a particular year are representative of excess labor market churning in this country. Alternatively, we could also ask whether a given measure of transformation has the same interpretation in an otherwise stable environment and in a fluid labor market. To address this point we propose our final measure of labor market

<sup>14</sup>Naturally, employment changes in the sector could be negative if the sector experiences separations to non-employment.

flows. Following the contribution of Hausmann et al. (2005), we identify **episodes of rapid change**. Using LiT data, we identify episodes of rapid change in a given labor market as years in which a variable meets two criteria: the measure has high value in a given country (80<sup>th</sup> percentile as the threshold to define high values); and the measure grew 50% with respect to the previous year. Hence, our identification of episodes of change looks as follows:

$$Episode = \begin{cases} 1 & \text{if } variable_t > 80^{th} \text{ percentile and } variable_t > 1.5 * variable_{t-1} \\ 0 & \text{otherwise,} \end{cases} \quad (1)$$

where *variable* denotes previously discussed measures of labor market flows, computed separately for cohorts born before and after 1965 (displayed in Figures 2 and 3, respectively). We show only the eight transition economies, for which the data availability on the estimates of the adjusted gender wage gap is the longest. The vertical axes identifies whether an episode took place in that year (1) or not (0). The figure also indicates on which variable we recorded the episodes. Three options are possible: hirings, separations or both. The figure allows to observe the relative frequency of those episodes, as well as the synchronization.

Figures 2 and 3 reveal some interesting features of episodes. First, the number of episodes of hirings is higher than the number of episodes of separations. On average we observe up to three episodes of hirings per country, whereas the number of separations is much lower (around 2). This conclusion is reversed among cohorts born after 1965, see Figure 3.<sup>15</sup> Second, we can observe the degree of country heterogeneity both in terms of timing and in the number of episodes. The Czech Republic appears to have more episodes towards the end of the transition period; in Russia, episodes appear to be evenly split over time; and in Poland they appear to be concentrated in the period 1995 to 2000.

Episodes of more intensive flows do not appear to be synchronized. Figure 2 shows that only in one country-year, there was a simultaneous episode of hirings and separations. The number raises up to 6 among cohorts born after 1965, which represents still less than 10% of all episodes.<sup>16</sup> The analysis of flows related to structural reallocation, either due to transition to market economy or globalization, provides similar results. First, on average, episodes appear to be less frequent: we noted less than two episodes per country. Second, episodes of separations are more numerous than episodes of hirings, but in the case of structural flows, the distinction between cohorts born before and after 1965 is less pronounced. The number of episodes suggest that employment growth in the new sector was more spread over time than separations from the old sector. Last, correlation coefficients are non-significant, regardless of whether one focuses on episodes or levels. Episodes of separations then indicate an increase in non-employed population.

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<sup>15</sup>Results do not imply that hirings were larger than separations for older cohorts, or the converse among younger cohorts. In fact, hirings were larger among younger cohorts, and separations were larger among older cohorts. Episodes reflect how concentrated flows were.

<sup>16</sup>The lack of any significant correlation is documented in Table A5 in Appendix using correlation and partial correlation (adjusting for country and year effects) coefficients. Estimates show little signs of synchronization. Correlation coefficients are either non-statistically significant, or indicate that hirings and separations tended to move in opposite directions.

Figure 2: Number of hirings and separation episodes per year: cohorts born before 1965

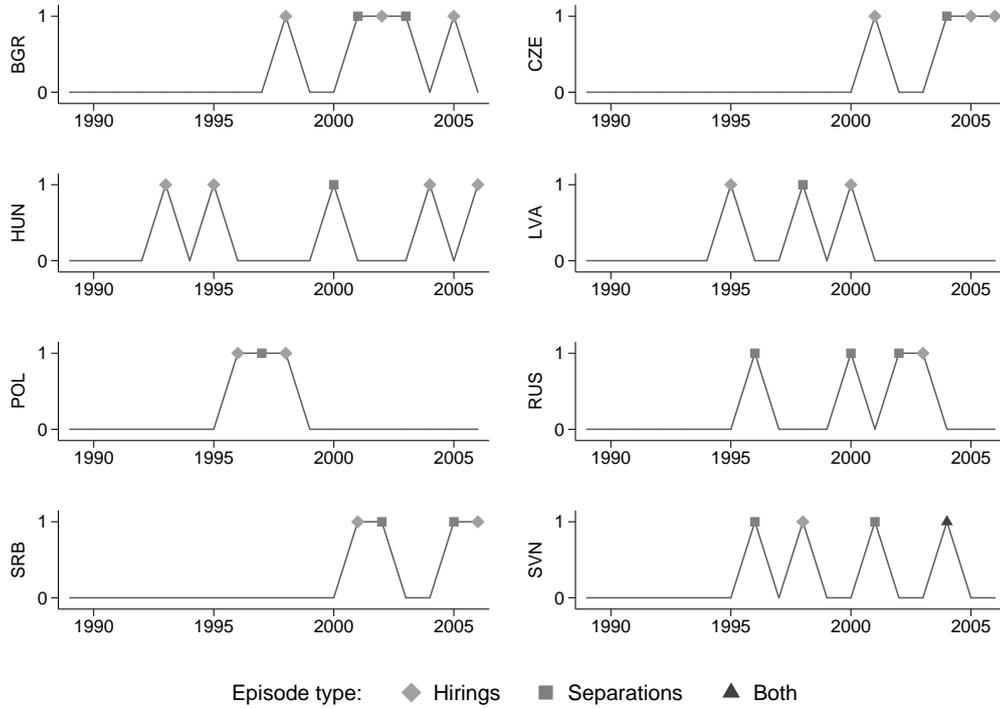
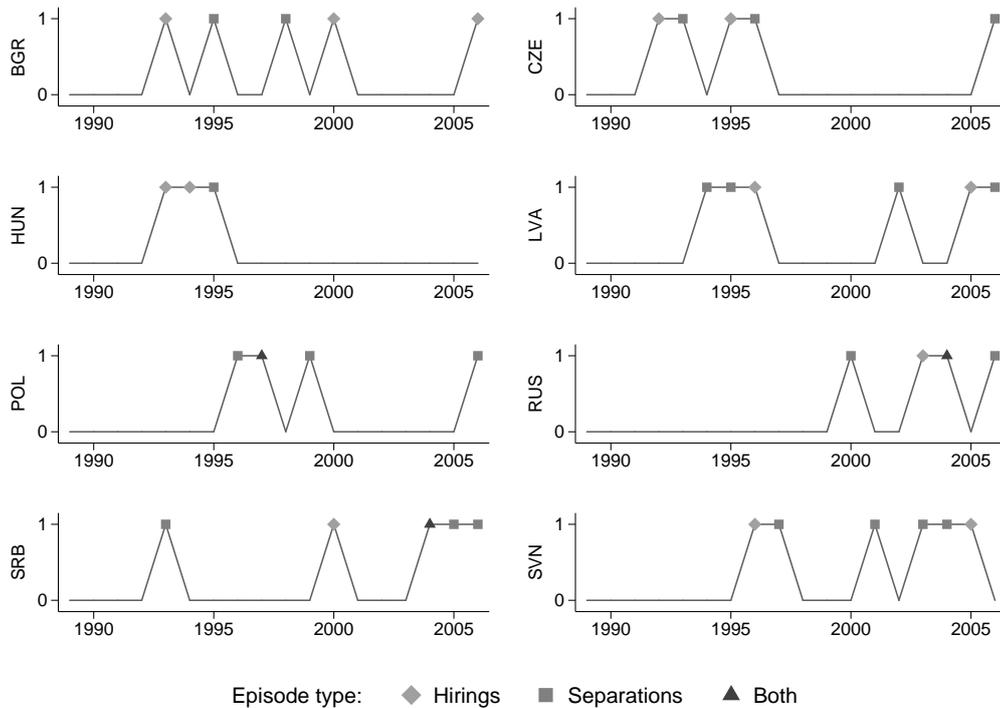


