Migration Magnet: The role of work experience in rural-urban wage differentials in Mexico

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Abstract

This study estimates separate selectivity bias corrected wage equations for formal and informal workers in rural and urban Mexico using data from the Mexican Family Life Survey (MxFLS). We control for different potential selection patterns using probit and multinominal logit models in the first step in which health, personality traits and family characteristics serve as exclusion restrictions for working per se and working in the formal sector. Oaxaca-Blinder Decompositions show that rural-urban wage inequality in the informal sector is mainly explained by differences in returns to experience. In the formal sector, only differences in average education explain the rural-urban wage gap. Furthermore, we analyse rural-to-urban migrants' labour market performance. The findings suggest that rural-to-urban migration will continue and the informal sector will further increase.

Keywords: Returns to experience, rural-urban wage differentials, informality, internal migration, Mexico

JEL classifications: J24, J31, R23, Q15

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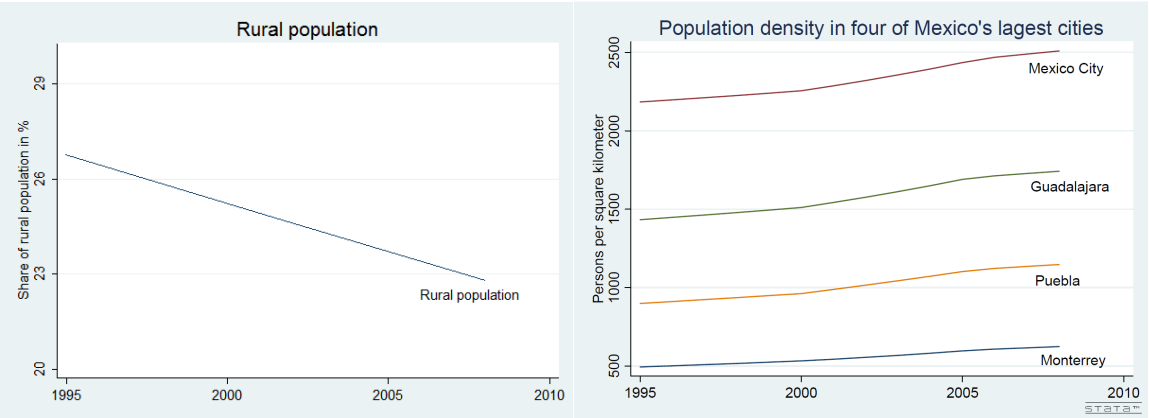
1 Introduction

Theories of economic development postulate that rural-to-urban migration is the driving force of a country's development. Following Todaro (1969) and Harris and Todaro (1970) people migrate from rural to urban areas to find well paid employment which is not available in rural areas. If migrants do not find a job with higher rewards than their reservation wage they will stay unemployed or return. In this model the unemployment rate acts as the driving force in determining a migration equilibrium. The theory is extended by Lucas (2004) who argues that high urban wages are attributed to high skills and not accessible for low skilled immigrants. In his model, individuals migrate to the cities to accumulate work experience as a form of human capital formation. According to human capital theory (Becker, 1964), the accumulation of experience will raise future earnings prospective. This will in turn reduce poverty and welfare dependency. Following this augmentation, the two main incentives to migrate are (1) earning high wages and (2) the accumulation of human capital.

This implies that wages are higher in the cities than in the countryside, which has been clearly demonstrated by economists for decades. Besides the wage differences between rural and urban areas, there are also wage differences between the types of job a worker can obtain, i.e. a formal job or an informal job. Early theories by Lewis (1954) and Fields (1975) suggest that the informal sector is the disadvantaged segment of a dual labour market in which workers are not protected by social security regulations and are in weak bargaining positions with their employers. However, in the last decades, some developing countries have shown a reversed development: the informal sector has been increasing. This has aroused the interest of economists to test the segmented market hypothesis empirically. For Mexico, e.g. Maloney (1999), Maloney (2004), Marcouiller et al. (1997) and Bargain and Kwenda (2009) show that informal work is indeed voluntary for reasons such as opportunity costs and flexibility. Hence, instead of simply queuing for a formal job, people earn wages and accumulate human capital in the informal sector.

In Mexico, as in many other countries, wage differentials have many dimensions, e.g. between rural and urban employment and between formal and informal sectors. An urban wage premium enhances rural-to-urban migration which in turn leads to social and economic problems, such as un- and underemployment, poverty, crime and an increasing informal sector rather than to economic development. Figure 1 shows the decrease of the rural population and the increase of population density in four of Mexico's largest cities, namely Mexico City, Guadalajara, Puebla and Monterrey. It shows that between 1995 and 2008 the rural population decreased from 27 to

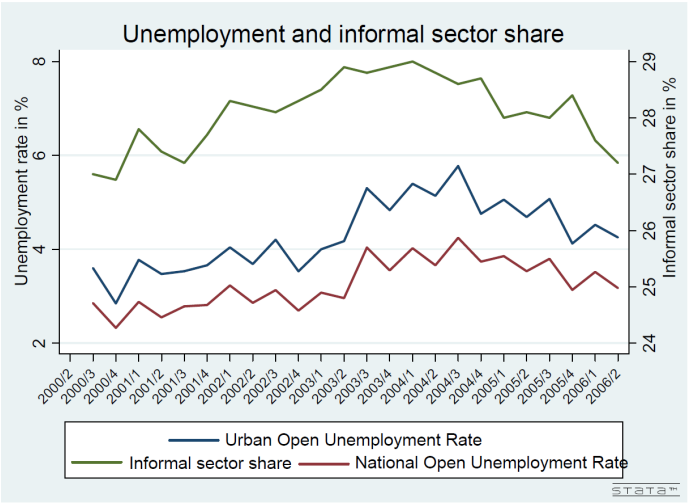
Figure 1: Population Increase In Urban Areas



[a] Source: The World Bank (http://data.worldbank.org/country/mexico) and OECD Metropolitan database (http://stats.oecd.org/index.aspx)

23% while population density in the cities rose. All four example cities show a similar development, i.e. an increase in population density of about 23% within 14 years, which is approximately 1.5% per year. Furthermore, Figure 2 displays the development of the urban and total open unemployment rate in Mexico over the period mid-2000 to mid-2006 and the rise in informal employment over the same period. It can be seen that the urban unemployment rate is much larger than the total open unemployment rate, but exhibits the same pattern. Moreover, the higher the unemployment rate is, the larger is the informal sector share. Combined with Figure 1, these macroeconomic indicators suggest that the increase in rural-to-urban migration, rising urban population density, more unemployment and larger informal sector shares go hand-in-hand.

Figure 2: Unemployment Rates and Informal Sector Share



[a] Source: INEGI (http://www.inegi.org.mx/)

Still, individuals migrate to the cities. Mexico's urban population grew from 66%

to 76% between 1980 and 2005, with Mexico City comprising 29% of the urban population in 1980 but only 23% in 2005 (World Bank, 2010). We contribute to the explanations of the driving forces of rural-to-urban migration in Mexico by investigating the differences in wages between rural and urban areas. Focusing on the argument that rural-to-urban migration is induced by the incentive to accumulate human capital in form of work experience, this paper analyses the returns to work experience and other human capital related factors for rural and urban salaried workers. It is further analysed to what extent these personal endowments can explain the wage gap and which role the informal sector plays. Mexico's Federal Labour Law distinguishes between salaried and non-salaried workers by employer or firm dependency. Non-salaried workers, i.e. the self-employed, are excluded from this analysis as their incomes need special attention and cannot easily be compared to wages of salaried workers, and needs to be covered in a separate study.

The Mexican Social Security Law requires salaried workers to be registered by their employers with the IMSS (Insitituto Mexicano del Seguro Social). However, there are several incentives not to register and simply work informally which are not mutually exclusive. One is the high price for social security coverage which amounts to about 30% of a worker's wage in one of the lowest three deciles of the wage distribution (Levy, 2008). Furthermore, social security benefits have to be bought as a bundle even if the worker does not want or need all components. Other incentives are the various social protection benefits (health insurance, housing subsidies, pension schemes, access to day care centres and life insurance) which can be bought independently and are almost free for poor workers when they are not officially working for an employer. Importantly, non-registration goes hand-in-hand with the avoidance of payroll taxes. These are reasons why the Social Security Law is violated massively, leading to a persisting large share of informal employment.[1]

Using the novel and representative Mexican Family Life Survey (MxFLS), this is the first study which investigates wage differentials between rural *and* urban areas in Mexico. Former studies on wage gaps between groups in Mexico were restricted to urban areas as representative data on the whole population was not available before the publication of the MxFLS.[2] This study uses the second wave (MxFLS-2) which consists of data collected in the second half of 2005 and early 2006.

To overcome the econometric problem of self-selection into work as opposed to not working and selection into different sectors of the labour market, the Heckman (1979) selection-bias correction model is applied. Separate wage equations for formal

[1] See Levy (2008) for a detailed description of Social Programs in Mexico and their outcomes.

