Do personality differences explain the gender pay gap?
Evidence from three transition economies

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Abstract

We use data from an employee survey conducted in Russia, Armenia and Kazakhstan to study the contribution of gender differences in personality to gender differences in pay. In particular, we focus on the influence of locus of control (LOC) because there is evidence from studies conducted in developed market economies suggesting that individuals with an internal LOC (i.e. those who believe that their success is determined by own actions) demonstrate greater initiative and better performance than individuals with an external LOC (i.e. those who believe that their success is determined by external forces). Similar to these studies, we find that among the participants of our survey, men are more likely to exhibit an internal LOC, while women are more likely to have an external LOC. Gender differences in LOC are particularly large among Russian employees, while very small in the Kazakhstan sample. Additionally, we find that an internal LOC is associated with higher pay for both male and female participants of the Armenian and Russian surveys. In Kazakhstan, the estimated effects of LOC are positive, but small and very noisy. The results from the Oaxaca-Blinder-Neumark wage gap decomposition show that among the participants of the surveys, gender differences in LOC explain 5.5% of the gender pay gap in Armenia, 7% of the gap in Russia, and 2.7% of the gap in Kazakhstan. We suggest possible explanations for the observed cross-country differences and discuss policy implications.

1. Introduction

It is a well-established fact that women's earnings are lower than men's earnings, although the size of the gender pay gap varies with the characteristics of labor market institutions and degree of economic development (Blau and Kahn 2003, Brainerd 2000). It would probably be accurate to say that substantial gender differences in pay have been found in all countries ever studied by economists. Why are the earnings of men and women so different? Do observed discrepancies in earnings reflect true gender differences in productivity, or are they a consequence of discriminatory practices exercised by employers? Studies conducted in developed market economies find that part of the gender pay differential is attributable to the variation in education and experience by gender (see, for example, Blau 1998 and Gunderson 1989). Gender segregation was found to be particularly important in explaining male-female earnings differences in transition economies (Jurajda 2003, Ogloblin 1999). Nevertheless, these factors explain only a limited portion of the gender pay gap, and the remaining difference is typically regarded as a measure of gender discrimination.

The recent literature recognizes that taking into account skills and cognitive abilities may not be enough when studying individual differences in productivity. Indeed, an impressive array of research shows that performance is influenced by personality, where the considered personality traits include preference for performing in competitive environments (Gneezy et al. 2003, Niederle and Vesterlund 2006), individual locus of control (Andrisani 1977, Goldsmith et al. 2000, Heckman et al. 2006, Linz and Semykina 2006, Osborne Groves 2005, Semykina and Linz 2006), self-esteem (Goldsmith et al. 1997, Heckman et al. 2006, Murnane et al. 2001), and others. These findings demonstrate that certain personality traits

entail productivity-enhancing non-cognitive skills and should be incorporated into the earnings analysis.

Numerous psychological studies find that personality traits tend to vary by gender (Feingold 1994, Kling et al. 1999, Smith et al. 1997, and references therein), which suggests that personality may contribute to the discrepancies in earnings of men and women. However, research investigating this issue is scarce. To the best of our knowledge, only two studies consider personality factor in the analysis of gender pay gap. Mueller and Plug (2004) use data from the Longitudinal Study of Wisconsin high school graduates to examine the contribution of personality traits to gender differences in pay. In one of our earlier studies (Semykina and Linz 2006), we analyze personality differences by gender and male-female differences in pay among Russian workers. Both studies find that gender differences in personality explain part of the gender pay gap, which underscores the importance of further research in this area.

Although the influence of non-cognitive skills on productivity and earnings is well-documented in the literature, the existing evidence is based predominantly on the studies of developed market economies. Whether the same results hold in other economic environments – such as less developed countries and transition economies – requires separate investigation. Similarly, relatively little is known about gender differences in personality in less developed and former socialist countries. The goal of our study is to address this gap in the literature by considering personality and its relation to gender differences in pay in three transition economies.[1]

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[1] Although the transition to market may have already been completed, we will still refer to these economies as transition economies.

We use data collected in 2005 from employees in Armenia, Kazakhstan, and Russia to examine gender differences in personality and their role in explaining the gender earnings gap. We argue that as the market economy emerges and labor markets develop, wages will begin to match labor productivity, and non-cognitive skills will be rewarded in a manner consistent with what has been found in developed market economies. That is, earnings of men and women will be influenced by personality characteristics, and the effect will vary between men and women.

A specific personality trait that we consider is Rotter's locus of control (Rotter 1966), which describes an individual's propensity to attribute own success to either personal actions (an internal locus of control) or external forces (external locus of control). Similar to the studies conducted in developed market economies, we find that internal locus of control is associated with higher earnings. We also find that gender differences in personality among the participants of our surveys essentially match those reported in existing studies; in particular, men tend to be more internal than women. Among Armenian and Russian employees, gender differences in personality explain a nontrivial part of the gender pay gap.

The significance of our results is twofold. First, we show that personality affects earnings of workers in these three transition economies, which implies that non-cognitive skills enhance labor productivity in various economic environments. And second, we demonstrate that a part of the gender pay gap that would regularly be attributed to discrimination is in fact a market response to differences in productivity by gender.

Our findings have important implications for the studies of gender pay gap, since they suggest that our understanding of the underlying sources of the gender differences in pay can be improved by considering personality factor. Additionally, our findings have direct policy

implications, since they suggest that gender pay gap can be reduced via the introduction of special training programs aimed at improving non-cognitive skills among women.

The rest of the paper is structured as follows. The discussion of the concept of locus of control and its relation to earnings and gender in developed and former socialist economies is presented in Section 2. Section 3 contains the description of the data used in our analysis. Methodological issues related to gender pay gap decomposition and estimation of personality effects on earnings are discussed in Section 4. Section 5 contains empirical results, and Section 6 concludes.

2. Background and Motivation

In this study, we consider a particular personality trait – locus of control (LOC). The concept of LOC was introduced by Rotter (1966) and is based on the observation that some individuals tend to attribute their achievements to internal forces, such as personal effort and hard work, while others tend to attribute personal success and failure to external forces, such as fate or chance. Individuals in the former group are said to have an internal LOC, while individuals in the latter group are said to have an external LOC. Because of the anticipation that personal effort leads to desired rewards, internals are expected to demonstrate greater initiative and exert greater effort than externals. Consequently, individuals with an internal LOC should perform better and be more productive than individuals with an external LOC.

The validity of the LOC concept was studied by many researchers in various contexts, and findings of these studies confirm the major theoretical conclusions. Specifically, it was found that, in comparison to externals, individuals with an internal LOC expend more effort to control circumstances, set harder goals, make better use of information, perform better on

complex assignments, are more motivated to work, and are better leaders (see Spector 1982 and references therein). On the productivity side, internal LOC was found to be associated with higher earnings (Andrisani 1977 1981, Goldsmith et al. 2000, Heckman et al. 2006[2], Linz and Semykina 2006a 2006b, Osborne Groves 2005, Semykina and Linz 2006) and better performance (Linz and Semykina 2006a, 2006b).

Another issue that has received substantial attention in the literature and is important for our study is gender differences in LOC. Although some studies find no significant gender differences in LOC (Mueller 2004, Feingold 1994), there is extensive evidence showing that men tend to be more internal than women (Costa et al. 2001, Hall 1984, Maccoby and Jacklin 1974, Sherman et al. 1997, Smith at al. 1997)[3]. Overall, the notion of men being more internal seems to prevail in the literature, and this result was found to hold in various cultural and economic environments (Semykina and Linz 2006, Smith at al. 1997).