Figure 3: Number of hirings and separation episodes per year: cohorts born after 1965



Notes: Vertical axis indicate the number of episodes of rapid labor reallocation. Estimates for other countries / years and other measures available upon request.

## 4 Results

Our approach in this study consists of two steps. First, we compute comparable measures of adjusted gender wage gaps. These estimates are obtained by the means of the  $\tilde{N}$ opo (2008) decomposition. Subsequently, the gender wage gap estimates are used as explained variables, whereas labor market flows and episodes play the role of the correlates. This way we aim to analyze the relationship between the scope of the structural change and the (estimates of) adjusted gender wage gap. In Table A6 we provide summary statistics of the gender wage gaps for our two cohort groups. Gender wage gaps, adjusted or not, are quite similar in both cohorts, and hover around 20% - 25% of men's wages. However, for the cohort born after 1965 estimates present a greater dispersion, which might be related to the smaller sample sizes used in the estimation. As is standard in the gender wage gap literature, adjusted gender wage gap are greater than the raw gaps, suggesting that if workers from both genders faced the same rewards to their characteristics, women should earn more.<sup>17</sup> Estimates of adjusted gender wage gaps for transition countries are in excess of those for advanced economies. Moreover, estimates appear to be more spread in transition economies. These conclusions do not depend on the cohort split of the sample.

Data coverage by source differs substantially across countries and periods, as shown in Table A1 in the Appendix. Moreover, given differences in sample size across sources, estimates are unlikely to be equally reliable. Our strategy to deal with these concerns is twofold. First, we include fixed effects for the interaction of country and data source. Second, we provide weighted estimates, in the spirit common in meta-analyses, i.e. adjusting greater weight to more precise estimates of the adjusted gender wage gap (see Stanley and Jarrell 1998). We use the inverse of the standard deviation of the estimate of the adjusted gender wage gap as weight, correcting for the number of data sources for a given country and a given year. Finally, we cluster standard errors at country-year level.

For cohorts active before transition, more labor market flows are related to greater adjusted gender wage gaps, as signified by positive and significant coefficients in Tables 3 and 4. The exception from this rule are more intensive inflows to the market service sector; they display a small but statistically significant negative coefficient. By contrast, for cohorts born after 1965, i.e. in majority entering labor market after the beginning of the transition, there appears to be no significant relation between labor market flows and the adjusted gender wage gap. These results are not driven by the episodes of sudden changes in the labor market. In Table 5 we show the estimations for the episodes measures for the 9 indicators of the labor market flows. Columns indicate the variables used in the estimation of episodes. Thus, in the first column episodes reflect periods on which hirings were high and grew with respect to the previous year. Rows indicate the time span upon which episodes are considered: L1 indicates whether there

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<sup>17</sup>Given the short list of covariates included in the regression, the percent of matched men and women is large, regardless of the cohort under study. Hence, the contribution of differences in wage between workers in and out of the common sample on the total gender wage gap is unlikely to be substantial. The average value of these gaps conditional on observing some gap is presented in columns  $\Delta_M$  and  $\Delta_F$ .

was an episode in the year prior to the estimate of the gender wage gap; in L2 and L3, whether there was an episode in any of the two or three years prior to the estimate of the gender wage gap. While the general results are broadly confirmed – typically positive and significant correlations for cohorts born before 1965 and weak or no correlation for the younger cohorts – the coefficients are usually insignificant and of small magnitude. The presence of an sudden episode is associated with a change of the adjusted gender wage gap by a fraction of a percentage points. Hence, it appears that it is the constant intensity of flows and not selected years that make up for the correlations observed in Tables 3 and 4.

Two plausible explanations can be put forward. First, younger cohorts might be characterized by a lower variation in the estimates of the adjusted gender wage gap, as they are at earlier stages of their careers. However, evidence from Figure 1 and Table A6 suggests otherwise. Second, it is possible that the generational divide on the effects reflects the different segments of the labor market occupied by these two cohorts. If younger cohorts entered into the booming sectors, they might be less exposed to labor market churning that affected older cohorts. The other side of the coin is that demand for skills held by workers active prior to transition might have fallen, leading to greater adjusted gaps, e.g. due to asymmetric effects on participation of men and women (greater self selection among women).