[2] The commonly used Mexican data is the National Urban Employment Survey (ENEU), which has only recently been expanded to rural areas.

and informal salaried workers in rural and urban areas are estimated, including the generated non-selection hazard from a probit model. We find the expected large and significant urban wage premium in both the formal and informal sector. Subsequently, Oaxaca-Blinder decomposition techniques are used to show to which extent the rural-urban wage differential can be explained by (a) individuals' personal endowments differences and (b) differences in unobservable characteristics. Moreover, we analyse rural-to-urban migrants' labour market performance. The results suggest structural differences between the formal and informal sector. In the informal sector, the rural-urban wage differential is explained by differences in levels of human capital endowments. The unexplained part however is solely driven by differences in returns to experience. In the formal sector, only differences in observable education levels can explain the wage differential. The results suggest that rural-to-urban migration will continue and the informal sector will further increase in size.

The paper is organised as follows. The next section reviews the existing literature on rural-urban wage differentials and migration incentives. Section 3 describes the empirical strategy to identify wage differentials and account for selectivity bias. Section 4 explains the data and provides descriptive statistics. Section 5 discusses the main findings and the last section concludes.

2 Literature review

The literature on rural-to-urban migration is based on the theoretical models by Todaro (1969) and Harris and Todaro (1970). According to their models, people migrate from rural to urban areas to find high wage jobs which are not available in rural areas. If people do not find a job with higher rewards than their reservation wage they will stay unemployed or return; the unemployment rate acts as a the driving force on determining a migration equilibrium. This theory is extended by e.g. Lucas (2004) who argues that high urban wages are attributed to high skills and not accessible by low skilled immigrants. In his model, people migrate to the cities to accumulate work experience as a form of human capital.

Newer models of migration also include social factors such as previous migration experience, networks and inequality in the migration decision. One factor that has received much attention in recent years is relative deprivation, i.e. the perception of an individual or household to be worse off or disadvantaged compared to a particular reference group, for example, other people in the same village (Quinn, 2006, Stark and Taylor, 1989, 1991). Quinn (2006) uses the data from the Mexican Migration Project for the year 2004 and finds that relative deprivation explains part of the migration decision for internal migrants but not for those who migrate to the United

States. Gould (2007) argues that working in a city increases workers' productivity (see also Glaeser and Maré, 2001). Using the U.S. National Longitudinal Survey of the Market Experience, he finds that white-collar workers receive a wage premium in the rural areas if they gathered work experience in a city, whereas blue collar workers' urban work experience is not rewarded more than rural experience. Hence the incentive to accumulate human capital in the city is part of the migration decision and return migration is dependent on the sector of occupation.

In Mexico, increasing urbanisation has led to economic and social problems such as increasing under-employment and high crime rates. Also, it has increased wage inequality as more productive and human capital intensive firms settled in the cities and they pay higher wages than rural less productive firms. That these higher wages exist for certain groups of workers even after controlling for human capital and other endowments is shown by e.g. Glaeser and Maré (2001) for the U.S.

When investigating rural-urban wage differentials in Mexico, it has to be taken into account that the labour market is further divided into formal and informal employment. In fact, many authors do not focus on rural-urban wage differentials but on differences between formal and informal wages. Exemplary studies that find wage penalties for workers in the informal sector are provided by Bargain and Kwenda (2009) and Bargain and Kwenda (2010) who compare informal-formal sector wage gaps in Brazil, South Africa and Mexico. For Mexico, they use the ENEU and restrict their survey to male dependent workers in urban areas. Using fixed effects quantile estimation, they are not able to control for self-selection into sectors but for other unobserved time-invariant characteristics. The median penalty for working informally is stable during 2004-2007 at about 9%. Hanson (2010) and Arias et al. (2010) state that the informal sector in Mexico´s cities has increased which is partly due to perverse registration incentives induced by social insurance regulations. Furthermore, informality hinders economic development as productivity is low in informal firms (Hsieh and Klenow, 2009).

Another study on wage differentials between informal and formal sectors in Mexico was conducted by Gong and van Soest (2002) using the 1992/1993 waves of the ENEU, restricting their sample to workers in Mexico's five major cities. They apply a multinominal logit model with random effects for the sector choice and dynamic random effects wage regressions. They find that lagged sector variables are not significant and have no effect on current wages. In line with e.g. Maloney (1999) they find wage differentials for high educated workers but not for low educated workers. This implies that formal sector jobs are inaccessible for low educated workers and a need for labour protection for the poorest workers in Mexico's urban areas.

For Mexico, many articles have been published investigating not only wage differentials but also labour mobility between sectors (Maloney, 1999, 2004, Bosch and Maloney, 2007, 2008). They note that informal employment is a desirable choice (see Marcouiller et al., 1997, Maloney, 1999) and see the informal sector as a result of competitive markets in which individuals work voluntarily because of high opportunity costs, such as more flexibility and avoidance of tax payments. The segmented market hypothesis is commonly rejected for Mexico.

Another notable study is Meng (2001) which is one of the few studies which distinguish formal and informal labour and investigate rural-urban migration in the same context. For China, she finds that urban work experience raises the probability of becoming a formal worker and that wage differences are mainly explained by observable personal endowments.

One drawback in the literature on informal labour markets is the different definitions of informality, which impede the comparison of the results. Generally, the most commonly used definitions can be classified into two groups. First, the *legal* definition is based on the contribution to the social security system (e.g. Tannuri-Pianto and Pianto, 2002, Bosch and Maloney, 2007, 2008). Informal workers are those, who do not contribute to the social security system and, simultaneously, do not benefit from social security regulations such as health care and pension schemes. Another *legal* definition is based on the formality of the workers' contracts. Here, informal workers are those, who do not have a written contract and, consequently, cannot assert their labour rights. However, they may enjoy more flexibility. The other group of definitions is based on *productivity* grounds. According to them, the informal sector comprises workers in firms with less than or equal to five employees (e.g. Maloney, 1999, Gong and van Soest, 2002), based on the argument that small firms tend neither to register their business nor their employees. The problem with firm size as a measure is that larger firms tend to pay higher wages and are at risk of being caught defaulting as their number of employees increases. Hence, they are more likely to register (Badaoui et al., 2007). In this study the most unambiguous, *legalistic*, definition is used which corresponds to registration with the social security system.

All articles found in an intensive literature search and cited here for Mexico are based on either rural or urban household surveys or solely on migrants. Using the novel Mexican Family Life Survey (MxFLS) allows the investigation of wage differentials between rural and urban workers in different sectors. Notably, households from rural areas are more likely to be exposed to poverty and low (formal) employment opportunities and the likelihood for working informal is higher in rural areas

compared to urban areas.

3 Empirical Methodology

The empirical strategy to identify the determinants of the rural-urban wage differential and to find out which wage related factors are mainly driving rural-to-urban migration is to estimate wage regressions and to apply Blinder-Oaxaca decomposition techniques.

One issue that has to be taken into account when estimating wage equations for different groups of workers is different sources of selection bias. The most obvious source is the selection bias from *self-selection into work* vs. not working, i.e. sample selection. The other source is, given that an individual is working, *self-selection into one sector* of the labour market, distinguishing between formal salaried employment, informal salaried employment and self-employment[3]. As the self-employed have a very different wage determination compared to salaried workers, they are excluded from the sample[4]. Hence, the remaining sectors are formal salaried employment and informal salaried employment.

To account for selection bias, Heckman (1979) selection models are estimated. This two-step model is described in the following example for the *self-selection into work*-bias correction. First, a probit model is estimated to determine the probability of individual i working ($w_i = 1$) as opposed to not working ($w_i = 0$) which can be written as:

$$w_i = \gamma Z_i + u_i \tag{1}$$

where Z_i are observed characteristics of the individual, such as human capital and family indicators, γ is the vector of coefficients of these variables and u_i is the error term which is normally distributed with zero mean and unity variance. Subsequently, the non-selection hazard (also known as inverse Mill's ratio) $\lambda_{w/nw}$ is calculated from the estimated parameters of the selection equation. This is included in the second step wage regression which has the following form

$$\ln y_i = \alpha_i + \beta X_i + \delta \lambda_{w/nw} + \epsilon_i \tag{2}$$

where y_i is the hourly wage of individual i, β is a vector of coefficients of observable personal and household characteristics X_i and ϵ_i the error term which is assumed

[3]See Magnac (1991) for evidence of self-selection into the informal sector.
[4]See Hamilton (2000) for a discussion on the difficulty of measuring self-employed earnings.

to be normally distributed with zero mean and variance σ^2. y_i is observed if and only if $\gamma Z_i + u_i > 0$, i.e. $w_i > 0$. The wage equations will be estimated both using ordinary least squares (OLS) and with the two-step method including the non-selection hazard term. The estimation results suggest that there is no *self-selection into work* as the non-selection hazard coefficient is insignificant and the other coefficients do not differ between OLS and Heckman two-step. Hence, we do not need to account for *self-selection into work* but only for *self-selection into formal employment* when estimating wage equations for formal and informal workers separately. Hence, we only include the selection bias correction term $\lambda_{f/inf}$ generated from a probit model in which the dependent variable is a dummy for working formally as opposed to informally and vice versa for the other group.

Subsequently, the two-fold Blinder-Oaxaca decomposition technique (Blinder, 1973, Oaxaca, 1973) is used to find out in how far differences in wages between rural and urban workers are explained by differences in observable characteristics and to which part differences remain unexplained. The decomposition technique can be written as

$$\overline{\ln y^R} - \overline{\ln y^U} = \hat{\beta}^R(\overline{X^R} - \overline{X^U}) + (\hat{\beta}^R - \hat{\beta}^*)\overline{X^R} + (\hat{\beta}^* - \hat{\beta}^U)\overline{X^U} \tag{3}$$

where $\hat{\beta}^U$ and $\hat{\beta}^R$ are recovered from the separate wage equations of the rural and urban samples. β^* is a vector of coefficients from a pooled model over both samples which includes a dummy variables which identifies the populations. The left hand side of equation (3) is the raw wage gap, the right hand side consists of the difference in characteristics or explained part and the unexplained part due to differences in coefficients. To determine the explained part the group differences in the endowments vector is weighted by the coefficients vector of the rural population. To identify the contribution of the human capital variables separately, we decompose the rural-urban wage differential in detail.

