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RURAL WAGE EMPLOYMENT: IS THERE A PREMIUM FOR AGRICULTURE?

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Abstract

This paper investigates the determinants of rural and non-rural wages using the quarterly Labor Force Survey (LFS) collected by the Palestine Central Bureau of Statistics (PCBS). We estimate the wage equation for rural and non-rural workers controlling for structural, socioeconomic, and political factors. Results show that employment in agriculture reduces wages for both rural and non-rural workers. The work in Israel (premium) is shown to raise average wages by 60-70% for non-rural workers and 40-50% for rural workers. Despite this finding, the paper recommends reducing dependence on employment in Israel as a long-term solution to unemployment and to improve higher education for both rural and non-rural workers.

JEL Classification: J3

Keywords: Rural and Non-Rural Wages, Palestine

ملخص

تبحث هذه الورقة محددات الأجور في المناطق الريفية وغير الريفية باستخدام مسح قوة العمل الفصلية (LFS) التي جمعها مكتب المركزي الفلسطيني للإحصاء. نقوم بتقدير معادلة الأجور للعمال الريفيين وغير الريفية مع ضبط العوامل الهيكلية والاجتماعية والاقتصادية، والسياسية. تظهر النتائج أن العمالة في قطاع الزراعة يقلل أجور كل العاملين في المناطق الريفية وغير الريفية. ويظهر أن العمل في إسرائيل (العلاوة) لرفع متوسط الأجور بنسبة 60-70٪ للعمال غير الريفيين و40-50٪ للعمال الريفيين. وعلى الرغم من هذه النتيجة، توصي الورقة بتقليل الاعتماد على العمل في إسرائيل كحل طويل الأجل للبطالة وتحسين التعليم العالي للعاملين في كل من المناطق الريفية وغير الريفية.

1. Introduction

The signing of the Oslo peace accords of 1993 between the Palestine Liberation Organization (PLO) and Israel has had strong implications for the Palestinian labor markets. In addition to the structural changes that accompany the development process (Kuznets 1966), there are political factors affecting both rural and non-rural labor markets in different ways. The division of the occupied Palestinian territory (oPt) into three areas, A, B, and C implies varying levels of restrictions on those areas[1]. While the Israeli Labor market has been shrinking in the face of Palestinian unskilled workers since 1993 and more severely since 2000[2], the Palestinian Authority (PA) has been opening opportunities for skilled workers in the public sector. As a result, many rural workers ended up with government jobs, meanwhile taking part in casual agricultural work. The PA followed a policy of support to the agricultural sector to increase the resilience of the rural work force and to avoid land confiscation by Israel for settlement activities. However, employment in agriculture in rural Palestine is similar to many other developing countries in that it is seasonal; but it differs because it acts as a refuge to workers whose employment is disrupted due to political unrest. The rural population makes up 17% of total Palestinian population, which accounts for almost three quarters of a million people; thus making the impact of political as well as structural factors on wages and reallocation a large one.

This paper focuses on rural vis-à-vis non-rural wages and examines the determinants of wages in both areas. Our hypothesis is that the sector of employment matters significantly for rural wages. In particular, the rural population relies heavily on agriculture for employment and that may be responsible for the rural – non-rural wage gap. As the economy grows, reliance on agriculture as a sector of employment diminishes overtime; hence one would expect a convergence of wages in the two areas (Hnatkovska and Lahiri 2013). Rural areas also depend more heavily on employment in Israel (where wages are higher), but the importance of this source of disparity has been diminishing overtime due to restriction on labor mobility by Israel; again leading to the expectation of the convergence hypothesis, which states that rural and non-rural wages will tend to converge as agricultural share of employment gets smaller and access to Israeli labor market becomes more restricted.