A possible downside of previous specifications is that they provide information for those years on which the adjusted gender wage gap is estimated. Yet, there is no information on the context on which these measures were obtained. A value hirings of 0.2 might be quite large in Poland (known for rigid labor market), and at the same time relatively low Estonia (known for high labor mobility). To some extent, these effects are moderated by the inclusion of the country (and data source) fixed effects, but admittedly, not entirely. We provide several robustness checks to the results discussed above, these include having episode count (instead of incidence) and comprising both the measures of flows and the episodes indicators, to account for country specificity. The results are available in Tables A7 and A8.

Table 3: Labor market flows and adjusted gender wage gap

Cohort	Hirings	Separations	Net	Gross	Excess
Born before 1965	0.59** (0.26)	0.30* (0.17)	0.33** (0.17)	0.53** (0.24)	0.43** (0.22)
N	143	143	143	143	143
$R^2$	0.89	0.88	0.88	0.89	0.89
Born after 1965	-0.16 (0.23)	-0.01 (0.32)	-0.23 (0.19)	-0.08 (0.17)	0.10 (0.16)
N	139	139	139	139	139
$R^2$	0.87	0.87	0.87	0.87	0.87

*Notes:* Table presents coefficients of a regression of the adjusted gender wage gap on estimates of labor market flows. *Hirings* is the ratio of new matches to employment; *separations* is the ratio of dissolved matches to employment; *net* is the difference between separations and hirings; *gross* is the sum flows to employment, out of employment and between jobs; *excess* is the difference between gross and the absolute value of net.

All estimates are weighted by the inverse standard deviation of the adjusted gender wage gap and the inverse number of data points per country year. Additional controls include a set of dummy variables for years and country-source pairs. Standard errors clustered at the country-year level. \*, \*\*, \*\*\* indicate significance at the 15%, 10% and 1% level.

Table 4: Labor market flows related to transition and adjusted gender wage gap

Cohort	Outflows from		Inflows to	
	SOE	manufacturing	private	services
Born before 1965	0.20*** (0.08)	0.07 (0.12)	-0.04 (0.04)	-0.04** (0.02)
N	143	143	143	143
$R^2$	0.89	0.88	0.88	0.89
Born after 1965	0.01 (0.03)	0.05 (0.10)	-0.03 (0.02)	-0.01 (0.04)
N	139	139	139	139
$R^2$	0.87	0.87	0.87	0.87

*Notes:* Table presents coefficients of a regression of the adjusted gender wage gap on estimates of flows connected to transition.  $Outflows_i$  is the ratio of dissolved matches to employment in sector  $i$ .  $Inflows_i$  is the proportion of hirings in sector  $i$  over all hirings.

All estimates are weighted by the inverse standard deviation of the adjusted gender wage gap and the inverse number of data points per country year. Additional controls include a set of dummy variables for years and country-source pairs. Standard errors clustered at the country year level. \*, \*\*, \*\*\* indicate significance at the 15%, 10% and 1% level.

Table 5: Episodes of fast transition and the adjusted gender wage gap

	Hirings	Separations	Net	Gross	Excess	Outflows from SOE manufacturing		Inflows to private services	
Cohorts born before 1965									
$L_1$	-0.01 (0.02)	0.04*** (0.01)	-0.04* (0.02)	0.04* (0.02)	-0.01 (0.02)	0.05*** (0.02)	0.03*** (0.01)	0.03 (0.03)	0.01 (0.02)
$L_2$	0.01 (0.02)	0.02** (0.01)	-0.03 (0.02)	0.06*** (0.01)	-0.00 (0.02)	0.04*** (0.02)	0.04*** (0.01)	-0.03 (0.03)	-0.00 (0.01)
$L_3$	0.01 (0.02)	0.02 (0.01)	-0.00 (0.02)	0.06*** (0.01)	-0.01 (0.02)	0.04*** (0.02)	0.04*** (0.01)	-0.05*** (0.02)	-0.02 (0.02)
Cohorts born after 1965									
$L_1$	0.01 (0.02)	0.00 (0.02)	0.08*** (0.02)	0.14*** (0.04)	0.00 (0.05)	-0.02 (0.02)	-0.00 (0.02)	-0.03 (0.03)	-0.06 (0.05)
$L_2$	0.01 (0.02)	-0.00 (0.02)	0.02 (0.02)	0.01 (0.04)	0.00 (0.03)	-0.01 (0.02)	-0.01 (0.02)	-0.00 (0.02)	-0.03 (0.02)
$L_3$	0.00 (0.02)	0.01 (0.02)	0.03* (0.02)	0.02 (0.03)	0.00 (0.03)	-0.02 (0.01)	-0.01 (0.02)	-0.01 (0.01)	-0.00 (0.03)

*Notes:* Table presents coefficients of a regression of the adjusted gender wage gap on episodes of rapid labor market change. Each cell represents a different regression. Columns indicate the variable on which measures of rapid labor market change were obtained.  $L_n$  represent dummy variables on whether the country experienced an episode of reallocation of a given variable in any of the last  $n$  years. The remaining variables are defined as in Tables 3 and 4. All estimates are weighted by the inverse standard deviation of the adjusted gender wage gap and the inverse number of data points per country year. Additional controls include a set of dummy variables for years and country  $x$  data source fixed effects. Standard errors clustered at the country-year level. \*, \*\*, \*\*\* indicate significance at the 15%, 10% and 1% level.

Our analysis suggests the existence of a diverging tendencies between workers with prior working experience on the onset of transition and those who begun their careers in the market-based system. For cohorts working before 1965, the adjusted gender wage gap correlates with different measures of job flows and their intensity. Relation to different flows are mostly positive, suggesting that risk aversion might be behind changes in the gender wage gap among cohorts active at the onset of transition. However, the fact that effects tend to persist over time for separations to a greater extent than for hirings suggests that risk aversion might be only part of the story. Self-selection of women into the labor market could also play a role.