4 Data

The data used is the novel Mexican Family Life Survey (MxFLS) which is a panel survey of approximately 8,440 Mexican households and 35,000 individuals. It is representative at the regional, urban-rural and state levels and contains information on the individuals, households and communities with a re-contact rate between the first wave in 2002 (MxFLS-1) and the second wave of 2005 (MxFLS-2) of about 90%. The questions cover a variety of topics such as labour market status, family

Table 1: Distribution of individuals by sectors

	Urban		Rural	
	Mean	Std.Dev.	Mean	Std.Dev.
Not working	0.51	(0.50)	0.64	(0.48)
Informal salaried	0.29	(0.45)	0.28	(0.45)
Formal salaried	0.20	(0.40)	0.08	(0.27)
N	5584		3808	

Note: Authours' calculations based on MxFLS-2.

characteristics, education, household income, health and self-evaluations.[5]

This study uses exclusively the second wave (MxFLS-2) because earnings variables seem less reliable in 2002.[6] The data is restricted to men and women between the age of 16 and 65 years. Self-employed workers, full-time students and the seriously ill (incapable) are excluded from the sample. The final sample consists of almost 10,000 individuals of whom 44% are salaried workers in either formal or informal employment. The detailed distribution of the workforce is displayed in Table 1. Those 'not employed' include also workers without remuneration. In the rural areas 36% are salaried workers. In urban areas 49% are employed. Individuals were defined as living in a rural area if they live in a community with less than 2500 inhabitants, and in an urban area otherwise.

There are different definitions of informality in the literature, being based in firm size, contracts or occupations. The here used *legal* definition of the informal sector is based on the definition of Mexico's Federal Labour Law, which distinguishes between salaried and non-salaried workers by employer or firm dependency. Within this definition the number of subgroups is large and assigning occupations to certain groups is not possible as the majority of jobs can be salaried and non-salaried. One example that is given by Levy (2008) is a shoe shiner who can work independently and also he could be employed by a hotel being a salaried worker. Salaried workers are eligible to social security benefits which include health insurance, pension, child care, housing loans, life and work-risk insurance and sports and cultural facilities, when they are registered with the IMSS (Insitituto Mexicano del Seguro Social). Moreover, they are protected by firing regulations and severance pay.

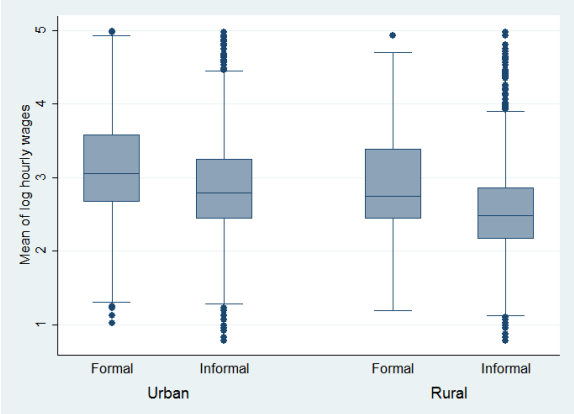
In fact, Social Security Law prescribes that salaried workers must be registered by their employers with the IMSS. The definition of informality based on enrolling with

[5]More details can be found at http://www.ennvih-mxfls.org/.

[6]In 2002 about 20% of workers stated non-positive wages while no individual stated non-positive wages in 2005. The reasons for this may not be due to idiosyncratic measurement error.

IMSS is most relevant and accurate for Mexico because of the legal labour market institutions as explained by Levy (2008). Hence, information on the working contracts is used to define informal workers[7]. This classifies those individuals as informal workers who do not have an ISSSTE-contract (government workers) or an IMSS-contract (registered to social security) and formal if they have either. The ISSSTE is the social security institution for public sector workers and the armed forces. As not all public workers are registered with ISSSTE, e.g. public workers in educational institutions and workers of the public electricity companies, it is impossible to exclude all public workers and hence they form the group of formal workers together with all workers who are registered with IMSS. This *legalistic* definition is also used by e.g. Bosch and Maloney (2007) and Bargain and Kwenda (2009).

Figure 3: Wage Premia

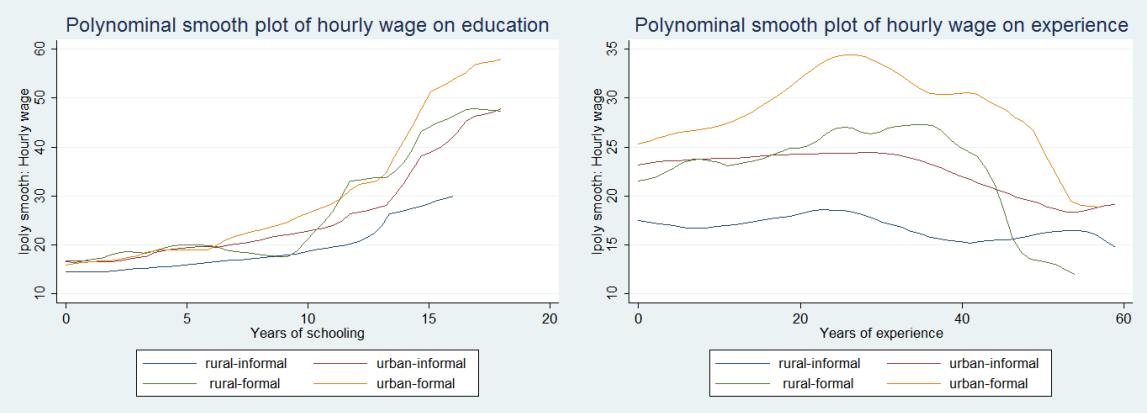


The key dependent variable is log hourly wage which is constructed by dividing reported average monthly earnings by 4.33 times reported average hours worked per week. Individuals who failed to report positive wages were deleted from the sample, accounting for about 2%. Additionally, the top and the bottom two percentiles of the wage distribution were deleted from the sample to avoid bias due to outliers. Figure 3 shows the mean of hourly log wages of workers in the different groups. It can easily be seen that formal urban wages are highest on average and rural informal wages are lowest. Formal rural and informal urban workers have about the same mean wage. Figure 4 plots hourly wages for all groups separately on years of schooling and experience, respectively. It can be seen that wages differ with regard to schooling for the highest educational groups as can be expected, with lowest wages for rural informal workers and highest for urban formal workers. The graph for experience

[7]As Maloney (1998), Bosch and Maloney (2008) and Levy (2008) point out, workers, especially poor workers, are highly mobile between sectors and hence workers can actually not be labelled as formal workers or informal workers. For simplicity we use these terms here but actually, when referring to an informal (formal) worker, we mean an individual, whose last job at the time of data collection has been in the informal (formal) sector.

shows a greater difference between the groups. These patterns will be more precisely analysed in the next section.

Figure 4: Wage Distribution



The key independent variables are experience, education, cognitive ability and family and job characteristics. Experience is modelled as Mincerian potential experience (age minus years of schooling minus 6) because job history is not available in the data. The individuals are divided into two education groups, i.e. education up to compulsory level (0-9 years of schooling) or more ($\geq$10 years), including high school and university graduates. A special feature of the MxFLS is that a Raven's test was conducted with almost every individual. The Raven's test scores measure an individual's cognitive ability and the test scores are included in the regressions[8]. In the "returns to education" literature it is argued that an individual's educational achievement is influenced by their intelligence and the inclusion would lead to endogeneity bias (Card, 1999, Psacharopoulos, 1994). However, the correlation coefficient between the years of education and the test score is 0.33 suggesting that endogeneity problems can be neglected. The inclusion of the test score should only lower the education estimates.

Family characteristics include household size, number of elderly and infants in the household, dummies for being the household head, being married and measures of a person's character. These measures include risk attitudes, assessed from a battery of questions in a hypothetical lottery included in the data and if a person is 'honest', i.e. agreeing to the statement "Laws are there to be broken". The personality variables, along with having a farm or not and the number of infants and elderly persons, serve as selection variables in the probit models.

[8]see Raven et al. (2003) for more information about the test.