Stiglitz (1974) provided a model of labor turnover as a reason why firms in urban centers pay a higher wage than in the rural sector. In his model, monitoring and training are the driving forces behind a rural – urban wage gap despite the widespread unemployment in fewer developing countries. Recent studies point to the agglomeration effect (Combes et al. 2008) in enhancing worker productivity from being in urban centers where most of the jobs are. The sorting effect is another mechanism through which urban wages can be higher than rural wages due to lower job search cost of better job offers (Kim 1990).

The literature on wage setting in rural agriculture distinguishes between the types of wage contracts. Moretti and Perloff (2002) use the efficiency wage model to explain wage differential in agriculture in California. They distinguish between two types of payments: the first is the direct hire model, and the second is through local labor contractors. The first group gets higher wages as a mechanism to reduce monitoring cost and shirking. They test the efficiency wage model against alternative models and find evidence that the efficiency wage model outperforms the human capital model, the dual labor market model, and insurance model.

[1] Area A is under the security control of the Palestinian Authority (PA), Area B is under mutual security control, while area C is under Israeli security control. Area C (which is mostly rural) constitutes 60 percent of the West Bank area and still suffers from the Israeli practices of settlement activity, building and infrastructure restrictions, and continued closure shocks to the domestic labor market.

[2] The Impact of the Israeli policy of switching reliance on foreign guest workers instead of Palestinian workers on Palestinian employment and wages is analyzed in Aranki and Daoud (2010). The authors show that just over 40 percent of Gazan labor force and about 32 percent of West Bank labor force were employed in Israel in the mid-eighties. These figures dropped to roughly 5 and 10 percent for Gaza and the West Bank respectively.

Ahmad (1982) uses the labor supply-demand framework to address the question why of widespread unemployment and underemployment in developing countries would not depress wages in agriculture. He distinguishes between voluntary and involuntary unemployment. The increased labor supply of the involuntarily unemployed casual worker is very small (relative to total unemployment) to depress wages. His contention is that while the surplus labor model of Lewis (1954) and the efficiency wage model of Leibenstein (1957) and Bliss and Stern (1976) are not sufficient to explain wage behavior. The reason is that the subsistence wage model necessitates a wage level enough to perpetuate the population; thus in a country with increasing population, wages must be higher than the subsistence level (Ahmad 1982). On the other hand, the efficiency wage model requires a certain caloric intake, which Bliss and Stern (1976) found is less than what is needed to support the efficiency wage. Both of these theories alone cannot explain wages in agricultural Bangladesh. Ahmad (1982) postulates that structural factors such as inequality in land distribution, cropping intensity, and tenancy positively affect wages; while the proportion of agricultural wage laborers and uncertainty in production affect wages negatively[3].

The literature on rural and agricultural wages in the oPt is less frequent. Many studies have recently focused on the wages of Palestinian workers in general. The focus was prompted by Angrist's studies (1995, 1996, and 1997) of returns to education and employment in Israel[4]. Agnrist finds declining returns to education due to increased supply of university graduates. Daoud (2005) finds low returns to education, but at the margin, returns to female education are higher. The analysis in Daoud (2005) reveals that closures[5] have a differential impact on males and females' unemployment; the ratio of male to female unemployment increased from 1.4 in 1999 to 3.5 in the Intifada year 2001. Daoud and Shanti (2012) investigated employment sector choice and wage differential and find that education has a more profound effect on female participation in all sectors. They also find that male wages are higher in the public sector than in the private sector, but that the gap is mostly explainable by the endowment effect. On the other hand, the male female wage gap in the private sector is not mostly explained by endowments; rather it is unexplained for the most part. Sayre (2001) utilized the same data used by Angrist (1995) to compare the wage premium due to schooling between 1981 and 2001. In another study, Sayre and Miller (2004) examined the relationship between labor demand shocks and the reversal of returns to education in Palestine; they argue that the establishment of the PA increased the demand for skilled workers leading to an increase in the wages of skilled workers relative to the unskilled wages. Hazan and Zoabi (2011) treat the wage issue from a different perspective, looking at fertility issues and parental preference for boys rather than girls in an attempt to explain the higher female returns. Mansour (2010) shows that employment restrictions on Palestinians employed in Israel constitute a negative labor supply shock leading to an increase in the schooling return. Miaari (2009) uses quintile regression to decompose wage differential for private/public sector. Tansel and Daoud (2011) provide a comparative analysis of returns to education on Palestine and Turkey. Daoud and Sadeq (2012) investigate the determinants of returns to education using quarterly labor force survey data covering 1996-2011.