The lack of results for cohorts entering the labor market after transition has started, could be interpreted in a similar vein. Cohorts entering the labor market after transition might have lacked a “safe” alternative. Whereas older cohorts could have accepted wage cuts and wage arrears to in exchange for keeping the job, younger cohorts might have not been given that choice, as they lacked an employment to begin with. More importantly, “stable” jobs, such as those in administrative positions, might have been less so in the context of transition. By contrast, in the older cohorts wages were admittedly excessively compressed prior to the transition commencement, creating the room for decompression, which appears to have been not gender neutral. Consequently, whereas a combination of self-selection and risk aversion could help to explain why gender wage gaps in cohorts active before onset of transition are related to labor market, they have little explanatory power among cohorts that entered the labor market afterwards.

Transition countries offer a great natural experiment to study how rapid transformation of the labor market affect gender inequality, in this case how it could affect gender wage equality, adjusting for differences in characteristics. Our initial hypothesis was that periods of large structural change had an effect on wages asymmetric with respect to gender. Indeed, it appears that more labor flows tends to be less beneficial for women.

While the use of transition economies as a natural experiment is quite promising, data availability constrains empirical strategies. First, one could be interested in splitting cohorts into more groups. Some of the workers born after 1965 made their educational decisions under Socialist rule, and might be prone to suffer some of the same skill obsolescence than older workers. One could then expect that results of this group to be somewhere in-between those from cohorts born before 1965 and cohorts that made all decisions after the onset of transition. Then, estimating the relation independently from these groups could move the results of the later cohorts even further away from the older groups. Unfortunately, such a split would considerably reduce the samples used in the estimation of episodes of labor transformation from the LiTS database. Second, the lack of comparable data from all transitions country lead to the use of databases of varying reliability. We took steps to moderate this concern, namely include country-source fixed effects, weight observations by the inverse of the standard deviation of the estimate (giving more weight to the more precisely estimated adjusted gender wage gaps as is frequent in the meta-analytical literature) and cluster standard errors at country-year level.

A final concern arises from recognizing shortcomings of using retrospective data for the

estimation of the flows. If respondents are more able to recall more recent transitions, then our estimates of job flows are biased. In our case, such concern appear to be not significant. First, descriptive evidence on the number of episodes indicates that while there is a spike between 2005 and 2006, these are not the sole years for which we observe episodes. Depending on the country and cohort, episodes might be found as early as 1994, as shown in Figures 2 and 3. Second, even if flows were concentrated towards the end of the sample period, their influence should be smaller in regressions including lags, which still show the importance of globalization and reallocation processes.

## 5 Conclusions

Gender wage differentials have garnished considerable attention of the researchers worldwide. Notwithstanding, comparative studies remain rare. For one, such analyses require micro-data sets which are relatively difficult to acquire and of diverse quality. For another, the profession has to a large extent focused on developing reliable measures of adjusted wage gaps, rather than on the comparative analyses. Few existing comparative papers either focus on the raw gap (e.g. Polachek and Xiang 2014) or employ meta-analysis techniques to control for differences in estimation procedure (e.g. Stanley and Jarrell 1998, Weichselbaumer and Winter-Ebmer 2007). Our paper aimed to partially fill this gap. We employed a relatively robust non-parametric technique developed by Āopo (2008) to provide comparable estimates for over 150 databases from post-communist economies in the early years of transition. We utilize these estimates to provide additional insight on the determinants of the adjusted gender wage gap.

Whereas previous research focused on long term processes, such as institutional change, we explore the role played by structural transformation of the labor market, particularly periods of large and sudden changes, hence our selection of transition economies. These countries experienced a period of rapid adjustment of the labor market, which responded to two forces: transition from probably overmanned and inefficient state-owned enterprises to private firms; and reallocation of production away from manufacturing and into services resulting from globalization forces. We seek to learn whether the churning resulting from the two sources of reallocation affected wages of a vulnerable group asymmetrically.

Results from transition economies suggest a positive correlation between the adjusted gender wage gap and worker flows, particularly among cohorts that were active before the onset of transition. This cohort divide is related to the mismatch between skills acquired during the centrally-planned economy period and those demanded by the emerging productive structure, which put older workers in general in a more disadvantageous position. This appears to have led to greater wage inequality between men and women, after adjusting for differences in individual characteristics. Such interpretation is supported by the fact that flows out of the inefficient sector, and especially episodes of rapid increases in those flows, showed a strong positive relation with the gender wage gap among older cohorts.

In a broader context, these results indicate that crises have asymmetric effects in the labor market, with stronger effects among groups in a disadvantageous position, such as women, but

also migrants or other minorities. Such effects call for policies that help to cushion business cycle effects targeted at workers from these groups. A possible example, related to the skill obsolescence narrative from transition economies, could consist of maintaining gender quotas in re-skilling and activation programs targeted at nonemployed individuals. It is also possible that the positive role of flows out of the inefficient sector could be related to social norms. To the extent that women are considered secondary earners, their income might be perceived as less relevant for the household and a higher separation rate among women as a “lesser evil.” The mechanism which translates such patterns to increased gender wage gaps could consist of two types of adjustments. On the one hand, in low paying jobs women are fired more intensively, but wages were less unequal in this group, hence making the increase in the adjusted gender wage gap a composition problem. On the other hand, wage bargaining position of workers – in general weaker at the moments of large structural change – could be more abused towards disadvantageous groups, such as women or minorities. With the currently available data, we are unable to discriminate empirically between the two mechanisms, but both call for policies targeted at disadvantageous groups.

Even though our study uses a comprehensive collection of micro-datasets, the majority of the countries analyzed belong to Central and Eastern Europe. Hence, our conclusions cannot be literally extended to Former Soviet Bloc countries, nor to other formerly centrally planned economies, such as Nicaragua or Vietnam. Moreover, we find evidence for labor market flows *per se*, but no results suggest that the patterns observed are confined to a transition from a centrally planned to a market economy. Rather, we interpret our findings as encouragement to seek further relationship between labor market flows and (adjusted gender) wage inequality.