Why would women be less internal than men? Psychological research suggests that gender differences in LOC originate from the social roles associated with each gender (Feingold 1994, Smith at al. 1997). Men are traditionally viewed as leaders and tend to occupy dominating roles, while women's traditional responsibilities are related to housekeeping and childbearing/childcare. Although the views of gender roles have largely changed in recent decades, gender stereotypes were found to be very robust (see Feingold 1994 for references). As suggested in the literature, prevailing social norms and expectations create an environment that is less responsive to women's efforts for achievement, which leads to the development of external LOC in women.

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[2] Heckman et al. (2006) use a composite measure, which is the standardized sum of scores on the Rotter's LOC and Rosenberg's self-esteem scales.

[3] Maccoby and Jacklin (1974) find that gender differences in LOC are not present in children, but emerge in the college years. Among other literatures, the studies of adults tend to find gender differences (greater male internality) more often than do studies of children.

Since gender differences in personality appear to favor men in terms of labor market outcomes, it is expected that personality can help to explain part of the gender pay gap. We may be relatively confident in expecting such an outcome for developed countries, where the relationship between LOC and earnings is well-established. However, particular considerations are necessary when studying transition economies.

Before the collapse of the Soviet regime, wages in former Soviet economies were centrally-determined. Remuneration for labor was higher for employees with advanced educational degrees and in particular sectors of the economy; similarly, as workers acquired more experience and achieved supervisory status, they were paid more. However, despite the fact that wage determination was based on formal credentials and records of work experience, it was rather vaguely related to actual productivity. Moreover, other productivity enhancers (including motivation and personality traits), which were not supported by any sort of certificate, were not considered in the wage allocation among workers.

It is also likely that under the wage-grid remuneration system the actual productivity of employees was not affected by their LOC. As suggested in the literature (Spector 1982, Kren 1992), individuals with an internal LOC are motivated to expend effort only if they believe that their actions will be rewarded. Under the Soviet wage remuneration system, workers could be rather certain that their initiative and effort would not lead to a wage increase (nor would the absence of those lead to a wage cut), and so, there were no incentives to work hard.

Since early 1990s former socialist countries have undergone substantial economic changes that led to the establishment of a direct relationship between productivity and wages. In Armenia, Kazakhstan, and Russia, like other transition economies, privatization of state-

owned enterprises and elimination of soft budget constraints pushed the managers to look for new profit-maximizing strategies. The centrally-determined wage system was demolished and, with the exception of the public sector, enterprises have been given freedom to develop their own rules for setting wages. One of the consequences was the change in the remuneration approach, so that the monetary reward became more tightly linked to labor productivity.[4] The adjustment process went differently in each country, and in some cases it was more successful than in others. However, as long as earnings reflect workers' inputs into the production process, personality traits will, by default, be rewarded in the labor markets.

Despite the declarations of fairness and equal opportunities for men and women, the gender pay gap in Soviet-type economies was substantial (Brainerd 2000, Newell and Reilly 1996). Since the beginning of the transition, gender differences in earnings persisted and remained at relatively high levels (Brainerd 2000, Newell and Reilly 2001). In the three countries considered in this study, gender wage inequality increased by early 2000. In Russia, women's earnings were on average 67 to 70% of men's earnings during the mid- and late-1990s (Brainerd 2000, Newell and Reilly 2001, Ogloblin 1999), but dropped to about 63% in 2000 (Ogloblin 2005, World Bank 2002). In Kazakhstan, the female to male wage ratio was 72 to 75% in late 1990s (Newell and Reilly 2001, World Bank 2002), but fell to 60% in 2000 (World Bank 2002). In Armenia, the wage ratio was slightly more than 55% in 2000 (World Bank 2002). Although a substantial part of the gender gap in transition economies was found to be attributable to gender differences in observed characteristics, a significant portion of the gap remained unexplained (Newell and Reilly 2001, Ogloblin 1999).

We argue that another factor – personality – contributes to gender differences in pay in former socialist economies. As discussed above, individuals with internal LOC exhibit

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[4] For example, returns to education in Russia have increased substantially by late 1990s (Clark 2002).

greater initiative and better performance in complex-task situations. These characteristics are particularly important in changing economic environments, and, if markets operate properly, earnings should be higher among workers with internal LOC. Moreover, there is evidence suggesting that women in former socialist countries are less internal than men (Smith at al. 1997). This is not surprising, given that both before and after the collapse of the Soviet regime the majority of senior positions in these countries were held by men, while women spent a large amount of time in housekeeping and childcare activities[5].

In this study, we examine whether personality does indeed play a significant role in explaining gender differences in pay in former Soviet countries. By considering workers in Armenia, Kazakhstan, and Russia – countries that are rather different economically and culturally – we hope to shed some light on the importance of personality in determining gender pay gap in these economies and study how this is related to country-specific economic and cultural conditions.

3. Data

Since the early 1990s, large nationally representative samples of workers in transition economies became available. Collected by the World Bank, national statistical agencies and educational and research institutions, these data contain comprehensive information about demographics, incomes, expenditures, and employment histories. However, in spite of the variety of collected information, the content of these data remains somewhat limited. In particular, to the best of our knowledge, there are no nationally representative surveys of former socialist economies that collect data on personality. Therefore, in order to facilitate

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[5] Gronau (2006) reports that in transitional Russia married women spent more than 35 hours a week in home work and childcare, although the amount of home production revealed a tendency to decline. Petrosyan (2005) presents the evidence of women doing most of the housework in Armenia.

the analysis, we used data from our own surveys, where we were able to inquire about personality traits and work-related attitudes of the respondents.

We use data collected in May and June 2005 in selected cities in Armenia, Kazakhstan, and Russia. In Armenia, survey questionnaires were distributed at 159 enterprises in Yerevan; in Kazakhstan, the data were collected from the employees at 163 enterprises in Almaty and several other cities; in Russia, the survey was conducted among the employees at 99 enterprises in Ufa. Because of limited funding, representative samples of workers in the cities could not be collected; however, all attempts have been made to make the pool of respondents diverse[6]. Although we understand that our data are not representative at the national level, we will refer to the corresponding data sets as Armenia, Kazakhstan, and Russia, for convenience.

Once we restrict our data to the respondents who provide information on their earnings, personality, and other variables used in our analysis, we obtain samples that consist of 1238 observations in Armenia, 699 observations in Kazakhstan, and 773 observations in Russia. The descriptive statistics for all three samples are reported in Table 1. Age characteristics of workers in our Russian and Armenian samples are very similar to those obtained from nationally representative surveys of workers in transition economies (see, for example, Brainerd 2000). If we look at an "average" participant of Russian or Armenian survey, it was a person in his/her late thirties with about 15 years of schooling. Kazakh employees are very similar in terms of educational qualifications, but they are somewhat younger and more active in changing jobs. Job attachment is the greatest among Russian

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[6] Local project coordinators in Ufa, Yerevan, and Almaty were instructed to contact top-level managers in a wide variety of workplaces to request permission to conduct a survey of their employees. Once permission was granted, the interviewers were instructed to have questionnaires completed by workers in as many occupational categories, as possible. Further details on the data and data collection process can be found in Linz and Semykina (2006b).

survey participants, and their average job tenure is slightly longer than that reported in recent studies by Ogloblin (2005) and Ogloblin and Brock (2005). Additionally, state employees are overrepresented in our Russian sample. In Kazakhstan, the share of supervisors among male employees is somewhat small. Thus, there appear to be discrepancies between our samples and representative samples of Armenian, Kazakh, and Russian workers. However, the impact of these differences on the estimates of personality effects should be substantially reduced once we control for employee and workplace characteristics in our earnings regressions.