The emphasis in the previous literature is on returns to education with public-private sector selection correction or gender self-selection. The rural sector is introduced simply as a dummy variable to check whether rural sector wages are higher or lower than urban and camp dwellers. The present study is the first to consider rural labor market and self-selection into agriculture. The next section presents the data and some descriptive analysis that

[3] Yellen (1984) and Ezeala-Harrison (2005) provide a good review of efficiency wage models

[4] Angrist's sample was based on Israel's Central Bureau of Statistics of Palestinian males ages 18-64.

[5] This term refers to the restriction on Palestinian workers from reaching the Israeli labor market.

motivate the model. Section 3 explains the econometric methodology, followed by the empirical findings. Finally, section 5 concludes and provides policy recommendations.

2. Data and Sample Descriptive Statistics

This section provides an overview of some Palestinian labor market regularities relating to rural and non-rural employment patterns. The structural distribution of wage employment, schooling, and employment in Israel are thought to have strong and varying effect on rural and non-rural wages. We first focus our attention on wage distributions for rural and non-rural Palestine. Our data comes from PCBS's household labor force survey data. The frequency of the data is quarterly; each household is interviewed twice successively - dropped from the sample for two quarters, and then re-interviewed for another two quarters. The average daily wage is reported in New Israeli Shekel (NIS). Figure 1 below gives an overall description of rural and non-rural wage densities.

The wage density in Figure 1 shows that in 2012 rural wages have a higher peak, which is the opposite of 1999, but that the two distributions are closer together in 2012 implying that the wage gap is getting narrower. The forces at work that may be responsible for this convergence phenomenon are: structural transformation factors (distribution of employment by industry), human capital factors (education, experience, and other socio-economic factors), supply and demand shocks resulting from political unrest (2006 and 2001 dummies), migration, and employment in Israel.

The structural transformation hypothesis postulates that (Caselli and Coleman 2001) and (Hnatkovska and Lahiri 2013) an increase in agricultural productivity releases workers from agriculture and increases the supply of labor to urban centers (migration) lowering the urban workers' relative wage. Our data shows that the share of rural employment in agriculture tends to fluctuate with a declining trend reaching 38.6% in the fourth quarter of 2006 and a low 17.4% in the third quarter of 2010[6]. On the other hand, this proportion stays around 10% for non-rural areas. The distribution of employment by industry averaged over the entire sample period is given below.

The share of employment in other services, which is mainly from the public sector, is highest for both rural and non-rural workers, it is however one and a half times larger for non-rural workers. The opposite is true for the construction sector; the proportion of rural employment in construction is almost double that for non-rural workers. Agriculture's share of rural employment is roughly 12% in rural areas, while it is only 8% for non-rural workers. These differences are likely to have an impact on the wages of workers in both areas, as well as on migration. The migration data shows that for the oPt as a whole, the proportion of workers who work in the same district of residence fluctuates around 60% for the West Bank and 20% for Gaza. This implies that the proportion that migrates (which includes another district, Israel, and international locations) is much higher in the Gaza Strip. Thus, fewer people migrate to other districts and other locations in the West Bank[7]. This may be a reflection of lower wage gap between rural and non-rural areas, or that movement restrictions are the reason. Yashiv (2008) uses Israel Central Bureau of Statistics on Palestinian workers in Israel; he finds that migrants are less skilled than residents. The results also indicate that a high migration premium attracts migrants, but that skilled workers will get a low return (offered low skill jobs) and are thus deterred.