## References

- Acemoglu, D., Autor, D. H. and Lyle, D.: 2004, Women, war, and wages: The effect of female labor supply on the wage structure at midcentury, *Journal of Political Economy* **112**(3), 497–551.
- Adamchik, V. A. and Bedi, A. S.: 2003, Gender pay differentials during the transition in poland, *The Economics of Transition* **11**(4), 697–726.
- Ammermüller, A., Heijke, H. and Wößmann, L.: 2005, Schooling quality in eastern europe: Educational production during transition, *Economics of Education Review* **24**(5), 579–599.
- 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., Ñopo, H. and Winder, N.: 2012, *New Century, Old Disparities: Gender and Ethnic Wage Gaps in Latin America*, World Bank Publications.
- 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.
- Bartolucci, C.: 2013, Gender wage gaps reconsidered a structural approach using matched employer-employee data, *Journal of Human Resources* **48**(4), 998–1034.
- Bertrand, M., Kamenica, E. and Pan, J.: 2015, Gender identity and relative income within households, *The Quarterly Journal of Economics* **130**(2), 571–614.
- Biddle, J. E. and Hamermesh, D. S.: 2013, Wage discrimination over the business cycle, *IZA Journal of Labor Policy* **2**(1), 1–19.
- Black, S. E. and Spitz-Oener, A.: 2010, Explaining women’s success: Technological change and the skill content of women’s work, *Review of Economics and Statistics* **92**(1), 187–194.
- Blau, F. D. and Kahn, L. M.: 1992, The gender earnings gap: learning from international comparisons, *The American Economic Review* **82**(2), 533–538.
- Blau, F. D. and Kahn, L. M.: 1996, Wage structure and gender earnings differentials: an international comparison, *Economica* pp. S29–S62.

- 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.: 2017, The gender wage gap: Extent, trends, and explanations, *Journal of Economic Perspectives* **forthcoming**.
- 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.: 2003, After, before and during: returns to education in Hungary (1986–1998), *Economic Systems* **27**(4), 377–390.
- Card, D., Cardoso, A. R. and Kline, P.: 2016, Bargaining, sorting, and the gender wage gap: Quantifying the impact of firms on the relative pay of women, *The Quarterly Journal of Economics* **131**(2), 633–686.
- 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.
- Cha, Y. and Weeden, K. A.: 2014, Overwork and the slow convergence in the gender gap in wages, *American Sociological Review* **79**(3), 457–484.
- Chi, W. and Li, B.: 2008, Glass ceiling or sticky floor? Examining the gender earnings differential across the earnings distribution in urban China, 1987–2004, *Journal of Comparative Economics* **36**(2), 243–263.
- Christofides, L. N., Polycarpou, A. and Vrachimis, K.: 2013, Gender wage gaps, “sticky floors” and “glass ceilings” in Europe, *Labour Economics* **21**, 86–102.
- Cortes, P. and Pan, J.: 2013, Outsourcing household production: Foreign domestic workers and native labor supply in Hong Kong, *Journal of Labor Economics* **31**(2), 327–371.
- Cortes, P. and Pan, J.: 2016, When time binds: Returns to working long hours and the gender wage gap among the highly skilled, *IZA Discussion Papers 9846*, Institute for the Study of Labor (IZA).
- Denny, K. and Doyle, O.: 2010, Returns to basic skills in central and eastern Europe, *Economics of Transition* **18**(1), 183–208.
- 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 für ArbeitsmarktForschung - Journal for Labour Market Research* **41**(2/3), 157–179.

- Falch, T. and Naper, L. R.: 2013, Educational evaluation schemes and gender gaps in student achievement, *Economics of Education Review* **36**, 12–25.
- Fernández, R., Fogli, A. and Olivetti, C.: 2004, Mothers and sons: Preference formation and female labor force dynamics, *The Quarterly Journal of Economics* **119**(4), 1249–1299.
- Firpo, S., Fortin, N. M. and Lemieux, T.: 2009, Unconditional quantile regressions, *Econometrica* **77**(3), 953–973.
- Fortin, N., Lemieux, T. and Firpo, S.: 2011, Decomposition methods in economics, *Handbook of labor economics* **4**, 1–102.
- 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.: 2006, Institutions, markets and men’s and women’s wage inequality: Evidence from ukraine, *Journal of Comparative Economics* **34**(2), 200–227.
- 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.
- Goldin, C.: 2014, A grand gender convergence: Its last chapter, *American Economic Review* **104**(4), 1091–1119.
- Goldin, C. and Olivetti, C.: 2013, Shocking labor supply: A reassessment of the role of world war ii on women’s labor supply, *The American Economic Review* **103**(3), 257–262.
- Goraus, K., Tyrowicz, J. and van der Velde, L.: 2017, Which Gender Wage Gap Estimates to Trust? A Comparative Analysis, *Review of Income and Wealth* **63**(1), 118–146.
- 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.
- Gregory, P. R., Mokhtari, M. and Schrettl, W.: 1999, Do the Russians really save that much? Alternate estimates from the Russian Longitudinal Monitoring Survey, *Review of Economics and Statistics* **81**(4), 694–703.
- Hansen, J.: 2007, Human capital and welfare dynamics in Canada, *The B.E. Journal of Economic Analysis & Policy* **7**(1).
- Hausmann, R., Pritchett, L. and Rodrik, D.: 2005, Growth accelerations, *Journal of Economic Growth* **10**(4), 303–329.
- Hirsch, B. T. and Winters, J. V.: 2014, An anatomy of racial and ethnic trends in male earnings in the US, *Review of Income and Wealth* **60**(4), 930–947.