The ratios of average female earnings to average male earnings are reported at the bottom of Table 1. The estimate in our Russian sample is 0.62, which is rather similar to the nationally representative estimates reported by Ogloblin (2005) and the World Bank (2002). Earnings of the female participants of the Kazakhstan and Armenian surveys are relatively high. The females to males earnings ratio is 0.75 in our Armenian sample and 0.8 in Kazakhstan. As reported by the World Bank (2002), in 2000 the gender wage ratios in Armenia and Kazakhstan were 0.55 and 0.6, respectively, which is well below our estimates. However, the time lag between the UNICEF Transmonee surveys, whose data were used by the World Bank, and our surveys is rather large. Therefore, we cannot assess whether the observed discrepancies are due to differences in sampling procedures or due to changes in economic conditions of these countries.[7]

As mentioned above, the survey instrument contained a set of questions that allowed us to evaluate the LOC of the survey participants. To construct the LOC measure, we use ten statements from Rotter (1966). Five statements represent the internal LOC, and five are for the external LOC (see Table 2). The respondents were asked to specify their degree of

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[7] For instance, rapid economic growth in Kazakhstan since 2000 (Becker *et al.* 2005) might have lead to substantial changes in the wage structure in this country.

agreement with each statement using a 5-point Likert scale (1 = strongly agree, and 5 = strongly disagree). To construct the composite LOC measure, we summed up the scores from the internal questions and subtracted the scores from the external questions. Thus, our LOC measure can change from -20 to +20 and is greater for workers with internal LOC. We checked the validity of this composite measure by computing reliability coefficients (Cronbach alpha) for each survey. In all three data sets the estimated coefficients were sufficiently large (0.75 in Armenian sample, 0.69 in Kazakhstan, and 0.6 in Russia), indicating that respondents considered the questions to be tightly related.

4. Methodology

4.1. Earnings gap decomposition

The impact of various factors on individual earnings is usually modeled by specifying a log earnings equation

$$\ln w = X\beta + \varepsilon, \tag{1}$$

where $\ln w$ is the natural logarithm of earnings, X is a row vector of explanatory variables, β is a column vector of parameters, and ε is the error term. When equation (1) is estimated separately for men and women, the parameter vectors will be different for each gender and will represent the gender-specific returns to considered characteristics.

Oaxaca (1973) and Blinder (1973) suggested that after equation (1) is estimated separately for each gender using the ordinary least squares (OLS) estimator, the gender pay gap can be written as a difference in average log earnings of men and women:

$$\overline{\ln w_m} - \overline{\ln w_w} = \overline{X_m}\hat{\beta}_m - \overline{X_w}\hat{\beta}_w \tag{2}$$

In equation (2), $\overline{\ln w_m}$ and $\overline{\ln w_w}$ are the average log earnings of men and women, respectively, $\overline{X}_m$ is the vector of average characteristics of men, $\overline{X}_w$ is the vector of average characteristics of women, $\hat{\beta}_m$ and $\hat{\beta}_w$ are the vectors of estimated coefficients in men's and women's equations, respectively, and the error terms disappear because the average value of residuals in the OLS regression is zero.

Furthermore, the decomposition technique proposed by Oaxaca (1973) and Blinder (1973) helps to separate out the two parts of the gender pay gap:

$$\overline{\ln w_m} - \overline{\ln w_w} = (\overline{X}_m - \overline{X}_w)\hat{\beta} + \left[\overline{X}_m(\hat{\beta}_m - \hat{\beta}) + \overline{X}_w(\hat{\beta} - \hat{\beta}_w)\right], \qquad (3)$$

where $\hat{\beta}$ represents a non-discriminatory wage structure – the vector of returns to the observed characteristics that would prevail in the market in the absence of gender discrimination. The first term in equation (3) is the "explained" part of the gap that is due to gender differences in the observed characteristics, while the term in brackets represents the "unexplained" part of the gap, which is usually attributed to gender discrimination. Originally, it was proposed that either $\hat{\beta}_m$ or $\hat{\beta}_w$ can be used to describe the non-discriminatory wage structure; however, later several alternative methods were developed (Cotton 1988, Neumark 1988, Oaxaca and Ransom 1994, Reimers 1983). In this study, we use the methodology proposed by Neumark (1988) and Oaxaca and Ransom (1994), who suggest estimating $\hat{\beta}$ by running a pooled log earnings regression. This approach is appealing because it considers both male and female earnings when deriving the non-discriminatory wage structure from the data.

4.2. Specification of earnings equations

As a dependent variable in our earnings equations we use the natural logarithm of monthly earnings on the main job. The key explanatory variable that we want to study is the LOC measure. Since it is important to understand how results change once personality is incorporated in the analysis, we estimate earnings equations and perform gender gap decomposition with and without LOC variable, and examine how conventional estimates (no LOC in the equations) compare to those obtained from the extended regressions (LOC included). For each country, the LOC measure was standardized to have a zero mean and unit variance.

Our goal is to examine whether equally qualified workers employed in similar jobs receive different remuneration because of their personality (non-cognitive skills), and study how personality traits affect gender differences in pay; therefore, in our regressions we control for various employee and workplace characteristics. Specifically, in the vector of observed characteristics (X) we include years of schooling, age and its square (to proxy for general experience), tenure and its square (to control for the firm-specific experience), a dummy variable equal to one if the employee has supervisory responsibilities, a dummy variable equal to one if the worker was unemployed for more than two weeks within the last five years, number of job changes within the last five years, an indicator for state-owned enterprises, and industry dummies. A reach set of controls allows us to evaluate the net effect of personality on earnings and helps to mitigate the effects that may be specific to our samples.

We estimate earnings equations separately for pooled, men's and women's samples, which allows us to see how the effect of personality differs by gender. In the pooled regressions, we use weights to account for the excessively large proportions of female

workers in our data. In particular, male observations were assigned a greater weight to mimic the gender composition of the working population in each country[8]. Estimates from the weighted pooled regressions were used as a non-discriminatory earnings structure in equation (3).

4.3. Endogeneity of LOC in earnings equations

A problem that we need to address before estimating the effect of LOC on earnings is the potential endogeneity of the LOC measure. As discussed in the literature (Spence 1982, Bowles et al. 2001), locus of control may be affected by previous experiences, such as earnings, promotions, and various rewards. If current earnings influence workers' LOC, then the direction of causality in the earnings equations can be questioned. Another possible source of endogeneity is a measurement error. Our LOC measure is not perfect, and if the measurement error is correlated with the LOC variable, the OLS estimator will be biased. Regarding the first problem, we argue that the reversed causality issue is unlikely to arise in our regressions. As shown by McCrae and Costa (1990) and Costa and McCrae (1997), personality traits develop in young ages and are very stable in adults. Since the average age of our respondents is far beyond 30, we expect that their LOC has been already shaped. Whether the measurement error is correlated with the reported LOC scores is not known a priori.

To find out whether the LOC measure is endogenous in our log earnings equations we run several tests. Goldsmith et al. (2000) suggest that family background characteristics and accumulated assets can be used as instruments for LOC. Therefore, as potential instruments

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[8] The data on the gender composition of the pool of employed workers in Armenia, Kazakhstan, and Russia were obtained from the Armenian Statistics Yearbook 2005, Database of Gender Statistics at World Bank, and Rosstat (Russian Statistical Agency) website, respectively.

we consider family background (parents' education, an indicator for living with both parents before age 16, an indicator for those who grew up in a large city) and assets (an indicator equal to one if either respondent or respondent's spouse owns an apartment, an indicator equal to one if either respondent or respondent's spouse owns a car, an indicator equal to one if either respondent or respondent's spouse owns a garden house). We use Sargan's test for overidentifying restrictions to check the validity of these instruments. Here we only report the results for pooled regressions, since these regressions were used for estimating the non-discriminatory earnings structure. In earnings equations for Russian workers, two asset variables (an indicator for apartment owners and an indicator for garden house owners) and all family background variables were found to be valid instruments; the hypothesis that the instruments were not correlated with the error term could not be rejected at any conventional significance level (χ^2_{19} = 23.27, p-value = 0.226). In Armenian data, only family background variables turned out to be valid instruments (χ^2_{17} = 24.32, p-value = 0.111). In earnings equations for Kazakhstan, both assets and family background were found to be correlated with the error, so we were unable to find valid instruments there.