[6] 2006 was a year in which government activities came to almost a complete stop after Hamas won the elections with a clear majority taking control of the Palestinian legislative council; consequently, the donor countries halted their donations. On the other hand, 2010 was a year of good economic performance.

[7] The smaller area of Gaza and easier movement between governorates can explain this phenomenon. Thus in Gaza there is more commuting than migration.

For the rural population and the urban population as well, employment in Israel and the settlements is the location of choice because wages are higher. The proportion of total employment in Israel is higher for rural areas than it is in non-rural areas, which tends to raise rural wages above those in non-rural areas.

The human capital model, Mincer (1974) and Becker (1964), relates wages to years of schooling, experience, and quadratic experience to account for concavity in the earnings profile. Figure 4 below shows a time series plot of quarterly average years of schooling versus average daily wage for rural and non-rural workers. The evidence shows that while schooling is higher on average for non-rural workers, their wages tend to be occasionally lower.

Between 2000 and 2010 the average daily wage series for rural and non-rural are practically indistinguishable from each other, while the schooling gap is wide and is not changing drastically. Meanwhile, the schooling gap is narrowing after 2009, while the wage gap is widening. This shows that employment in Israel may be the reason behind this divergence (see Figure 4 below).

Figure 4 below provides a time series plot of average years of schooling and proportion of employment in Israel for rural and non-rural areas for each quarter. This plot illustrates to what extent wage differentials depend on differences in employment shares. It is clear that since the outbreak of the second Intifada (fourth quarter of 2000), the proportion of rural employment in Israel dropped from 30% to almost 7%, and nearly equal to the proportion for non-rural workers. The wage differential was nearly zero for that period. Also for the year 2012, the gap in employment shares is very wide, as is the wage gap. The data also show that rural wages are more volatile and seem to have a positive covariance with employment in Israel.

The years 2009 and early 2000 also provide evidence on the impact of employment in Israel on lowering the return to education. Regression analyses in subsequent sections show that employment in Israel has a large wage premium despite the lower schooling for such workers.

3. Model

The sample descriptive statistics in the preceding section suggest some factors, which could be responsible for the differential impact on rural and non-rural wages. The inclusion of the vector of socio-economic variables for each type of locality helps identify the differential impact. The empirical strategy to assess such differential impact is to estimate the Mincer earning equation (Mincer 1974) using PCBS labor force survey data that covers the 2005-2011 period:

$$W_{ijt} = x_{ijt}\,\beta_i + e_{ijt} \qquad (1)$$

Where i, j, t refer to individual, district, and quarter indices. The workers' log average daily wage is a function of workers' demographic, educational attainment, and labor characteristics[8]. The main variable of interest is type of industry, which for the purpose of this study is classified into agricultural and non-agricultural sector. This industry classification is formed as an industry dummy variable that takes the value of 1 for the agricultural sector and 0 for other sectors. All else equal, the coefficient of industry classification estimates the wage differential between agriculture relative to other sectors (the reference group).

[8] The set of explanatory variables includes schooling, gender, experience, industry, occupation, marital status, geographic dummies, and quarter dummies.

The above analysis is based on rural wage employment. Still, unpaid family workers constitute a considerable share of rural total employment (12% in 2010). This is likely to create selectivity bias, which would produce a downward bias of the industry estimate. Maluccio (1998) shows that OLS estimates of returns to schooling are biased downward by as much as 60% if endogeneity and selection are ignored. We control for unpaid wage-selectivity bias by controlling for parent's type of industry. In particular, whether workers' and their parent's type of industry is the same. The rationale of using parent's type of industry is that it increases the probability of selecting the same business[9].