- Hoyos, A., Ñopo, H. and Pena, X.: 2010, The persistent gender earnings gap in Colombia, 1994-2006, *IZA Discussion Paper 5073*, Institute for the Study of Labor (IZA).
- Hsieh, C.-T., Hurst, E., Jones, C. I. and Klenow, P. J.: 2013, The Allocation of Talent and US Economic Growth, *Working Paper 18693*, National Bureau of Economic Research.
- Huber, M., Lechner, M. and Wunsch, C.: 2013, The performance of estimators based on the propensity score, *Journal of Econometrics* **175**(1), 1–21.
- 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.
- Johnston, D. W., Lordan, G. et al.: 2014, When work disappears: Racial prejudice and recession labour market penalties, *Discussion Paper 1257*, Centre for Economic Performance, LSE.
- 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.
- Kassenboehmer, S. C. and Sinning, M. G.: 2014, Distributional changes in the gender wage gap, *Industrial & Labor Relations Review* **67**(2), 335–361.
- 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).
- Lavy, V. and Sand, E.: 2015, On the origins of gender human capital gaps: Short and long term consequences of teachers' stereotypical biases, *Working Paper 20909*, National Bureau of Economic Research, Inc.
- 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.
- Lilien, D. M.: 1982, Sectoral shifts and cyclical unemployment, *Journal of Political Economy* **90**(4), 777–793.
- 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.
- Madalozzo, R. and Martins, S. R.: 2007, Gender wage gaps: Comparing the 80s, 90s and 00s in brazil., *Revista de Economia e Administraco* **6**(2).

- Mandel, H.: 2012, Winners and losers: The consequences of welfare state policies for gender wage inequality, *European Sociological Review* **28**(2), 241–262.
- 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.
- Mandel, H. and Shalev, M.: 2009, How welfare states shape the gender pay gap: a theoretical and comparative analysis, *Social Forces* **87**(4), 1873–1911.
- 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.
- Mussida, C. and Picchio, M.: 2014, The gender wage gap by education in Italy, *The Journal of Economic Inequality* **12**(1), 117–147.
- Newell, A. and Reilly, B.: 1999, Rates of return to educational qualifications in the transitional economies, *Education economics* **7**(1), 67–84.
- Ñopo, H.: 2008, Matching as a tool to decompose wage gaps, *The Review of Economics and Statistics* **90**(2), 290–299.
- Ñopo, H., Daza, N. and Ramos, J.: 2012, Gender earning gaps around the world: a study of 64 countries, *International Journal of Manpower* **33**(5), 464–513.
- 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.
- Olivetti, C. and Petrongolo, B.: 2014, Gender gaps across countries and skills: demand, supply and the industry structure, *Review of Economic Dynamics* **17**(4), 842–859.
- Oostendorp, R. H.: 2009, Globalization and the gender wage gap, *The World Bank Economic Review* **23**(1), 141–161.
- Orazem, P. F. and Vodopivec, M.: 1997, Value of human capital in transition to market: Evidence from Slovenia, *European Economic Review* **41**(3), 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.
- Polachek, S. W. and Xiang, J.: 2014, The gender pay gap across countries: A human capital approach, *Discussion Papers 8603*, Institute for the Study of Labor (IZA).

- Pratap, S., Quintin, E. et al.: 2006, Are labor markets segmented in argentina? a semiparametric approach, *European Economic Review* **50**(7), 1817–41.
- 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.
- Stockhammer, E. and Onaran, E.: 2009, National and sectoral influences on wage determination in Central and Eastern Europe, *European Journal of Industrial Relations* **15**(3), 317–338.
- Strand, S.: 2014, School effects and ethnic, gender and socio-economic gaps in educational achievement at age 11, *Oxford Review of Education* **40**(2), 223–245.
- Trapido, D.: 2007, Gendered transition: Post-Soviet trends in gender wage inequality among young Full-Time workers, *European Sociological Review* **23**(2), 223–237.
- Tyrowicz, J., van der Velde, L. and Siwinska, J.: 2015, Language and (the estimates of) the gender wage gap, *Economics Letters* **136**, 165 – 170.
- 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.
- Zohoori, N., Mroz, T. A., Popkin, B., Glinskaya, E., Lokshin, M., Mancini, D., Kozyreva, P., Kosolapov, M. and Swafford, M.: 1998, Monitoring the economic transition in the Russian Federation and its implications for the demographic crisis - the Russian Longitudinal Monitoring Survey, *World Development* **26**(11), 1977–1993.

## 6 Appendix

Table A1: Countries and years included in the analysis

Country	ISSP	LFS	LMS	LSMS	SES
BGR	1992/1993, 1997/2000, 2002/2005			1995, 1997, 2001	2002, 2006
CZE	1992, 1995/1999				2002, 2006
EST					2002, 2006
HRV	2006				
HUN	1990, 1992/1999, 2002/2006				2002, 2006
LTU					2002, 2006
LVA	1995/1996, 1998/2006				2002, 2006
POL	1991/1999, 2001/2004, 2006	1995/2006			2002, 2006
ROM					2002, 2006
RUS	1991/1997, 1999, 2001, 2003, 2005/2006		1994/1996, 1998, 2000/2006		
SRB		1995/2002		2002/2003	
SVK	1999, 2002/2004				2002, 2006
SVN	1993/2006				
UKR			2003/2004		

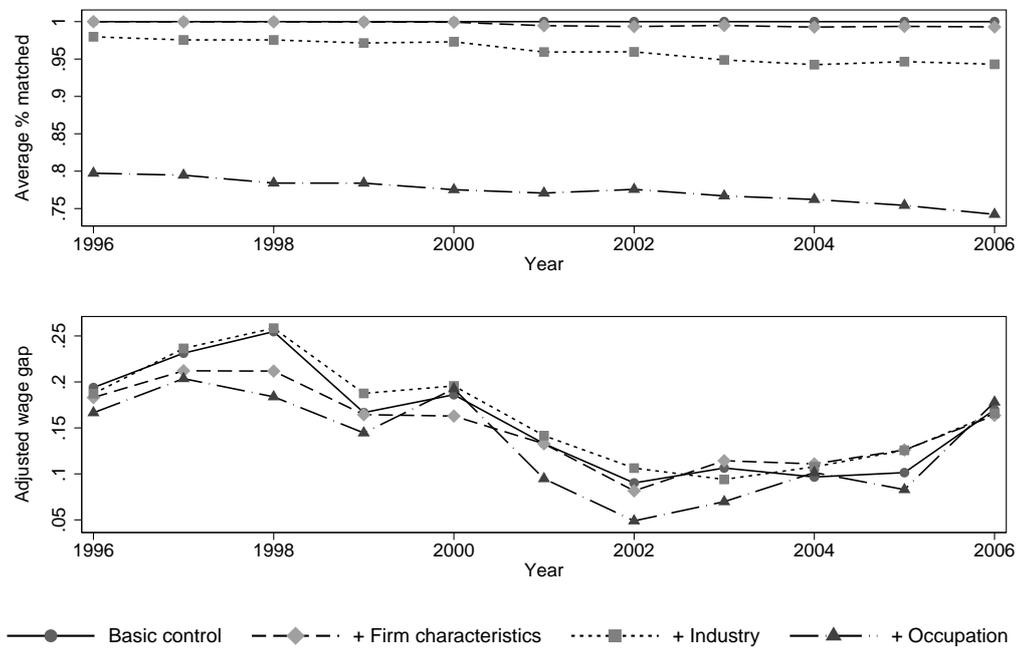
*Notes:* Table displays different datasources used to recover the gender wage gap for each country and year included in our analysis. *ISSP* stands for the International Social Survey Program; *LFS* for national labor force surveys; *LMS* for Longitudinal monitoring survey (Ukraine and Russia); *LSMS* for Living Standards and Measurement Survey; *SES*, for Structure of Earnings Survey. More information on each database are available on the main text.