Table 2: Descriptive statistics by sector and locality

	Informal				Formal			
	Urban		Rural		Urban		Rural	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female	0.37	(0.48)	0.25	(0.43)	0.39	(0.49)	0.29	(0.46)
Married	0.51	(0.50)	0.52	(0.50)	0.59	(0.49)	0.56	(0.50)
Indigenous	0.07	(0.25)	0.17	(0.37)	0.06	(0.24)	0.11	(0.31)
Hh head	0.46	(0.50)	0.52	(0.50)	0.50	(0.50)	0.52	(0.50)
High education	0.28	(0.45)	0.10	(0.30)	0.43	(0.50)	0.32	(0.47)
Age 16-25	0.25	(0.44)	0.25	(0.44)	0.18	(0.38)	0.21	(0.41)
Age 26-35	0.28	(0.45)	0.27	(0.44)	0.33	(0.47)	0.30	(0.46)
Age 36-45	0.25	(0.43)	0.25	(0.43)	0.29	(0.45)	0.26	(0.44)
Age >46	0.22	(0.41)	0.23	(0.42)	0.21	(0.41)	0.23	(0.42)
Experience	21.0	(13.3)	23.8	(14.0)	20.4	(11.4)	22.0	(12.6)
Hrs/year	2102	(958)	1974	(991)	2283	(803)	2182	(918)
Raven test	0.55	(0.23)	0.49	(0.24)	0.59	(0.23)	0.54	(0.24)
Honest	0.81	(0.39)	0.80	(0.40)	0.83	(0.37)	0.82	(0.38)
Risky	0.37	(0.48)	0.39	(0.49)	0.38	(0.48)	0.41	(0.49)
Health	2.70	(0.64)	2.65	(0.63)	2.80	(0.63)	2.71	(0.71)
Hh size	9.95	(4.56)	10.64	(4.95)	9.40	(4.19)	9.91	(3.95)
Nr. of infants	0.38	(0.65)	0.40	(0.65)	0.30	(0.58)	0.38	(0.65)
Nr. of elderly	0.35	(0.89)	0.40	(0.91)	0.32	(0.86)	0.47	(1.06)
Farm	0.05	(0.22)	0.20	(0.40)	0.03	(0.17)	0.23	(0.42)
N	1594		1076		1123		295	

Note: Authors' calculations based on MxFLS-2. Numbers are mean values and standard deviations in parentheses.

Table 2 provides descriptive statistics on these variables. It can be seen that the average years of work experience are higher in rural areas than in urban areas. This pattern is very similar in the formal and the informal sector with about 22-24 years in rural and about 20-21 years in urban areas. It appears that the differences in years of experience are driven by differences in education and are not due to age differences as the age profiles do not differ largely between rural and urban residents. Years of work experience are highly correlated with age because we can only use potential experience. After discussing the main results, we will also discuss some robustness checks which show that the results for returns to experience differ from those for age.

Notably, the share of high educated workers is very different between sectors. The highest share of high educated workers is in the urban formal sector with 43% of all workers. In the urban informal sector, 32% are university educated as well as in the formal rural sector and only 10% of the informal workers in the rural areas have attended high school and/or university or college. Furthermore, the urban workforce performs better in the Raven's test score. These observations hint at the existence of self-selection into formal employment in rural and urban areas based on human capital endowments. Also, differences between rural and urban workers exist with regard to psychological indicators such as risk attitudes and honesty.

5 Results

5.1 All workers

In this section we discuss the results from the wage regressions for all workers. First, it is important to note that wage regressions which include the non-selection hazard term generated from the probit estimations show that self-selection into salaried employment does not affect the wage determination neither in rural nor in urban areas (Table 3) and it can be concluded that the wage regression results are not biased due to *self-selection into work*. Hence, in the subsequent wage regressions for formal and informal workers, it is not necessary to control for *self-selection into work* which allows a relatively simple estimation procedure. In the following, we will base our discussion on the OLS estimation results[9].

At this point it has to be made clear, that although the wage regressions are based on cross-sections, unobserved ability bias is reduced due to the Raven's test score variable. The test score coefficient is 17% for urban workers and 13% for rural workers, suggesting that by answering one more of the twelve questions correctly the wage is raised on average by 13 percentage points.

[9]The probit estimation results can be found in Appendix Table A1.

Table 3: Wage Equations for All, Rural and Urban Workers

	All				Rural		Urban	
	OLS	HM	OLS	HM	OLS	HM	OLS	HM
Urban	0.195***	0.200***	0.026	0.028	–	–	–	–
	(0.023)	(0.025)	(0.086)	(0.086)				
Exp*Urban	–	–	0.011**	0.011**	–	–	–	–
			(0.006)	(0.005)				
Exp sq.*Urban	–	–	-0.000	-0.000	–	–	–	–
			(0.000)	(0.000)				
High edu.*Urban	–	–	0.035	0.034	–	–	–	–
			(0.053)	(0.054)				
Raven*Urban	–	–	0.024	0.024	–	–	–	–
			(0.087)	(0.086)				
Experience	0.019***	0.019***	0.011**	0.011**	0.006	0.008	0.023***	0.024***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.004)
Experience sqrd.	-0.000***	-0.000***	-0.000***	-0.000***	-0.000**	-0.000**	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High education	0.244***	0.252***	0.220***	0.223***	0.155**	0.178***	0.253***	0.262***
	(0.027)	(0.031)	(0.051)	(0.052)	(0.065)	(0.066)	(0.030)	(0.036)
Raven test	0.153***	0.157***	0.134*	0.135*	0.127*	0.138*	0.167***	0.172***
	(0.042)	(0.043)	(0.070)	(0.070)	(0.069)	(0.072)	(0.053)	(0.053)
Hh size	-0.004	-0.003	-0.003	-0.003	0.005	0.006	-0.007***	-0.007**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.003)
Indigenous	-0.090***	-0.091***	-0.089***	-0.090***	-0.127**	-0.131***	-0.051	-0.054
	(0.034)	(0.034)	(0.034)	(0.034)	(0.049)	(0.049)	(0.050)	(0.049)
Female	-0.134***	-0.165**	-0.134***	-0.144**	-0.150***	-0.277*	-0.126***	-0.156**
	(0.028)	(0.067)	(0.028)	(0.068)	(0.053)	(0.167)	(0.033)	(0.071)
Hh head	0.028	0.039	0.029	0.032	0.075*	0.109*	0.017	0.031
	(0.025)	(0.034)	(0.025)	(0.034)	(0.044)	(0.061)	(0.032)	(0.042)
Married	0.072***	0.062**	0.073***	0.070**	0.063	0.037	0.068***	0.056
	(0.021)	(0.028)	(0.021)	(0.028)	(0.039)	(0.048)	(0.025)	(0.035)
Formal	0.137***	0.138***	0.137***	0.137***	0.156***	0.157***	0.115***	0.115***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.043)	(0.044)	(0.024)	(0.025)
Constant	3.263***	3.238***	3.383***	3.375***	3.385***	3.330***	3.398***	3.371***
	(0.102)	(0.107)	(0.113)	(0.123)	(0.159)	(0.177)	(0.149)	(0.144)
Hrs/year	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\lambda_{w/nw}$	–	0.037	–	0.012	–	0.116	–	0.041
		(0.073)		(0.074)		(0.146)		(0.088)
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occup. dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	4089	9390	4089	9390	1372	3807	2717	5583
$\bar{R}^2$	0.386	–	0.386		0.339	–	0.368	–
χ^2	–	2616	–	2629	–	791	–	1649
p	–	0.000	–	0.000	–	0.000	–	0.000

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. OLS: Ordinary Least Squares, HM: Heckman Selection 2nd step. 15 state dummies, 23 industry dummies and 18 occupation dummies included. λ is the nonselection hazard variable generated from the probit model.

In the wage regression for the whole sample (column 2), it can be seen that a significant urban wage premium exists and amounts to 20%. This finding is very similar to the results of Glaeser and Maré (2001) for the US. The wage regression for all workers in the sample is extended by interaction terms of the human capital variables with the urban residence dummy. Only the work experience interaction coefficients are significant and suggest that experience is higher rewarded in urban areas than in rural areas by about 1.1%-points. These findings are further supported by the separate wage equations for rural and urban workers (columns 5-8). While the return to one additional year of work experience is 2.3% in urban areas, it is not significantly different from zero in rural areas. This finding is important because higher rewards for work experience in urban areas will play a role in the decision to stay in an urban area if they live there or to migrate to a city if they are currently living in the countryside. However, the coefficients cannot be compared quantitatively as they were estimated in separate regressions. To see if experience is indeed such an

important factor in explaining the wage differential, detailed decomposition analyses will be applied. Before we come to these results, we will discuss the findings of the formal/informal sector wage analyses.

5.2 Formal vs. informal workers

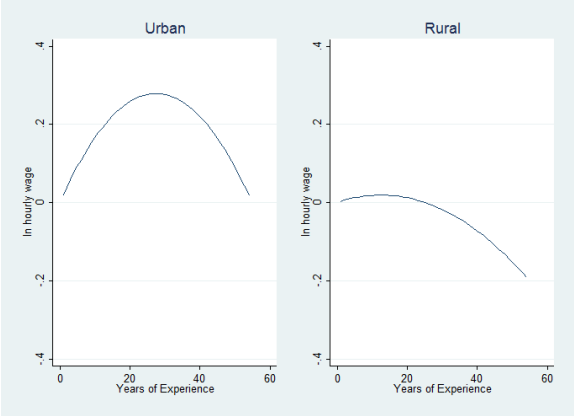
As mentioned in the literature section, several authors have found wage differentials between formal and informal workers. We show that this differential also exists in 2005 in Mexico, even when distinguishing between rural and urban workers. That the differential also exists in the rural areas of 16% and 12% in the cities (Table 3, columns 6 and 8) is novel evidence because earlier studies on the formal wage gap in Mexico were mostly based on the National Urban Employment Survey which did not cover rural households until recently.