Another[10] source of selectivity bias is industry self-selection. That is workers are not-necessarily randomly distributed across industries. We correct for this selectivity bias using Heckman's (1976) two-stage estimation model. The first stage model is a probit model in which the dependent variable (D) is a binary variable, which takes 1 for workers employed in agriculture sector and 0 for those employed in non-agriculture sector, such as

$$H_{it} = x_{rit}\beta + v_i t + \alpha u_{1it} \qquad (2)$$

D = 1 if $H_i > 0$

D = 0 if $H_i = 0$

This dependent variable is regressed on worker's demographic characteristics (X), educational attainment, and type of industry as in equation (1). We also control for other variables that would affect worker's self-selection, including a dummy variable that indicates if a worker's type of industry is the same as his/her parent. This is, as explained above, is used to control for unpaid wage employees.

Let $\hat{p}_i$ denote the probability of success (selecting agriculture sector), which is calculated by maximizing the log likelihood function

$$\ln L = \sum_i [D_i \ln \Phi(\delta z + x_{ri}\beta) + (1 - D_i)\ln(1 - \Phi(\delta z + x_{ri}\beta))] \qquad (3)$$

Where φ and Φ are probability density and commutative distribution functions of the standard normal distribution. Using equation (3), the selectivity bias term (inverse Mills ratio) is calculated as followed:

$$\hat{M}_i = \frac{\phi(-\hat{p}_i)}{\Phi(\hat{p}_i)} \qquad (4)$$

Mills ratio is added to wage equation (1) to correct for the industry self-selection.

4. Empirical Results

Estimates of equations (1) and (2) are reported in Tables (1) and (2), we begin by the wage equation where self-selection is considered for people who are wage employees in agriculture.[11] The equations are estimated for the two sub-populations, rural and non-rural populations. The motivation for this sample splitting regression is to check for observed differences in the wage determination for each area. Although we estimate the wage equation as a linear function of schooling at this stage, we do provide non-linear specifications in Tables 5 and 6. The schooling coefficient is very low for both areas,[12] it indicates that a linear

[9] Unpaid family members are a prime example.

[10] Employment in agriculture is included as an explanatory variable in Tables 5 and 6 to show the effect of being employed in agriculture on wages for each type of locality.

[11] Self-selection results in biased estimates for the wage equation, the sign of the bias may be upward or downward. See Tansel and Daoud (2012) for more details.

[12] See Daoud and Sadeq (2012) for more on the determinants of returns to schooling in Palestine.

specification means an increase in schooling by one year leads to a 0.7% increase in average daily wage; the coefficient is significant for both areas (rural and non-rural). Regressions on a year-by-year basis yield estimates more in line with the ones reported in the literature. The earnings profile is evident by the sign of age and age-square which are significant and have a positive and negative signs respectively.[13] Female earnings are 14.9% lower than their male counterparts in non-rural areas. This is compared with 12% in rural areas.

Controlling for workers' education, being employed in Israel results in a higher wage premium in non-rural areas; a non-rural worker would earn 59.2% more than a person with the same attributes that is employed domestically. Rural workers in Israel earn only 43.9% more than their domestically employed counterparts.

Because the selection equation is for employment in agriculture, we cannot include industry dummies. Instead, we use occupation categories in which elementary occupation is the base category. Of particular interest is the coefficient on skilled agricultural and fishery workers. Being a skilled agricultural worker implies no significant change in wages for non-rural population; however, having this occupation implies an increase by about 8 percent above the level of elementary occupations for the rural population. Professional clerks have the highest occupation premium in rural areas. The average daily wage for workers in services and shop sales are not significantly different from those in elementary occupations in rural areas.