Table A2: Countries and years included for comparison purposes

Country	ECHP	ISSP	LFS	SES
AUS		1990/1995		
AUT	1995/2001			
CHE		1996/1997, 2001, 2005/2006		
CYP		1997		2002, 2006
DEU	1994/2001	1989/1993, 1997/2000, 2002/2006		2006
DNK	1994/2001			
ESP	1994/2001			2002, 2006
FIN	1996/2001	2001/2006		2002, 2006
FRA	1994/2001		1989/2006	2002, 2006
GBR	1994/2001		1996/1998, 2000, 2002/2006	2002, 2006
GRC	1994/2001			2002, 2006
IRL	1994/2001			
ITA	1994/2001	1994, 1997/1998		2002, 2006
LUX	1994/2001			2002, 2006
NLD	1994/2001			2002, 2006
NOR		1989, 1996/2006		2002, 2006
PRT	1994/2001			2002, 2006
SWE	1998/2001	1994, 1997/2000, 2002/2006		2002, 2006

*Notes:* Table displays different datasources used to recover the gender wage gap for each country and year included in our analysis. *ECHP* stands for the European Community Household Panel; *ISSP* for the International Social Survey Program; *LFS* for national labor force surveys; and *SES*, for Structure of Earnings Survey. More information on these databases available in the main text.

Figure A1: Comparison of gender wage gaps and percentage match under different controls



*Notes:* The upper figure displays the evolution of workers in the common support under different specifications. The measure used is the average of the percentage matched for men and women. The lower figure displays the evolution of the adjusted gender wage gap. *Basic controls* include age, education, marital status and a dummy for cities over 20 000 inhabitants. *Firm characteristics* adds size of the firm, ownership status and a dummy for whether worker has a full time position. *Industry* adds industry of employment, coded using NACE 1 codes. *Occupation* adds ISCO 88 occupational codes at the 1 digit level. All estimations are conducted on Polish LFS data.

Table A3: Labor market flows: all years

	Hirings	Separations	Net	Gross	Excess
Cohorts born before 1965	0.05 (0.03)	0.08 (0.03)	-0.03 (0.03)	0.10 (0.04)	0.06 (0.04)
Cohorts born after 1965	0.17 (0.08)	0.09 (0.05)	0.08 (0.07)	0.20 (0.09)	0.12 (0.07)
N	252	252	252	252	252

*Note:* Table presents average and standard deviations of different worker flows, in parentheses, for two cohorts of workers: those born before and after 1965. *Hirings* is the ratio of new matches to employment; *separations* is the ratio of dissolved matches to employment; *net* is the difference between separations and hirings; *gross* is the sum flows to employment, out of employment and between jobs; *excess* is the difference between gross and the absolute value of net. Sample includes only countries for which we estimate the gender wage gap, see Table A2, all years included.

Table A4: Measures of transition: all years

	Outflows		Inflows	
	Manufacturing	SOE	Services	Private
Cohorts born before 1965	0.08 (0.05)	0.14 (0.08)	0.50 (0.28)	0.64 (0.25)
Cohorts born after 1965	0.09 (0.09)	0.16 (0.13)	0.56 (0.18)	0.66 (0.19)
N	252	252	252	252

*Note:* Table presents average and standard deviations of different measures of transitions, in parentheses, for two cohorts of workers: those born before and after 1965. *Outflows<sub>i</sub>* is the ratio of dissolved matches to employment in sector *i*. *Inflows<sub>i</sub>* is the proportion of hirings in sector *i* over all hirings. Sample restricted countries for which we estimate the gender wage gap, see Table A2, all years included.

Table A5: Synchronicity of flows in labor markets

		Global	Transition	Globalization
Episodes	Correlation	-0.05	-0.06	-0.09*
Episodes	Partial correlation	-0.04	-0.14***	-0.07
Levels	Correlation	-0.32***	0.03	-0.12***
Levels	Partial correlation	0.11**	-0.03	-0.13***

*Notes:* Table displays correlation and partial correlation coefficients of measures of hirings and separations. Global refers to correlation between hirings and separations; transition, to the correlation between importance of private sector in hirings and separations from public sector; and globalization, to the correlation between importance of services in hirings and separations from manufacture industry. The number of observations is 308.

Table A6: Summary statistics of the matching

	Raw gap	$\Delta_A$	$\Delta_M$	$\Delta_F$	$\Delta_X$	% matched	
						male	female
Cohorts born before 1965							
Median	0.19	0.23	0.00	0.00	-0.03	1.00	1.00
p10	-0.02	0.06	-0.01	-0.05	-0.11	1.00	1.00
p90	0.39	0.46	0.02	0.01	0.02	1.00	1.00
Cohorts born after transition							
Median	0.18	0.25	-0.01	0.00	-0.04	1.00	1.00
p10	-0.08	0.06	-0.04	-0.01	-0.11	1.00	1.00
p90	0.55	0.63	0.00	0.01	0.01	1.00	1.00
Developed countries							
Median	0.15	0.17	0.00	0.00	0.00	1.00	1.00
p10	0.05	0.06	0.00	0.00	-0.05	1.00	1.00
p90	0.28	0.31	0.00	0.00	0.02	1.00	1.00

*Notes:* Table displays results of the estimation of the gender wage gap.  $\Delta_A$  stands for the adjusted gender wage gap;  $\Delta_M$ , for differences in wages between matched and unmatched men;  $\Delta_F$ , for differences in wages between matched and unmatched women; and  $\Delta_X$  for the explained component of the gap. All estimates presented as percentage of average male wage. For a full list of countries, databases and years under analysis refer to Tables A1 A2 in the Appendix.