We then test for endogeneity of the LOC variable in the earnings equations for Armenian and Russian employees and find no evidence of endogeneity bias[9]. In the pooled samples, heteroskedasticity-robust test-statistics were $F_{1,\ 672}$ = 1.21 (p-value = 0.272) for Armenia and $F_{1,\ 1210}$ = 0.01 (p-value = 0.919) for Russia[10]. Thus, the null hypothesis of no endogeneity bias could not be rejected at any conventional significance level. The tests

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[9] When testing for endogeneity we use a simple variable addition test described by Wooldridge (2002, Section 6.2.1).

[10] We must note that these results may be partly due to the fact that our instruments are only weakly correlated with the LOC measure. Although the instruments are jointly significant in the first-stage regressions in Armenia ($F_{18,\ 1194}$ = 2.36, p-value = 0.001), they are only marginally significant in regressions for Russian workers ($F_{21,\ 653}$ = 1.54, p-value = 0.063). In both cases, the F-statistics are not large, so we are not able to rule out the possibility of the weak-instruments problem (Stock and Yogo 2002).

performed on men's and women's samples produced similar results. Therefore, we conclude that OLS estimation is the appropriate method for estimating earnings equations for Armenian and Russian workers. Since we have no means to either test or correct for endogeneity in earnings equations for Kazakh workers, we use the OLS estimator for Kazakhstan, too.

5. Results

5.1. Gender differences in personality

The mean responses to questions used in construction of the LOC measure are reported in Table 3. For each respondent, LOC was computed as described in Section 3. It appears that, among Armenian and Russian participants, women on average score lower on the internal items and higher on the external ones. While gender differences for each particular item are minor, when combined together they reveal notable gender differences. The mean of the LOC measure is larger for men, and gender differences are statistically significant, which implies that among Armenian and Russian participants men tend to be more internal than women. In Kazakhstan, no significant gender differences emerge, as women may score higher on some internal items, while men may sometimes score higher on external items.

Comparison of the LOC distributions by gender (Figure 1) shows that personality differences found in Armenian and Russian data hold over the entire range of the LOC scores. Men's distributions are shifted to the right indicating that men are more likely to have an internal LOC, and these gender differences are particularly large among Russian employees. The situation is somewhat obscure in Kazakhstan. Among workers with extreme

values of LOC, men tend to be more internal; however, among the survey participants with the LOC that is close to sample average, women tend to be more internal.

The results obtained for Kazakhstan are atypical, so we question whether they are due to the unusual composition of our sample. As was mentioned earlier, a relatively small proportion of male participants in Kazakhstan hold supervisory responsibilities, and previous research has shown that employees in senior positions tend to be more internal (Smith at al. 1997). Since women in the Kazakhstan sample have an advantage in terms of seniority, this may partly explain the unusual LOC patterns. To separate out the gender effect from the position effect, we compare the LOC distributions for male and female workers with and without supervisory responsibilities. The estimated distributions, shown in Figure 2, confirm the results for Armenian and Russian employees – for both position levels, male participants of the surveys are more internal than female participants. Analogous gender differences in personality are found among Kazakh employees with supervisory responsibilities. Only for Kazakh workers without supervisory responsibilities is the relationship reversed. It appears that among the participants of the Kazakhstan survey, men who did not move up the career ladder tend to be external.

5.2. LOC and earnings: descriptive analysis

As a motivation for our regression analysis, we look at a general relationship between LOC and log earnings in our data. As seen in Table 4, average earnings of Armenian employees grow as LOC increases. In Russian sample, a positive relationship between LOC and earnings is strong for men, but relatively weak for women. In Kazakhstan, no clear pattern emerges. Among male Kazakh employees, average log earnings are the greatest for

workers with the lowest LOC scores, while among women the earnings are slightly higher for workers with average LOC.

As mentioned earlier, the unusual patterns in the data may arise if other factors distort the outcomes. To obtain the net effect of personality on earnings we need to hold other factors fixed, and this is what we do in the next subsection.

5.3. Earnings equations

We estimate log earnings equations as described in Section 4. Regression results for Armenian, Kazakh, and Russian employees are reported in Tables 5, 6, and 7, respectively. In the tables, the estimates show a typical concave age-earnings profile, although age effects are insignificant for Armenian and Kazakh workers. Tenure has an important effect on the earnings of participants of Kazakhstan survey, and the tenure-earnings profile is concave. The rate of return to a year of schooling is somewhat low; it exceeds 6% in the pooled Armenian and Kazakhstan regressions, but is under 4% for Russian workers. This result may have arisen because most of the participants of our surveys are well-educated[11].

Earnings of supervisors are substantially higher than earnings of regular workers. Depending on the sample (pooled, men, or women) and specification (LOC included or excluded), an increase in earnings due to having supervisory responsibilities is about 17-23% for Armenian workers, 17-18% for Kazakh workers, and 24-42% for Russian workers.

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[11] About 30% of workers in the Armenian sample reported more than 15 years of schooling. For Kazakhstan and Russia the corresponding numbers are 33% and 39%, respectively. At the same time, an increase in earnings due to additional schooling beyond 15 years is unlikely to be large in these countries. Since most educational institutions in former socialist economies belong to the public sector, the gain from having an extra year of post-graduate education in these countries is not very large. In cases when workers received the second higher education or participated in retraining courses, the average return to a year of schooling for these workers must have been lower because the initial education/training was not particularly useful in the new market environment.

Among the participants of our surveys, earnings are lower for those working at the state-owned enterprises, although the effects are not significant in Kazakhstan.

Incorporating personality in the earnings analysis alters the coefficients slightly. Consistent with the findings that internal individuals tend to acquire more education (Coleman and DeLeire 2003) and are more likely to hold supervisory positions (Smith at al. 1997), both the returns to education and supervisors' rewards decrease. The effect of LOC on earnings is positive, indicating that workers with internal LOC tend to have higher earnings. The coefficient estimates are particularly large and highly significant in Armenian and Russian samples. Based on the estimates of non-discriminatory earnings structure obtained from pooled regressions, an increase in LOC by one standard deviation results in a 9.4% increase in earnings for Armenian employees, and the corresponding increase for Russian employees is about 10%. Given that the standardized LOC varies from -4 to 3.8 in Armenian sample, and it varies from -3.7 to 3.3 in Russian sample, the differences in earnings of the most internal and most external workers are substantial. For Armenian workers the corresponding gain would be a 73% increase in earnings, while for Russian workers the gain would be a 70% increase in earnings. Among the participants of the Kazakhstan survey, personality effects are much smaller. The coefficient of the LOC is not significant in men's and women's regressions, and it is only marginally significant in the pooled sample.

With regard to gender differences, LOC has the same effect on the earnings of male and female participants of Armenian survey. In Kazakhstan and Russia, the effect of LOC on earnings is greater for men. Overall, the estimated effects of the LOC among the participants of our Armenian and Russian surveys are greater than those reported in the studies of developed market economies (Andrisanni 1978, Osborne Groves 2005). These findings

suggest that personality factor may be more important in changing economic environment than in stable labor markets.

5.4. Gender pay gap decomposition

The results from the earnings gap decomposition are reported in Table 8. The estimates show that a significant part of gender differences in log earnings is due to variation in education and position. In Armenian and Russian samples, women have lower earnings because they have fewer years of schooling and are less likely to hold supervisory positions. In Kazakhstan, the opposite is true. Female participants of the Kazakhstan survey have on average more years of schooling and many of these women have supervisory responsibilities, which gives them an earnings advantage over the male participants of the survey. In all three locations, women suffer a substantial disadvantage because they are more likely to work at state-owned enterprises.