To avoid potential bias from *self-selection into formal employment* probit regressions were conducted for all, rural and urban workers separately. The results can be found in Appendix Table A2. It can be seen that changing residence from rural to urban increases a worker's probability of working formally as opposed to informally by 16%-points, which can be expected when taking into account that only 22% of all workers in rural areas but 41% of all urban workers are formally employed. The separate probit equations for rural and urban workers show that determination of formal employment differs between rural and urban employees with respect to cognitive ability, other household earnings and household size. For example, in rural areas, scoring high in Raven's test raises the probability of working formally by 10%-points and is insignificantly different from zero in urban areas. Psychology characteristics do not seem to play a role in the choice of formal compared to informal employment. Furthermore, health only plays a role in urban areas. Most important for both urban and rural workers to decide for or access formal employment is high education. Also, the larger the household, the less likely a worker is formally employed in rural areas, but there is no effect for urban workers.

The results of the separate wage equations for formal and informal sector workers support what we have found in the wage equation for all workers but suggest quantitative differences between the sectors. The tables are in the appendix (Tables A3 and A4). For both formal and informal workers self-selection is not distorting the results as in all regressions the non-selection hazard coefficient is insignificant. From the regression for informal workers we can see that a significant urban wage premium exists, which is further supported by the separate equations (columns 5 to 8). We also find a significant return to high education of about 14% in the rural and 22% in the urban areas. For informal workers there is no return to cognitive

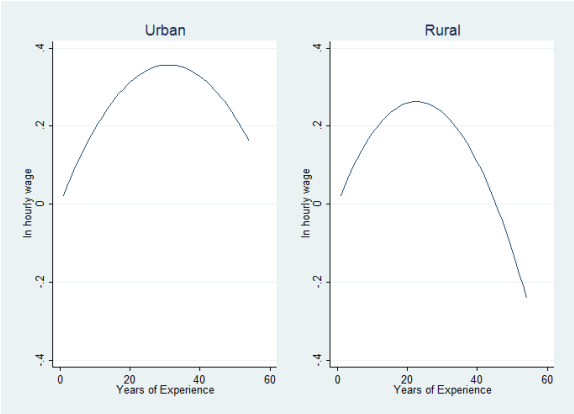
ability as the coefficient is not significantly different from zero. For informal workers in urban areas the return to experience is 1.3%-points higher than for informal rural workers. No other human capital related factors are significantly differently rewarded in urban than in rural areas (see Figure 5). For the formal sector, this is not found (see Figure 6). Note that the returns to experience are insignificant for rural workers in the informal sector.

Figure 5: Returns to Experience in Informal Sector



For formal workers, the results suggest that human capital, other than education, is not rewarded in rural areas as the coefficients are not significantly different from zero. The results show that it is important to separate the workforce into different groups when the intention is to detect determinants of wage inequality. We will decompose the wage differential in the next section to uncover which role the different indicators of human capital play in the determination of rural-urban wage differentials.

Figure 6: Returns to Experience in Formal Sector



In essence, the results suggest that experience is not rewarded in the rural areas but in urban areas. This will elevate the incentive to migrate to the urban areas. As

a consequence, the informal sector will increase in urban areas, assuming that formal jobs do not emerge as quickly as the rural population migrates.

5.3 Blinder-Oaxaca Decomposition

Table A5 shows that the overall difference between urban and rural wages is 32% for informal workers and 23% for formal workers. About one third of the differential can be explained by observable characteristics in the informal sector and in the formal sector. The detailed decomposition results are displayed in Table 4 for informal and formal workers, respectively. The results for informal workers show that differences in experience, education and cognitive ability endowments largely explain the wage gap. When we look at the unexplained part, it can be seen that differences in coefficients of work experience account for the largest share of the unexplained part, the coefficient is -0.4 and statistically significant at a 1% level. Returns to education and cognitive ability do not play a role in the unexplained part of the rural-urban wage differential, nor do the returns or premia to other characteristics. Hence, there are significant differences in returns to experience, even after controlling for other observable characteristics and self-selection.

In the formal sector, this difference in coefficients does not exist neither for experience nor for any other variable. Solely the differences in average human capital endowments explain the wage gap in the formal sector as can be seen in Table 4. This shows that it is not sufficient estimating separate wage equations for rural and urban workers to identify differences in returns to endowments. This finding supports the hypothesis that urban firms are more human capital intensive and high education is important in those firms while they reward work experience higher than rural firms.

5.4 Robustness checks

We conduct a series of robustness checks to make sure that inconsistencies in the data set do not drive the results and that we did not oversee important differences between groups or selection processes. Therefore, we apply a multinominal logit model in the first step in which the labour market choices are formal salaried employment, informal salaried employment and not working. The estimated inverse Mill's ratios from this model are included in the main wage equation. We do not find qualitative nor significant quantitative changes in the main results[10].

Another robustness check concerns the definition of the education variable. All

[10]We do not further discuss this methodology here as we are aware of the violation of the assumption of independent irrelevant alternatives in the multinominal logit model. The results can be obtained from the corresponding author.

Table 4: Decomposition for Informal and Formal Workers

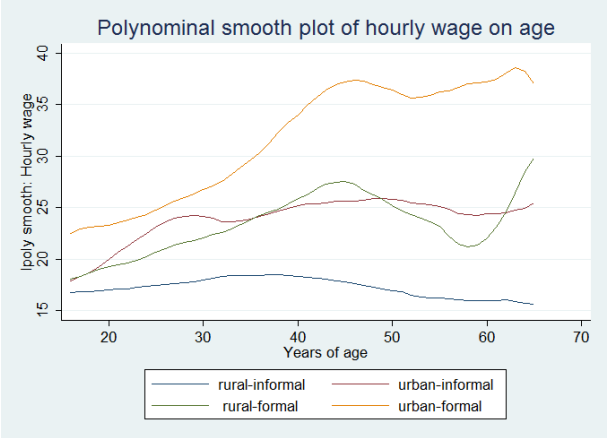
	OLS	
Informal	Explained	Unexplained
Experience	-0.041***	0.400**
	(0.013)	(0.170)
Experience sqrd.	0.042***	-0.180*
	(0.013)	(0.092)
High education	0.036***	0.006
	(0.007)	(0.013)
Raven test	0.006**	0.014
	(0.003)	(0.055)
Other	0.068***	-0.030
	(0.021)	(0.114)
N	2669	
Formal	Explained	Unexplained
Experience	-0.037*	-0.003
	(0.020)	(0.239)
Experience sqrd.	0.040**	0.086
	(0.019)	(0.126)
High education	0.035***	0.032
	(0.010)	(0.034)
Raven test	0.012**	0.045
	(0.005)	(0.085)
Other	0.016	0.000
	(0.030)	(0.186)
N	1418	

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. OLS: Ordinary Least Squares. The decomposition is formulated from the viewpoint of the rural population. For the underlying regressions see wage regression tables. *Other* inlcudes 15 state dummies, work characteristics and social characteristics.

regressions are run including a different education variable, which is equal to one if the individuals has attained university and equal to zero if educational attainment was up to high school level rather than attainment of more than 10 years vs. less than 10 years. In all regressions, the coefficient was larger and still significant but not changing the results qualitatively.

One drawback of the data is that we cannot measure actual work experience as we do not have sufficient information on job history. As work experience is measured by age minus years of education minus 6, the correlation between our work experience variable and age is high (about 97%). To remedy the concern that we are not actually measuring the effects of work experience but the returns to age, we plotted wages on years of age in Figure 7. Comparing the plots with those on work experience it can be seen that there are differences in age and experience profiles.

Figure 7: Wage Distribution, age instead of exp



In a following step we estimated all regressions including age instead of experience. The coefficients are larger for age than for experience and there are no significant differences between rural and urban workers. Hence, it can be concluded, that our experience variable is actually measuring the effect of work experience and not that of age. Moreover, all wage equations were also estimated including a cubic term of experience and with experience only. For some groups of workers, the coefficients were also significant but the findings do not differ qualitatively from the discussed results.[11]

5.5 Migrants' labour market performance

In the subsequent analysis we investigate the labour market performance of rural-to-urban migrants to see if it is in fact profitable for a rural worker to migrate to a city.

[11]The result tables of the robustness checks are not displayed for the sake of brevity but can be obtained on request by the corresponding author.

Therefore we introduce a dummy variable which is equal to one if the individual has lived in a rural area at the age of 12 and in an urban area at the time of interview and zero otherwise to proxy the migration status of an individual. We add this variable to the regressors in the main wage regressions as well as in the first-step selection equation. At this stage we will only discuss the results for the informal and formal sector separately as we again find large differences between sectors concerning rural-to-urban migrants' labour market performance. Furthermore, we will only discuss the results of the OLS models because we find no evidence of selection bias.

First, we find that rural-to-urban migrants are less likely to be working (see Table 5). Rural-to-urban migrants have a lower probability of 16% to be working compared to other urban workers. Second, given the migrant is working, his or her likelihood of working formally is 26% lower than the likelihood of an urban worker.