Table A7: Episodes count and the gender wage gap

# of episodes	Hirings	Separations	Net	Gross	Excess	Ouflows from SOE	Manuf.	Inflows to private	services
Cohorts born before 1965									
1	-0.01 (0.03)	0.04 (0.03)	0.01 (0.03)	0.04* (0.03)	-0.07*** (0.03)	0.04* (0.02)	0.04** (0.02)	0.05 (0.04)	0.05 (0.06)
2	-0.03 (0.04)	0.04 (0.09)	0.00 (0.03)	0.13*** (0.05)	-0.01 (0.04)	0.04* (0.03)	0.07*** (0.03)	-0.04 (0.05)	0.04 (0.08)
3	0.06 (0.06)	0.03 (0.09)	-0.04 (0.06)	0.00 (0.00)	-0.03 (0.04)	-0.03 (0.04)	0.04 (0.06)	-0.14** (0.07)	0.13 (0.10)
4	0.04 (0.05)						0.00 (0.07)		
N	154	154	154	154	154	154	154	154	154
R <sup>2</sup>	0.88	0.87	0.87	0.88	0.88	0.87	0.88	0.88	0.88
Cohorts born after 1965									
1	-0.03 (0.08)	-0.11** (0.06)	-0.02 (0.43)	0.23 (0.20)	-0.12 (0.11)	-0.03 (0.07)	-0.01 (0.08)	-0.17 (0.17)	0.03 (0.14)
2	-0.04 (0.08)	-0.13* (0.08)	-0.03 (0.42)	0.23 (0.23)	-0.20* (0.12)	-0.06 (0.09)	-0.07 (0.10)	-0.17 (0.17)	-0.10 (0.19)
3	-0.08 (0.08)	-0.11** (0.06)	0.00 (0.00)		-0.15 (0.15)	-0.13 (0.11)	-0.08 (0.08)	-0.08 (0.15)	0.00 (0.00)
4		-0.12* (0.07)					-0.04 (0.07)		
N	154	154	154	154	154	154	154	154	154
R <sup>2</sup>	0.80	0.80	0.80	0.80	0.81	0.80	0.80	0.80	0.81

*Notes:* Table presents coefficients of a regression of the adjusted gender wage gap on the number of episodes of rapid labor market change experience by the country since 1989. Columns indicate the variable on which measures of rapid labor market change were obtained. Variables are defined as in Tables 3 and 4. All estimates are weighted by the inverse standard deviation of the adjusted gender wage gap and the inverse number of datapoints per country year. Additional controls include fixed effects for years and country-source pairs. Standard errors clustered at the country year level.

Table A8: Flows and gender wage gap: alternative measures

# of episodes	Hirings	Separations	Net	Gross	Excess	Outflows from SOE manufacturing		Inflows to private services	
Cohorts born before 1965									
Flows	0.59*** (0.24)	0.29* (0.17)	0.33** (0.17)	0.53** (0.23)	0.43** (0.21)	0.20*** (0.07)	0.06 (0.12)	-0.05 (0.04)	-0.03 (0.02)
Episodes									
L1	-0.02 (0.02)	0.04*** (0.01)	-0.05*** (0.02)	0.02 (0.03)	-0.03 (0.03)	0.03* (0.02)	0.01 (0.03)	0.03 (0.04)	0.02 (0.02)
L2	-0.00 (0.02)	0.04*** (0.01)	-0.03 (0.02)	0.05*** (0.02)	-0.02 (0.02)	0.03** (0.01)	0.05*** (0.02)	-0.04** (0.02)	0.00 (0.02)
L3	-0.01 (0.02)	0.04*** (0.01)	0.01 (0.02)	0.05*** (0.02)	-0.02 (0.02)	0.03** (0.01)	0.05*** (0.01)	-0.04** (0.02)	-0.01 (0.03)
Cohorts born after 1965									
Flows	0.08** (0.04)	0.11 (0.23)	0.07 (0.16)	0.12*** (0.02)	0.14 (0.15)	-0.01 (0.04)	0.06 (0.11)	-0.03** (0.02)	-0.00 (0.05)
Episodes									
L1	-0.02 (0.03)	-0.01 (0.04)	0.00 (0.05)	0.10** (0.05)	-0.00 (0.06)	-0.03 (0.04)	-0.01 (0.05)	-0.05* (0.03)	-0.09* (0.06)
L2	0.00 (0.02)	0.01 (0.02)	0.00 (0.03)	0.03 (0.03)	0.01 (0.02)	-0.00 (0.02)	-0.03* (0.02)	-0.04 (0.04)	-0.06* (0.04)
L3	0.00 (0.02)	0.01 (0.02)	0.00 (0.03)	0.04 (0.03)	-0.02 (0.04)	-0.02 (0.02)	-0.06*** (0.02)	-0.03 (0.03)	-0.00 (0.04)

*Notes:* Table presents coefficients of a regression of the adjusted gender wage gap estimated on contemporaneous labor market flows and indicators, and on episodes of rapid labor market change. Controls for occupations included in the estimation of the adjusted gender wage gap.

Each cell represents a different regression. Columns indicate the variable on which measures of rapid labor market change were obtained.  $L_n$  represent dummy variables on whether the country experienced an episode of reallocation of a given variable in any of the last  $n$  years. Variables are defined as in Tables 3 and 4. All estimates are weighted by the inverse standard deviation of the adjusted gender wage gap and the inverse number of datapoints per country year. Additional controls include a set of dummy variables for years and country-source pairs. Standard errors clustered at the country year level.