Similarly to other studies of transition economies (Ogloblin 1999, Jurajda 2003), we find that gender segregation is an important determinant of the male-female earnings gap in our data. Among the participants of Russian survey, segregation explains almost 20% of the gap, and among Armenian employees it explains about 22% of the gap. Interestingly, among Kazakh employees, gender differences are in favor of women. The overall effect of segregation on the gender earnings gap in Kazakhstan is negative (the gap is reduced), because women amount to a very small fraction of workers in light manufacturing, which is one of the lowest-paying sectors in the Kazakhstan sample.

Regarding the personality factor, gender differences in LOC explain about 5.5% of the pay gap among Armenian employees and 7% of the gap among the participants of

Russian survey. These estimates are slightly larger than those obtained by Mueller and Plug (2004) for Wisconsin high school graduates. In Kazakhstan, personality differences explain less than 3% of the observed gender differences in log earnings, which is not surprising given the tiny gender differences in means of LOC among Kazakh employees. Importantly, accounting for workers' LOC helps to reduce the unexplained part of the earnings differential. After LOC is incorporated in the earnings equations, the unexplained portion of the gap drops by roughly 8% in Armenia, 9.5% in Russia, and 1.3% in Kazakhstan.

The fact that personality explains a remarkably small portion of gender pay gap among Kazakh workers follows from two findings. First, gender differences in means of the LOC measure are very small in the Kazakhstan sample, which is due to the prevalence of external LOC among male workers without supervisory responsibilities. Since in Kazakhstan personality patterns were found to be rather different depending on the supervisory status – among supervisors men tended to be more internal, while among regular workers women tended to be more internal – it may signal the necessity to consider these two groups of workers separately in the analysis of gender pay gap. And second, the estimated effect of LOC on earnings of Kazakh workers is relatively small and not significant at the 5% level, implying that either the non-cognitive skills associated with internal LOC do not enhance productivity, or wages do not reflect the true worker productivity in Kazakhstan. Although we do not have means to distinguish between these two explanations, we are inclined to believe that the major reason for personality effects being insignificant is the imperfect match between worker productivity and remuneration of labor. There is anecdotal evidence suggesting that young people in Kazakhstan typically receive help from friends and relatives in finding their initial employment. Moreover, Ardichvili (2001) finds that one of the most

important dimensions of work-related cultural values in Kazakhstan is paternalism in manager-employee relations. Although paternalism does not necessarily imply inefficiencies, in a paternalistic relationship managers feel responsible for guiding and protecting the workers, which in some circumstances may cause deviations from the profit-maximizing strategies. Paternalism is common for many Asian cultures, such as China, India, Japan, Korea, and Turkey (see Ardichvili 2001 for references), where "paternalistic relationships go beyond family boundaries, and vertical relationships in families extend to the workplace and social life" (Ardichvili 2001, p.366).

6. Conclusion

We considered personality factor (locus of control) as a determinant of earnings and gender differences in pay in three former socialist economies: Armenia, Kazakhstan, and Russia. We find that among Armenian and Russian workers, internal LOC is associated with higher earnings, men tend to be more internal than women, and gender differences in personality explain a nontrivial portion of the gender pay gap. In Kazakhstan, both the effect of LOC on earnings and male-female differences in personality were found to be small, so the role of personality in explaining the gender pay gap was minor.

Reducing the gender pay gap requires both the enforcement of existing anti-discrimination laws and development of new policies. Our findings suggest that in Armenia and Russia gender differences in pay can be diminished with the help of special programs that would encourage the formation of internal LOC in women. Early childhood programs were found to be effective in raising non-cognitive skills and promoting success of individuals in developed countries (Heckman et al. 2006). Introduction of similar programs

in the former socialist economies would be particularly beneficial for women, whose lack of non-cognitive skills makes them disadvantaged in the labor markets.

Although our results shed some light on the significance of personality traits in determining productivity and gender differences in pay in Armenia, Kazakhstan, and Russia, further studies of these and other transition and less developed countries are needed. The data we used in this study are not representative at the national level, and therefore, the applicability of our results is somewhat limited. By performing the conditional analysis of earnings we were able to reduce the distorting impact of the specificities of our data, which makes us confident that the personality effects observed in our data are similar to those present in the entire working populations of the three countries. Nevertheless, the goal of obtaining truly nationally representative estimates can only be attainable if the necessary data become available.

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Table 1. Descriptive Statistics for the Key Variables

	Armenia		Kazakhstan		Russia	
	Women	Men	Women	Men	Women	Men
Age	36.24	38.25	34.20	34.37	38.51	38.28
	(10.92)	(11.30)	(9.14)	(10.31)	(11.14)	(12.92)
Tenure	6.24	6.09	5.41	4.62	9.78	8.16
	(6.37)	(5.54)	(4.94)	(3.89)	(8.99)	(7.81)
Years of schooling	15.09	15.27	15.21	14.71	14.91	15.18
	(2.00)	(2.36)	(2.26)	(2.38)	(2.32)	(2.75)
Manager	0.31	0.49	0.36	0.33	0.41	0.54
Unemployment experience	0.28	0.27	0.35	0.37	0.20	0.24
Job changes	0.64	0.70	0.71	1.02	0.58	0.76
	(1.07)	(1.11)	(1.17)	(1.31)	(0.96)	(1.24)
State-owned enterprise	0.33	0.23	0.37	0.26	0.52	0.45
Heavy manufacturing / energy	0.05	0.05	0.04	0.02	0.05	0.05
Light manufacturing	0.15	0.28	0.10	0.31	0.22	0.20
Retail / wholesale trade	0.04	0.07	0.11	0.08	0.12	0.03
Education / training	0.08	0.04	0.09	0.02	0.16	0.17
Finance/banking	0.05	0.02	0.11	0.09	0.07	0.02
Health care	0.24	0.18	0.21	0.17	0.17	0.12
Public services	0.33	0.31	0.22	0.19	0.13	0.15
Other services	0.04	0.03	0.03	0.06	0.07	0.20
Women/Men earnings ratio	0.75		0.80		0.62	
Number of observations	717	521	372	327	548	225

Standard deviations reported in parentheses under the sample means.

Table 2. Components of the LOC Measure

Variable Name	Description
Internal	
NOLUCK	Becoming a success is a matter of hard work; luck has little or nothing to do with it.
DESERVE	In the long run, people get the respect they deserve in this world.
PLAN	When I make plans, I am almost certain I can make them work.
MYSELF	What happens to me is of my own doing.
WANTLUCK	In my case, getting what I want has little to do with luck.
External	
GDLEADR	Without the right breaks, one cannot be a good leader.
BADLUCK	Many of the unhappy things in people's lives are partly due to bad luck.
WHOPROMO	Who gets promoted often depends on who was lucky enough to be in the right place first.
ACCIDENT	Most people do not realize the extent to which their lives are controlled by accidental happenings.
NOINFLU	Many times I feel I have little influence over the things that happen to me.