Table 5: Rurual-to-urban Migrants' Labour Market Performance

	Probit		OLS wage regressions			
	Marg. Effects		Informal		Formal	
	Working	Formal	1	2	1	2
Migrant	-0.160***	-0.257***	-0.098***	-0.143	0.002	-0.222
	(0.044)	(0.056)	(0.035)	(0.134)	(0.036)	(0.162)
Migrant× Exp.	–	–	–	0.002	–	0.011
				(0.009)		(0.011)
Migrant× Exp.^{2}	–	–	–	-0.000	–	-0.000
				(0.000)		(0.000)
Migrant× High Educ.	–	–	–	0.182**	–	0.102
				(0.080)		(0.074)
Migrant× Raven score	–	–	–	-0.018	–	0.072
				(0.145)		(0.155)
Experience	–	–	0.020***	0.019***	0.023***	0.019***
			(0.005)	(0.007)	(0.006)	(0.007)
Experience sqrd.	–	–	-0.000***	-0.000**	-0.000***	-0.000**
			(0.000)	(0.000)	(0.000)	(0.000)
High education	0.433***	0.298***	0.188***	0.125**	0.309***	0.277***
	(0.050)	(0.058)	(0.044)	(0.053)	(0.041)	(0.048)
Raven test	0.279***	0.215*	0.104	0.109	0.277***	0.245**
	(0.093)	(0.118)	(0.072)	(0.105)	(0.078)	(0.102)
Other characteristics	Yes	Yes	Yes	Yes	Yes	Yes
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	No	Yes	Yes	Yes	Yes
Occup. dummies	No	No	Yes	Yes	Yes	Yes
N	5583	2717	1594	1594	1123	1123
R^2			0.309	0.312	0.480	0.482
Pseudo R^2	0.355	0.080				
p	0.000	0.000	0.000	0.000	0.000	0.000

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. The other characteristics are the same as in the previous models.

Our main interest lies on the analysis of migrants' reward for human capital in the urban areas. Hence, including the migrant regressor in the wage regression will show if migrant experience an earnings penalty or earnings premium and if this differs by human capital endowments. We find that migrants have on average a wage gap of about 8% in the informal sector (see column 3 in Table 5). Interacting the migrant dummy with human capital endowments reveals some important information on how different migrants gain from rural-to-urban migration and if migrating is reasonable in terms of wages. On the one hand, migrants who have obtained a university degree

enjoy an average wage premium of 18.5% compared to urban high educated workers. Interestingly, rural-to-urban migrants do not have lower returns to experience. The coefficient is almost zero and insignificant. In the formal sector we cannot find wage gaps between urban workers and rural-to-urban migrants.

This allows the conclusion that the high returns to experience found in the previous sections are indeed a pull factor into urban informal labour markets. The results should also be interpreted in the light of the findings of Boucher et al. (2005). They show that internal migrants in Mexico select on schooling whereas Mexicans who migrate to the U.S. are not more educated than stayers. Using the Mexican National Rural Household Survey they also find that internal migration increases the schooling level of the rural population through high-skill family migration networks. Hence, migration to urban areas in Mexico also has a positive side effect, which will facilitate development in rural areas through education. This positive side effect is only valid if the migrant finds employment in the urban area.

5.6 Discussion

The findings provide evidence that rural-urban wage differentials exist in Mexico and that there are differences in the decomposition between in formal and informal workers. Definitely, differences in all human capital related factors explain a large part of the rural-urban wage gap in the informal sector, while only education explains part of the wage gap in the formal sector. Additionally, in the informal sector, returns to experience are much lower for rural than for urban workers, even after controlling for a large number of observable characteristics. When considering that only a small part of the formal sector resides in the rural areas and wages are significantly lower in rural areas, small returns to experience are definitely a push factor out of the rural and into the urban labour market, seemingly preferably and possibly easier into the informal sector when the individual is endowed with at least some years of experience. Furthermore, the results seem to explain, at least partly, the macroeconomic picture described in the introduction. If the observed wage pattern continues to exist, low returns to experience will not only act as a push factor away from rural areas and into the cities but also serve as an impediment for return migration. That rural-to-urban migrants do not have lower returns to experience supports this result. Furthermore, rural-to-urban migrants enjoy an average wage premium for high education. This will have further consequences for the existence of the informal sector. Assuming that formal jobs do not emerge as quickly as the rural population migrates and the social security protection system does not change, the informal sector and unemployment will further increase in the cities.

As we are able to control for a large number of personal characteristics, it is likely that unobserved firm characteristics explain parts of the wage differential. As has been shown by other authors, firms in the cities are more productive and hence they pay higher wages (Glaeser and Maré, 2001, Gould, 2007). It seems plausible, that work experience only is rewarded in urban firms rather than in rural firms, which is supported by our results. This will be an incentive for individuals to migrate to the cities to accumulate human capital in the form of work experience and be accordingly paid. This is also in line with the theoretical suggestion by Lucas (2004).

For policy makers, these findings give direction for policy in at least two respects. First, there is a need for the government to attract more 'good' firms in rural areas in which work experience is needed or worthy experience can be obtained. There already exist few examples of foreign or international firms, which settled in rural areas and enforced some development in the areas around the factory. With the settling of a Volkswagen plant near Puebla in the 1960s, a previously poor rural area was turned into a flourishing city by improving the infrastructure and providing jobs for skilled and unskilled workers. Suppliers settled in a nearby business park, offering more and diverse employment possibilities. Furthermore, the presence of large inter- or multinational firms from developed countries helps to improve or at least maintain the health and safety standards, the adherence of human and labour rights and a relatively high wage level. Of course, there may also be examples in some countries, where the presence of foreign firms does not increase the standard of living and the freedoms for the employed workforce. However, there is supposedly a tendency towards improvement of regional labour markets through the settlement of particular large firms with an international background. Hand in hand with the employment in a large firm goes the increased possibility to be registered with the IMSS. The descriptive statistics show that the average number of employees in a firm that employs an informal worker is 50, while a formal worker has on average 119 co-workers. However, the attraction of large firm with international background is not enough as a method to increase formal employment. Policies needs to address the incentives to work formally, for example by changing the social insurance schemes which currently impose perverse incentives for registration with the IMSS (Levy, 2008).

6 Conclusion

This study investigates the differences in wages between rural and urban workers in the informal and formal sectors of Mexico's labour market. Using the novel, representative Mexican Family Life Survey (MxFLS) it has been shown that a large urban

wage premium exists in Mexico and that returns to experience are small in rural areas compared to urban areas. Applying Blinder-Oaxaca Decomposition techniques and correcting for selectivity into formal, i.e. registered employment, it has been shown that in the informal sector the differences in returns to human capital endowments, such as work experience, education and cognitive ability, explain large parts of the rural-urban wage gap. Furthermore, the unexplained part is solely based on the difference in returns to work experience between rural and urban workers. Hence, the more work experience a worker has accumulated, the higher is his monetary disadvantage when he or she works in a rural area as compared to an urban area. In the formal sector, only differences in education contribute to the explanation of the wage gap and no differences in coefficients can be identified. Furthermore, we find no difference in returns to experience for rural-to-urban migrants and even a positive wage premium for migrants with high education.

The findings suggest that there is a large incentive for rural residents with at least some years of work experience to migrate from the rural into urban areas in Mexico where they will receive higher rewards for work experience. If the observed wage pattern continues to exist, the found low rural returns to experience will not only act as a push factor away from rural areas and into the big cities but also serve as an impediment for return migration. Moreover, assuming that the number of rural-to-urban migrants increases faster than formal jobs emerge, which seems realistic given the low incentives to register, either under-employment or informal employment will increase in the cities. This will lead to further economic and social problems and continuing low economic growth.

Our study shows that it is important to separate the population into different groups, especially distinguishing between rural and urban workers as their incentives and outcomes differ largely, even independently of the personal endowments. To our knowledge, this is the first study for Mexico which has been able to separate the Mexican workforce by formality and locality and highlights the importance of the investigation of different human capital endowments, especially work experience.

The results provide direction for Mexican policy. One way to counteract rural-to-urban migration would be the strategic attraction of particular large firms in a rural area. This improves infrastructure, creates jobs and supposedly facilitates to observe the (non-)adherence of labour rights. Furthermore, large international firms tend to pay relatively high wages and are more likely to register their workers with the IMSS, which in turn can reduce poverty and welfare dependency. In such firms, e.g. Volkswagen in Puebla, workers can accumulate work experience and become

more productive for which they will then get accordingly paid. The settlement of such large firms and the related development could also serve as a pull factor for return migration to previously rural areas and also generate the incentive for the rural population to stay.

References

Arias, J., O. Azuara, P. Bernal, J. J. Heckman, and C. Villarreal (2010). Policies to Promote Growth and Economic Efficiency in Mexico. IZA Discussion Papers 4740, Institute for the Study of Labor (IZA).

Badaoui, E., E. Strobl, and F. Walsh (2007). Is There An Informal Employment Wage Penalty? Evidence from South Africa. Technical report, IZA Discussion Paper No. 3151.

Bargain, O. and P. Kwenda (2009). The Informal Sector Wage Gap: New Evidence Using Quantile Estimations on Panel Data. Technical report, IZA Discussion Paper No. 4286.

Bargain, O. and P. Kwenda (2010). Is Informality Bad? Evidence from Brazil, Mexico and South Africa. Technical report, IZA Discussion Paper No. 4711.

Becker, G. S. (1964). *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago, University of Chicago Press.

Blinder, A. (1973). Wage Discrimination: Reduced Form and Structural Estimates. *Journal of Human Resources 7(4)*, 436–55.

Bosch, M. and W. Maloney (2007). Gross Worker Flows in the Presence of Informal Labor Markets: Evidence from Mexico, 1987-2002. Technical report, IZA Discussion Paper No. 2864.

Bosch, M. and W. F. Maloney (2008). Cyclical Movements in Unemployment and Informality in Developing Countries. Technical report, Policy Research Working Paper 4648, The World Bank.