**Table 3. Means for the LOC Measure and its Components by Gender**

	Armenia			Kazakhstan			Russia		
	Women	Men	W-M (t-stat)	Women	Men	W-M (t-stat)	Women	Men	W-M (t-stat)
Internal	*17.87*	*18.40*	*-0.53**	*18.89*	*19.23*	*-0.34*	*17.19*	*17.66*	*-0.47**
	(3.66)	*(3.74)*	*(-2.48)*	*(3.41)*	*(3.12)*	*(-1.35)*	*(3.64)*	*(3.48)*	*(-1.67)*
NOLUCK	3.37	3.60		3.55	3.58		3.15	3.38	
	(1.16)	(1.13)		(1.16)	(1.16)		(1.30)	(1.15)	
DESERV	3.71	3.74		3.92	3.89		3.67	3.63	
	(1.07)	(1.11)		(1.08)	(0.96)		(1.33)	(1.31)	
PLAN	3.73	3.83		3.84	3.91		3.52	3.59	
	(1.00)	(0.95)		(0.96)	(1.02)		(1.10)	(1.01)	
MYSELF	3.59	3.77		3.89	4.09		3.49	3.68	
	(1.09)	(1.00)		(1.03)	(0.90)		(1.26)	(1.14)	
WANTLUCK	3.46	3.45		3.69	3.75		3.36	3.39	
	(1.04)	(0.99)		(1.09)	(1.03)		(1.21)	(1.14)	
External	*17.36*	*17.05*	*0.31*	*18.05*	*18.08*	*-0.03*	*16.62*	*15.42*	*1.20***
	(3.77)	*(3.78)*	*(1.43)*	*(3.75)*	*(3.79)*	*(-0.12)*	*(4.14)*	*(4.08)*	*(3.67)*
GDLEADR	3.68	3.70		3.77	3.78		3.71	3.62	
	(1.12)	(1.06)		(1.15)	(1.08)		(1.24)	(1.32)	
BADLUCK	3.36	3.28		3.52	3.50		2.94	2.73	
	(1.08)	(1.13)		(1.20)	(1.17)		(1.24)	(1.13)	
WHOPROMO	3.62	3.56		3.64	3.75		3.60	3.28	
	(1.14)	(1.07)		(1.15)	(1.13)		(1.30)	(1.34)	
ACCIDENT	3.46	3.40		3.66	3.69		3.46	3.10	
	(1.04)	(1.04)		(1.03)	(1.02)		(1.22)	(1.16)	
NOINFLU	3.23	3.11		3.45	3.36		2.90	2.68	
	(1.05)	(1.11)		(1.15)	(1.20)		(1.25)	(1.26)	
LOC	*0.51*	*1.34*	*-0.84***	*0.84*	*1.14*	*-0.30*	*0.57*	*2.24*	*-1.67***
	(4.58)	*(4.48)*	*(-3.20)*	*(4.22)*	*(4.43)*	*(-0.92)*	*(5.70)*	*(5.71)*	*(-3.71)*
Number of observations	717	521		372	327		548	225	

Standard deviations are reported in parentheses under the sample means.
For the gender differences in means, t-statistics are reported in parentheses under the estimates.

Figure 1. Distribution of LOC by gender

Armenia, all workers (N=1238)

Kazakhstan, all workers (N=699)

Russia, all workers (N=773)
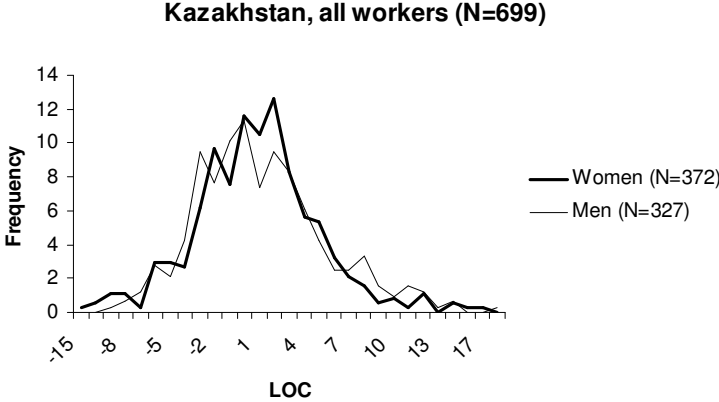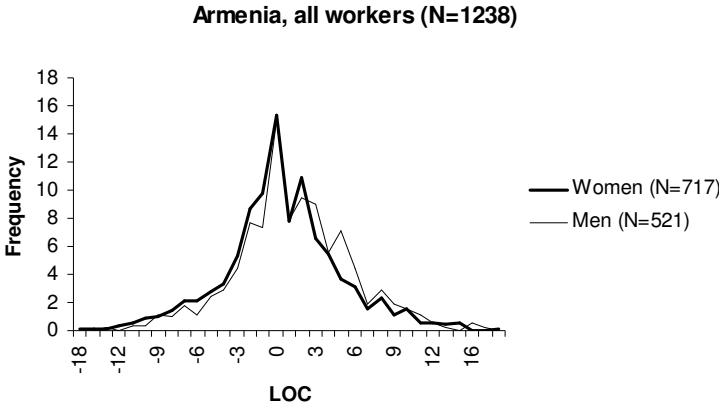
Figure 2. Distribution of LOC by status and gender

Armenia, supervisors (N=472)

- Women (N=219)
- Men (N=253)

Armenia, regular workers (N=766)

- Women (N=498)
- Men (N=268)

Kazakhstan, supervisors (N=242)

- Women (N=133)
- Men (N=109)

Kazakhstan, regular workers (457)

- Women (N=239)
- Men (N=218)

Russia, supervisors (N=348)

- Women (N=227)
- Men (N=121)

Russia, regular workers (N=425)

- Women (N=321)
- Men (N=104)
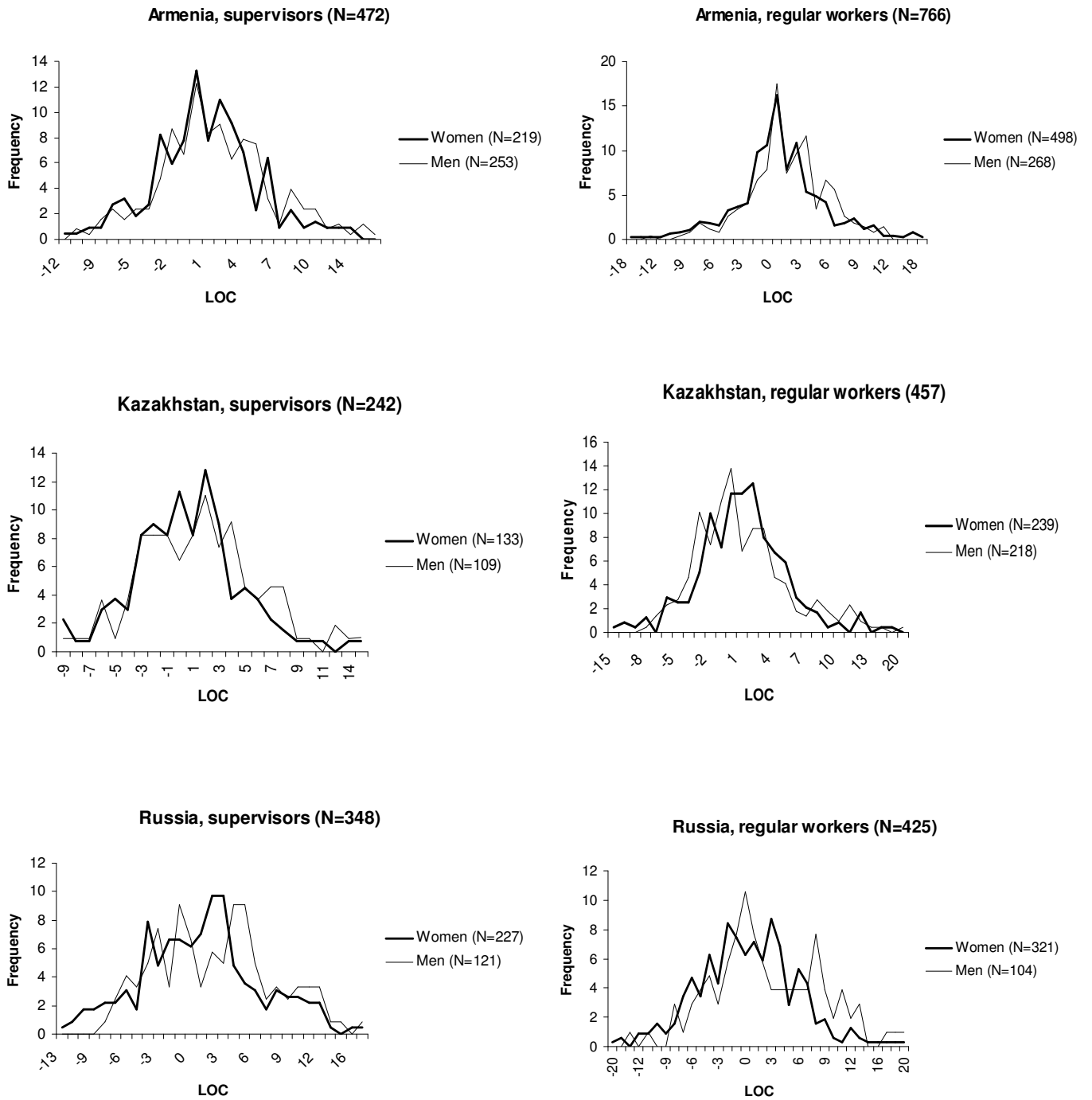
Table 4. Sample Means of (Logarithm of) Earnings by LOC and Gender