Boucher, S. R., O. Stark, and J. E. Taylor (2005). A Gain with a Drain? Evidence from Rural Mexico on the New Economics of the Brain Drain. Technical report, University of California Working Paper no. 05-005.

Card, D. (1999). Chapter 30 The causal effect of education on earnings. Volume 3, Part 1 of *Handbook of Labor Economics*, pp. 1801 – 1863. Elsevier.

Fields, G. S. (1975). Rural-urban migration, urban unemployment and underemployment, and job-search activity in LDCs. *Journal of Development Economics 2*(2), 165 – 187.

Glaeser, E. L. and D. C. Maré (2001). Cities and Skills. *Journal of Labor Economics 19*(2), pp. 316–342.

Gong, X. and A. van Soest (2002). Wage differentials and mobility in the urban labour market: a panel data analysis for Mexico. *Labour Economics 9*(4), 513 – 529.

Gould, E. D. (2007). Cities, Workers, and Wages: A Structural Analysis of the Urban Wage Premium. *Review of Economic Studies 74*(2), 477–506.

Hamilton, B. H. (2000). Does Entrepreneurship Pay? An Empirical Analysis of the Returns of Self-Employment. *The Journal of Political Economy 108*(3), pp. 604–631.

Hanson, G. H. (2010). Why Isn't Mexico Rich? NBER Working Papers 16470, National Bureau of Economic Research, Inc.

Harris, J. R. and M. P. Todaro (1970). Migration, Unemployment and Development: A Two-Sector Analysis. *The American Economic Review 60*(1), pp. 126–142.

Heckman, J. J. (1979). Sample Selection Bias as a Specification Error. *Econometrica 47*(1), 153–61.

Hsieh, C.-T. and P. J. Klenow (2009). Misallocation and Manufacturing TFP in China and India. *The Quarterly Journal of Economics 124*(4), 1403–1448.

Levy, S. (2008). *Good Intentions, Bad Outcomes: Social Policy, Informality and Economic Growth in Mexico*. Brookings Institution Press.

Lewis, W. A. (1954). Economic development with unlimited supplies of labour. *The Manchester School 22*, 139–191.

Lucas, R. E. J. (2004). Life Eamings and Rural-Urban Migration. *The Journal of Political Economy 112*(1), pp. S29–S59.

Magnac, T. (1991). Segmented or Competitive Labor Markets. *Econometrica 59*(1), pp. 165–187.

Maloney, W. F. (1998). Are labor markets in developing countries dualistic? Policy Research Working Paper Series 1941, The World Bank.

Maloney, W. F. (1999). Does Informality Imply Segmentation in Urban Labor Markets? Evidence from Sectoral Transitions in Mexico. *World Bank Econ Rev 13*(2), 275–302.

Maloney, W. F. (2004). Informality Revisited. *World Development 32*(7), 1159 – 1178.

Marcouiller, D., V. R. de Castilla, and C. Woodruff (1997). Formal measures of the informal-sector wage gap in Mexico, El Salvador, and Peru. *Economic Development & Cultural Change 45*(2), 367.

Meng, X. (2001). The Informal Sector and Rural-Urban Migration – A Chinese Case Study. *Asian Economic Journal 15(1)*, 71–89.

Oaxaca, R. (1973). Male-Female Wage Differentials in Urban Labor Markets. *International Economic Review 14* (3), pp. 693–709.

Psacharopoulos, G. (1994). Returns to Investment in Education: A Global Update. *World Development 22*(9), 1325 – 1343.

Quinn, M. A. (2006). Relative Deprivation, Wage Differentials and Mexican Migration. *Review of Development Economics 10*(1), 135–153.

Raven, J., J. Raven, and J. Court (1998, updated 2003). *Manual for Raven's Progressive Matrices and Vocabulary Scales. Section 1: General Overview.* San Antonio, TX: Harcourt Assessment.

Stark, O. and J. E. Taylor (1989). Relative Deprivation and International Migration. *Demography 26*(1), pp. 1–14.

Stark, O. and J. E. Taylor (1991). Migration Incentives, Migration Types: The Role of Relative Deprivation. *The Economic Journal 101* (408), pp. 1163–1178.

Tannuri-Pianto, M. and D. Pianto (2002). Informal employment in Brazil: a choice at the top and segmentation at the bottom: a quantile regression approach. Technical report, Working paper n 236, Department of Economics, University of Brasilia.

Todaro, M. P. (1969). A Model of Labor Migration and Urban Unemployment in Less Developed Countries. *The American Economic Review 59*(1), pp. 138–148.

World Bank (2010). *World Development Indicators (WDI).* http://data.worldbank.org/indicator.

Appendix

Table A1: Probit Equations – Earning Wage vs. Not Earning Wage

	All		Rural		Urban	
	Probit	MFX	Probit	MFX	Probit	MFX
Employee						
Urban (d)	0.313***	0.121***	–	–	–	–
	(0.036)	(0.014)				
Health	0.097***	0.038***	0.126***	0.044***	0.089***	0.036***
	(0.026)	(0.010)	(0.043)	(0.015)	(0.032)	(0.013)
Age	0.105***	0.041***	0.083***	0.029***	0.121***	0.048***
	(0.009)	(0.003)	(0.014)	(0.005)	(0.011)	(0.005)
Age sqrd	-0.001***	-0.001***	-0.001***	-0.000***	-0.002***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High education (d)	0.450***	0.178***	0.428***	0.160***	0.455***	0.179***
	(0.042)	(0.017)	(0.085)	(0.033)	(0.049)	(0.019)
Raven test	0.264***	0.103***	0.225*	0.079*	0.305***	0.122***
	(0.072)	(0.028)	(0.118)	(0.041)	(0.092)	(0.037)
Hh size	0.025***	0.010***	0.017***	0.006***	0.030***	0.012***
	(0.004)	(0.002)	(0.006)	(0.002)	(0.005)	(0.002)
Nr. of infants	-0.135***	-0.053***	-0.060	-0.021	-0.172***	-0.069***
	(0.027)	(0.011)	(0.047)	(0.016)	(0.034)	(0.014)
Nr. of elderly	0.038**	0.015**	0.029	0.010	0.046*	0.018*
	(0.018)	(0.007)	(0.028)	(0.010)	(0.024)	(0.010)
Indigenous (d)	-0.083	-0.032	-0.052	-0.018	-0.136	-0.054
	(0.058)	(0.023)	(0.084)	(0.029)	(0.088)	(0.035)
Female (d)	-1.660***	-0.592***	-1.869***	-0.643***	-1.520***	-0.539***
	(0.041)	(0.011)	(0.064)	(0.018)	(0.054)	(0.015)
Married (d)	-0.460***	-0.180***	-0.414***	-0.147***	-0.498***	-0.196***
	(0.035)	(0.014)	(0.059)	(0.021)	(0.045)	(0.017)
Hh head (d)	0.690***	0.270***	0.677***	0.250***	0.724***	0.279***
	(0.047)	(0.018)	(0.077)	(0.029)	(0.062)	(0.022)
Farm (d)	-0.206***	-0.079***	-0.061	-0.021	-0.332***	-0.130***
	(0.053)	(0.020)	(0.068)	(0.024)	(0.097)	(0.037)
Constant	-1.416***	–	-0.808**	–	-1.558***	–
	(0.197)		(0.331)		(0.250)	
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	9390	9390	3807	3807	5583	5583
Pseudo R^2	0.385	0.385	0.434	0.434	0.354	0.354
χ^2	4954	4954	2160	2160	2736	2736
p	0.000	0.000	0.000	0.000	0.000	0.000

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. (d) indicates a descrete change of a dummy variable from 0 to 1. The dependent variable is *employee* = 1 if the individual is a salaried worker, and zero otherwise, i.e. the coefficients represent the difference to non wage earners and not working individuals. 15 state dummies included.

Table A2: Probit Equations – Formal vs. informal Wage Earners

	All		Rural		Urban	
	Probit	MFX	Probit	MFX	Probit	MFX
Formal						
Urban (d)	0.458***	0.159***	–	–	–	–
	(0.051)	(0.017)				
Honest (d)	0.065	0.023	0.060	0.016	0.065	0.025
	(0.055)	(0.020)	(0.105)	(0.027)	(0.066)	(0.025)
Risky (d)	0.002	0.001	-0.064	-0.017	0.005	0.002
	(0.044)	(0.016)	(0.087)	(0.023)	(0.053)	(0.020)
Health	0.064*	0.023*	-0.011	-0.003	0.087**	0.034**
	(0.035)	(0.013)	(0.066)	(0.018)	(0.041)	(0.016)
Age	0.052***	0.019***	0.058**	0.016**	0.049***	0.019***
	(0.013)	(0.005)	(0.024)	(0.006)	(0.016)	(0.006)
Age sqrd	-0.001***	-0.000***	-0.001**	-0.000**	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High education (d)	0.451***	0.168***	0.875***	0.287***	0.341***	0.133***
	(0.050)	(0.019)	(0.109)	(0.040)	(0.057)	(0.022)
Raven test	0.207**	0.075**	0.153	0.041	0.250**	0.097**
	(0.098)	(0.035)	(0.183)	(0.049)	(0.118)	(0.046)
Hh size	-0.004	-0.001	-0.020*	-0.005*	0.001	0.000
	(0.005)	(0.002)	(0.011)	(0.003)	(0.007)	(0.003)
Nr. of infants	-0.049	-0.018	0.095	0.025	-0.105**	-0.041**
	(0.037)	(0.014)	(0.071)	(0.019)	(0.045)	(0.017)
Nr. of elderly	0.031	0.011	0.047	0.013	0.021	0.008
	(0.025)	(0.009)	(0.047)	(0.013)	(0.031)	(0.012)
Indigenous (d)	-0.038	-0.014	0.018	0.005	-0.021	-0.008
	(0.082)	(0.029)	(0.135)	(0.036)	(0.110)	(0.042)
Female (d)	0.051	0.019	0.025	0.007	0.048	0.019
	(0.054)	(0.020)	(0.107)	(0.029)	(0.064)	(0.025)
Married (d)	0.097*	0.035**	0.085	0.023	0.107*	0.041*
	(0.049)	(0.018)	(0.095)	(0.025)	(0.058)	(0.023)
Hh head (d)	0.062	0.023	-0.015	-0.004	0.093	0.036
	(0.061)	(0.022)	(0.121)	(0.032)	(0.072)	(0.028)
Farm (d)	-0.009	-0.003	0.174	0.049	-0.258*	-0.097**
	(0.080)	(0.029)	(0.109)	(0.032)	(0.134)	(0.048)
Constant	-2.032***	–	-2.035***	–	-1.529***	–
	(0.281)		(0.534)		(0.335)	
State dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	4088	4088	1371	1371	2717	2717
Pseudo R^2	0.108	0.108	0.135	0.135	0.074	0.074
χ^2	568	568	192	192	274	274
p	0.000	0.000	0.000	0.000	0.000	0.000