	Armenia		Kazakhstan		Russia	
	Women	Men	Women	Men	Women	Men
Total	11.03	11.34	9.92	10.03	8.45	8.86
	(0.74)	(0.73)	(0.47)	(0.54)	(0.59)	(0.68)
LOC <= -5	10.81	11.11	9.90	10.23	8.32	8.71
	(0.72)	(0.87)	(0.54)	(0.93)	(0.54)	(0.70)
-5 < LOC <= 0	10.97	11.25	9.92	9.93	8.49	8.77
	(0.73)	(0.72)	(0.44)	(0.42)	(0.54)	(0.62)
0 < LOC <= 5	11.10	11.42	9.93	10.05	8.42	8.88
	(0.73)	(0.71)	(0.47)	(0.52)	(0.64)	(0.73)
LOC > 5	11.22	11.48	9.89	10.18	8.52	9.00
	(0.80)	(0.71)	(0.56)	(0.61)	(0.58)	(0.68)
Highest-Lowest LOC Category	0.41***	0.37**	-0.01	-0.05	0.20**	0.29*
	(3.52)	(2.57)	(-0.07)	(-0.26)	(2.50)	(1.82)

Standard deviations are reported in parentheses under the sample means.
For the earnings differences by LOC, t-statistics are reported in parentheses under the estimates.

Table 5. OLS Estimates for Log Earnings, Armenia

	Pooled (1)	Women (2)	Men (3)	Pooled (4)	Women (5)	Men (6)
Age	0.019	0.006	0.023	0.022	0.005	0.029
	(0.014)	(0.019)	(0.020)	(0.014)	(0.019)	(0.020)
$Age^2/100$	-0.021	-0.004	-0.028	-0.024	-0.002	-0.033
	(0.017)	(0.024)	(0.024)	(0.016)	(0.024)	(0.024)
Tenure	-0.006	-0.021	0.005	-0.006	-0.019	0.003
	(0.012)	(0.014)	(0.020)	(0.012)	(0.014)	(0.020)
$Tenure^2/100$	-0.001	0.025	-0.007	0.003	0.023	0.004
	(0.041)	(0.045)	(0.078)	(0.041)	(0.045)	(0.079)
Education	0.067***	0.092***	0.049***	0.062***	0.090***	0.044***
	(0.010)	(0.013)	(0.013)	(0.010)	(0.013)	(0.013)
Manager	0.205***	0.165***	0.179**	0.196***	0.154***	0.174**
	(0.045)	(0.058)	(0.070)	(0.045)	(0.057)	(0.070)
Unemployed	-0.207***	-0.127**	-0.287***	-0.200***	-0.131**	-0.268***
	(0.054)	(0.067)	(0.085)	(0.053)	(0.067)	(0.083)
# Job changes	0.037*	0.017	0.049	0.036*	0.022	0.043
	(0.022)	(0.030)	(0.031)	(0.022)	(0.029)	(0.032)
State-owned enterprise	-0.122	-0.001	-0.211*	-0.142*	-0.019	-0.233**
	(0.077)	(0.102)	(0.118)	(0.077)	(0.102)	(0.117)
Heavy manufacturing / energy	-0.753***	-0.820***	-0.637***	-0.764***	-0.846***	-0.635***
	(0.111)	(0.164)	(0.142)	(0.112)	(0.169)	(0.141)
Light manufacturing	-0.447***	-0.484***	-0.396***	-0.456***	-0.492***	-0.401***
	(0.089)	(0.162)	(0.094)	(0.091)	(0.166)	(0.097)
Retail / wholesale trade	-0.544***	-0.442**	-0.551***	-0.540***	-0.457**	-0.529***
	(0.120)	(0.193)	(0.148)	(0.123)	(0.195)	(0.153)
Education / training	-1.022***	-1.089***	-0.870***	-1.002***	-1.086***	-0.835***
	(0.112)	(0.167)	(0.178)	(0.115)	(0.170)	(0.184)
Health care	-1.512***	-1.603***	-1.247***	-1.493***	-1.594***	-1.240***
	(0.164)	(0.198)	(0.357)	(0.167)	(0.202)	(0.368)
Public services	-0.672***	-0.749***	-0.538***	-0.657***	-0.743***	-0.518***
	(0.098)	(0.152)	(0.137)	(0.100)	(0.156)	(0.136)
Other services	-0.633***	-0.673***	-0.535***	-0.627***	-0.686***	-0.515***
	(0.088)	(0.157)	(0.101)	(0.090)	(0.161)	(0.103)
Construction / transportation	-0.533***	-0.778***	-0.276*	-0.521***	-0.784***	-0.254
	(0.133)	(0.199)	(0.166)	(0.133)	(0.203)	(0.161)
LOC	-	-	-	0.090***	0.086***	0.086***
				(0.020)	(0.023)	(0.032)
Constant	10.444***	10.276***	10.634***	10.451***	10.314***	10.585***
	(0.310)	(0.429)	(0.446)	(0.307)	(0.432)	(0.439)
Number of observations	1238	717	521	1238	717	521
R-squared	0.1916	0.2070	0.1679	0.2053	0.2203	0.1802

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Analytical weights used in the pooled sample
Reference industry category: finance/banking