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. (d) indicates a descrete change of a dummy variable from 0 to 1. The dependent variable is *formal* = 1 if the individual is working in the formal sector, and zero otherwise, i.e. the coefficients represent the difference to informal sector workers. 15 state dummies included.

Table A3: Wage Equations for All, Rural and Urban Informal Workers

	All				Rural		Urban	
	OLS	HM	OLS	HM	OLS	HM	OLS	HM
Urban	0.211***	0.211***	0.052	0.055	–	–	–	–
	(0.029)	(0.029)	(0.104)	(0.102)				
Exp*Urban	–	–	0.014**	0.013**	–	–	–	–
			(0.007)	(0.007)				
Exp sq.*Urban	–	–	-0.000*	-0.000*	–	–	–	–
			(0.000)	(0.000)				
High edu.*Urban	–	–	0.027	0.027	–	–	–	–
			(0.075)	(0.074)				
Raven*Urban	–	–	0.001	0.001	–	–	–	–
			(0.106)	(0.107)				
Experience	0.015***	0.016***	0.007	0.008	0.003	0.004	0.020***	0.024***
	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)
Experience sqrd.	-0.000***	-0.000***	-0.000*	-0.000*	-0.000	-0.000	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High education	0.199***	0.196***	0.184***	0.181***	0.156**	0.143*	0.205***	0.210***
	(0.038)	(0.037)	(0.066)	(0.066)	(0.078)	(0.077)	(0.045)	(0.045)
Raven test	0.118**	0.121**	0.115	0.117	0.091	0.096	0.118*	0.120
	(0.053)	(0.054)	(0.080)	(0.081)	(0.081)	(0.082)	(0.071)	(0.074)
Hh size	-0.001	-0.000	-0.001	-0.000	0.005	0.006	-0.004	0.000
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)	(0.004)	(0.005)
Indigenous	-0.090**	-0.095**	-0.090**	-0.094**	-0.099*	-0.103*	-0.074	-0.088
	(0.042)	(0.042)	(0.042)	(0.042)	(0.053)	(0.056)	(0.074)	(0.070)
Female	-0.188***	-0.292*	-0.189***	-0.265*	-0.253***	-0.368	-0.157***	-0.403**
	(0.038)	(0.160)	(0.038)	(0.161)	(0.066)	(0.255)	(0.048)	(0.199)
Hh head	0.019	0.052	0.020	0.044	0.069	0.102	0.001	0.085
	(0.032)	(0.057)	(0.032)	(0.057)	(0.050)	(0.086)	(0.043)	(0.079)
Married	0.100***	0.063	0.099***	0.072	0.065	0.038	0.104***	-0.012
	(0.027)	(0.061)	(0.027)	(0.061)	(0.046)	(0.073)	(0.035)	(0.097)
Constant	3.223***	3.111***	3.328***	3.244***	3.528***	3.453***	3.255***	2.880***
	(0.133)	(0.203)	(0.141)	(0.217)	(0.184)	(0.244)	(0.189)	(0.338)
Hrs/year	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\lambda_{f/inf}$	–	0.131	–	0.096	–	0.113	–	0.380
		(0.196)		(0.197)		(0.243)		(0.297)
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occup. dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2670	9390	2670	9390	1076	3807	1594	5583
$\bar{R}^2$	0.307	–	0.307	–	0.284	–	0.279	–
χ^2	–	1257	–	1267	–	513	–	674
p	0.000	0.000	0.000	0.000	–	0.000	0.000	0.000

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. OLS: Ordinary Least Squares, HM: Heckman Selection 2nd step. λ is the nonselection hazard variable generated from the probit model. 15 state dummies, 23 industry dummies and 18 occupation dummies included.

Table A4: Wage Equations for All, Rural and Urban Formal Workers

	All				Rural		Urban	
	OLS	HM	OLS	HM	OLS	HM	OLS	HM
Urban	0.167***	0.169***	0.074	0.064	–	–	–	–
	(0.039)	(0.063)	(0.176)	(0.177)				
Exp*Urban	–	–	-0.003	-0.003	–	–	–	–
			(0.011)	(0.010)				
Exp sq.*Urban	–	–	0.000	0.000	–	–	–	–
			(0.000)	(0.000)				
High edu.*Urban	–	–	0.016	0.016	–	–	–	–
			(0.080)	(0.079)				
Raven*Urban	–	–	0.066	0.071	–	–	–	–
			(0.159)	(0.160)				
Experience	0.024***	0.024***	0.026**	0.025**	0.023**	0.023*	0.023***	0.022***
	(0.005)	(0.006)	(0.011)	(0.010)	(0.011)	(0.013)	(0.006)	(0.007)
Experience sqrd.	-0.000***	-0.000***	-0.001***	-0.001***	-0.001***	-0.001**	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High education	0.306***	0.308***	0.295***	0.288***	0.221**	0.208	0.309***	0.303***
	(0.039)	(0.068)	(0.079)	(0.098)	(0.103)	(0.237)	(0.041)	(0.063)
Raven test	0.243***	0.244***	0.199	0.190	0.195	0.191	0.277***	0.273***
	(0.069)	(0.074)	(0.138)	(0.148)	(0.149)	(0.154)	(0.078)	(0.082)
Hh size	-0.005	-0.005	-0.005	-0.005	0.022***	0.023***	-0.010**	-0.010**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.008)	(0.008)	(0.004)	(0.004)
Indigenous	-0.031	-0.032	-0.028	-0.027	-0.160	-0.160	-0.005	-0.004
	(0.056)	(0.058)	(0.055)	(0.058)	(0.130)	(0.105)	(0.072)	(0.070)
Female	-0.054	-0.056	-0.051	-0.042	0.044	0.056	-0.072	-0.064
	(0.040)	(0.078)	(0.039)	(0.078)	(0.081)	(0.208)	(0.045)	(0.073)
Hh head	0.062	0.063	0.066	0.061	0.174**	0.171*	0.055	0.050
	(0.040)	(0.055)	(0.040)	(0.055)	(0.085)	(0.097)	(0.047)	(0.060)
Married	0.024	0.023	0.025	0.028	-0.022	-0.019	0.022	0.025
	(0.032)	(0.040)	(0.032)	(0.040)	(0.070)	(0.080)	(0.036)	(0.044)
Hrs/year	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	3.525***	3.516***	3.603***	3.641***	3.016***	3.047***	3.759***	3.785***
	(0.194)	(0.305)	(0.234)	(0.348)	(0.321)	(0.643)	(0.166)	(0.258)
$\lambda_{f/inf}$	–	0.005	–	-0.018	–	-0.018	–	-0.017
		(0.136)		(0.138)		(0.298)		(0.131)
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occup. dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1419	9390	1419	9390	296	3807	1123	5583
$\bar{R}^2$	0.460	–	0.460	–	0.505	–	0.451	–
χ^2	–	1111	–	1120	–	403	–	904
p	–	0.000	–	0.000	–	0.000	0.000	0.000

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. OLS: Ordinary Least Squares, HM: Heckman Selection 2nd step. λ is the nonselection hazard variable generated from the probit model. 15 state dummies, 23 industry dummies and 18 occupation dummies included.

Table A5: Decomposition Overall Results

	ALL	Informal	Formal
Urban	2.980***	2.870***	3.136***
	(0.014)	(0.018)	(0.021)
Rural	2.626***	2.548***	2.911***
	(0.019)	(0.021)	(0.041)
Difference	0.354***	0.322***	0.225***
	(0.024)	(0.028)	(0.046)
Explained	0.157***	0.111***	0.066*
	(0.019)	(0.021)	(0.035)
Unexplained	0.196***	0.211***	0.159***
	(0.023)	(0.028)	(0.037)
N	4089	2670	1419

Note: Standard errors in parentheses. *,** and *** denote significance level of 10%, 5% and 1% respcetively. The decomposition is formulated from the viewpoint of the rural population. For the underlying regressions see wage regression tables.