Table 6. OLS Estimates for Log Earnings, Kazakhstan

	Pooled (1)	Women (2)	Men (3)	Pooled (4)	Women (5)	Men (6)
Age	0.006	0.004	0.017	0.011	0.006	0.022
	(0.014)	(0.021)	(0.020)	(0.014)	(0.020)	(0.020)
$Age^2/100$	-0.005	-0.003	-0.016	-0.011	-0.006	-0.023
	(0.017)	(0.027)	(0.024)	(0.017)	(0.026)	(0.024)
Tenure	0.036***	0.045***	0.008	0.036***	0.045***	0.011
	(0.012)	(0.014)	(0.020)	(0.012)	(0.014)	(0.020)
$Tenure^2/100$	-0.143***	-0.185***	0.008	-0.149***	-0.185***	-0.014
	(0.053)	(0.063)	(0.066)	(0.052)	(0.062)	(0.068)
Education	0.064***	0.060***	0.059***	0.064***	0.062***	0.057***
	(0.009)	(0.011)	(0.011)	(0.009)	(0.011)	(0.012)
Manager	0.161***	0.167***	0.163***	0.157***	0.166***	0.156***
	(0.040)	(0.052)	(0.057)	(0.040)	(0.052)	(0.057)
Unemployed	-0.168***	-0.173***	-0.148*	-0.168***	-0.174***	-0.147*
	(0.050)	(0.056)	(0.077)	(0.050)	(0.056)	(0.077)
# Job changes	0.000	0.024	-0.046	0.000	0.025	-0.047
	(0.019)	(0.027)	(0.030)	(0.019)	(0.027)	(0.031)
State-owned enterprise	-0.327***	-0.289***	-0.271***	-0.330***	-0.286***	-0.293***
	(0.074)	(0.090)	(0.100)	(0.075)	(0.092)	(0.101)
Heavy manufacturing / energy	-0.176	-0.115	-0.273	-0.182	-0.113	-0.303
	(0.119)	(0.128)	(0.256)	(0.119)	(0.127)	(0.260)
Light manufacturing	-0.198**	-0.204*	-0.272*	-0.191**	-0.199*	-0.268*
	(0.084)	(0.114)	(0.149)	(0.083)	(0.111)	(0.147)
Retail / wholesale trade	0.047	0.041	0.039	0.065	0.047	0.067
	(0.086)	(0.104)	(0.152)	(0.086)	(0.104)	(0.150)
Education / training	-0.087	-0.213	0.715	-0.077	-0.210	0.728
	(0.173)	(0.136)	(0.638)	(0.175)	(0.138)	(0.656)
Health care	-0.213**	-0.259**	-0.258	-0.184*	-0.248*	-0.216
	(0.099)	(0.127)	(0.158)	(0.098)	(0.128)	(0.160)
Public services	0.129	0.004	0.173	0.134	0.004	0.190
	(0.109)	(0.128)	(0.181)	(0.109)	(0.128)	(0.180)
Other services	-0.016	-0.006	-0.060	0.006	0.003	-0.031
	(0.081)	(0.097)	(0.147)	(0.081)	(0.096)	(0.147)
Construction / transportation	0.011	-0.039	-0.043	0.035	-0.029	-0.013
	(0.097)	(0.178)	(0.149)	(0.095)	(0.177)	(0.148)
LOC	-	-	-	0.043*	0.023	0.050
				(0.023)	(0.027)	(0.035)
Constant	8.913***	8.922***	8.953***	8.821***	8.865***	8.866***
	(0.305)	(0.414)	(0.436)	(0.302)	(0.400)	(0.438)
Number of observations	699	372	327	699	372	327
R-squared	0.2849	0.3360	0.3462	0.2915	0.3380	0.3536

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Analytical weights used in the pooled sample
Reference industry category: finance/banking

Table 7. OLS Estimates for Log Earnings, Russia

	Pooled (1)	Women (2)	Men (3)	Pooled (4)	Women (5)	Men (6)
Age	0.054***	0.056***	0.084***	0.058***	0.055***	0.088***
	(0.012)	(0.015)	(0.021)	(0.012)	(0.015)	(0.021)
$Age^2/100$	-0.057***	-0.063***	-0.091***	-0.059***	-0.061***	-0.095***
	(0.014)	(0.019)	(0.024)	(0.014)	(0.019)	(0.023)
Tenure	-0.009	-0.004	-0.029	-0.009	-0.004	-0.025
	(0.011)	(0.010)	(0.020)	(0.010)	(0.010)	(0.020)
$Tenure^2/100$	0.011	-0.001	0.093	0.007	-0.002	0.077
	(0.031)	(0.031)	(0.060)	(0.031)	(0.031)	(0.063)
Education	0.034***	0.039***	0.027	0.031***	0.038***	0.025
	(0.010)	(0.009)	(0.017)	(0.010)	(0.009)	(0.017)
Manager	0.348***	0.316***	0.233***	0.325***	0.312***	0.217**
	(0.048)	(0.046)	(0.084)	(0.047)	(0.046)	(0.084)
Unemployed	-0.092	-0.074	-0.158	-0.077	-0.070	-0.128
	(0.073)	(0.063)	(0.126)	(0.071)	(0.063)	(0.124)
# Job changes	0.003	-0.007	-0.009	-0.008	-0.009	-0.019
	(0.026)	(0.028)	(0.038)	(0.025)	(0.029)	(0.036)
State-owned enterprise	-0.379***	-0.374***	-0.422***	-0.357***	-0.366***	-0.390***
	(0.078)	(0.082)	(0.113)	(0.076)	(0.082)	(0.111)
Heavy manufacturing / energy	-0.016	-0.366*	0.155	-0.109	-0.379*	0.010
	(0.155)	(0.214)	(0.197)	(0.156)	(0.214)	(0.208)
Light manufacturing	-0.230	-0.497**	0.004	-0.280*	-0.506**	-0.082
	(0.145)	(0.202)	(0.197)	(0.145)	(0.202)	(0.200)
Retail / wholesale trade	-0.453***	-0.486**	-0.499**	-0.504***	-0.509**	-0.537**
	(0.136)	(0.200)	(0.195)	(0.139)	(0.200)	(0.209)
Education / training	-0.263*	-0.442**	-0.186	-0.321**	-0.474**	-0.223
	(0.159)	(0.215)	(0.211)	(0.159)	(0.215)	(0.212)
Health care	-0.360*	-0.482**	-0.149	-0.426**	-0.512**	-0.193
	(0.187)	(0.218)	(0.484)	(0.191)	(0.217)	(0.509)
Public services	-0.445***	-0.620***	-0.229	-0.527***	-0.648***	-0.347
	(0.165)	(0.213)	(0.238)	(0.165)	(0.213)	(0.244)
Other services	0.048	-0.092	0.104	0.003	-0.113	0.066
	(0.142)	(0.205)	(0.186)	(0.144)	(0.204)	(0.188)
Construction / transportation	0.057	-0.155	0.108	-0.029	-0.189	0.024
	(0.151)	(0.214)	(0.196)	(0.152)	(0.213)	(0.200)
LOC	-	-	-	0.099***	0.036*	0.107***
				(0.022)	(0.021)	(0.038)
Constant	7.291***	7.276***	7.006***	7.283***	7.319***	6.921***
	(0.341)	(0.356)	(0.589)	(0.332)	(0.354)	(0.569)
Number of observations	773	548	225	773	548	225
R-squared	0.3614	0.3959	0.3467	0.3809	0.3994	0.3653

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Analytical weights used in the pooled sample
Reference industry category: finance/banking

Table 8. Decomposition of the Gender Earnings Differential.

	Armenia		Kazakhstan		Russia	
	Model without LOC	Model with LOC	Model without LOC	Model with LOC	Model without LOC	Model with LOC
	(1)	(2)	(3)	(4)	(5)	(6)
Gross differential	0.314	0.314	0.110	0.110	0.414	0.414
Differences in characteristics:						
Age	0.005	0.006	-0.001	-0.002	-0.027	-0.028
Tenure	0.001	0.0005	-0.004	-0.003	0.010	0.011
Years of schooling	0.012	0.011	-0.032	-0.032	0.009	0.008
Manager	0.037	0.035	-0.004	-0.004	0.043	0.040
Unemployment experience	0.003	0.003	-0.004	-0.004	-0.004	-0.003
Job changes	0.002	0.002	0.00002	0.000001	0.0005	-0.001
State-owned enterprise	0.012	0.014	0.035	0.035	0.025	0.023
Heavy manufacturing / energy	-0.005	-0.005	0.004	0.004	-0.0001	-0.001
Light manufacturing	-0.056	-0.057	-0.042	-0.041	0.004	0.005
Retail / wholesale trade	-0.012	-0.012	-0.001	-0.002	0.042	0.046
Education / training	0.036	0.035	0.006	0.006	-0.004	-0.004
Health care	0.043	0.043	0.005	0.004	0.019	0.023
Public services	0.043	0.042	-0.005	-0.005	0.024	0.028
Other services	0.011	0.011	0.0004	-0.0002	0.001	0.0001
Construction / transportation	0.002	0.002	0.0004	0.001	0.007	-0.004
LOC	-	0.017	-	0.003	-	0.029
Total explained differential	0.134	0.148	-0.042	-0.040	0.149	0.172
Unexplained differential	0.177	0.163	0.152	0.150	0.265	0.242
Percent explained by LOC		5.5%		2.7%		7.0%