Finally, workers in almost all governorates have higher wages than Rafah governorate (a depressed area in Gaza on the border with Egypt) with varying degrees. The geographic wage differential is often lower in rural areas, for example Deir Albalah wages are practically the same as those in Rafah but Salfeet enjoys an 80% premium. In non-rural areas, the gap is as low as -3.6% for Khan Younis and as high as 105% in Jerusalem's favor. West Bank and Gaza differences are evident from the coefficients on the last four governorate dummies (located in Gaza). Differences with Rafah are much lower in Gaza than in West Bank governorates; the implications for policy intervention are such that the disparity between the West bank and Gaza is large and therefore an economic as well as politically motivated intervention to end the siege on Gaza and to facilitate the movement between the two areas in necessary. Geographic differences do exist between localities, which points to evidence in support of efficiency wages as pointed above in the literature review (Stiglitz 1974), (Combes et al. 2008), and (Kim 1990).

On the question of why do individuals select to work in agriculture, we find evidence that schooling and total household wage income reduce the probability of being employed in agriculture significantly (by 3.4% and 0.1% respectively). The differences in the magnitude for each of those variables are not large. The time dummies are included to show the effect of severe political closures on employment in agriculture; the 2006 dummy shows that for rural areas, the probability of selecting into agriculture increased and was significant, for non-rural areas it was not significant. This supports the view that more people turn to agriculture for employment when other market opportunities disappear. This confirms the employment consequences on rural and non-rural areas. Closures have a more serious impact on wages and unemployment for rural areas, thus giving agriculture special support and or programs is important for the rural population[14]. We also find that if the household head is employed in agriculture, the likelihood of selecting the agricultural sector increases dramatically. Larger households and never married[15] are also more likely to select this sector. Thus, if schooling

[13] The age-schooling interactive term was dropped due to its insignificance

[14] The Palestinian Authority (through donor funding) started programs to support agriculture. The programs include rural roads, irrigation wells, giving trees to improve and cultivate the land. More support is needed in the area of commercial farming especially in areas were land confiscation for settlement activity is highly probable.

[15] This expression excludes widowed, divorced, and married. etc.

raises wages and lowers selection into agriculture, the policy implication is to increase the schooling of rural population.

Estimation with selection correction requires that the error terms from the first stage and second stage be correlated, that means if it is found that errors from the wage equation are not correlated with the errors from the selection equation, then OLS estimates are not biased and it is legitimate to run two independent regressions: OLS for wages and Probit for selection. The correlation coefficient (ρ_{ue}) can be either positive or negative. A negative coefficient means that some omitted variable in the wage equation affects the selection in an opposite direction to its effect on wages. In such a case (negative ρ_{ue} and hence λ), the inverse Mills ratio will be significant and individuals who select agriculture will have lower average wages. The Likelihood Ratio test (LR) tests the hypothesis of independent equations (H_0: $\rho_{ue} = 0$), that is no selection bias. The results of the selection equation are reported in Table 2 (first stage estimates). The sign of ρ_{ue} and hence λ is negative. That implies that individuals who self-selects into agriculture will have a negative impact on average wages. On the other hand, because wages for those in agriculture and other industries are observed, it would make sense to consider the issue as one of endogeneity and estimate the regression by instrumental variables (IV). We report the joint maximum likelihood estimation results since an alternative specification, which includes the linear and quadratic terms of tenure instead of the linear and quadratic term of age, results in a highly significant LR test.

Finally, we report the OLS and IV estimates of the wage equation using the independent variables in the selection equation (in addition to the wage equation regressors) as instruments for employment in agricultural dummy. An individual employed in agriculture will have the value of 1, and zero otherwise. Tables 3 – 6 report estimates of the OLS and IV estimates for the wage equation. The coefficient on agricultural industry dummy indicates that wages for workers employed in agriculture are 34% and 37% lower for non-rural and rural areas (Table 4). The OLS estimates are consistent with the IV estimates but smaller in magnitude. The effects of schooling, gender, and work in Israel are similar whether OLS or IV is used.

Turning to non-linear specification of schooling, we find that the models predictive ability improves marginally. Tables 5 and 6 report a non-linear specification of the schooling variable and uses tenure in the last job instead of potential experience. We find an increase in R^2 and significant "degree effect". Results show that workers with graduate degrees earn as much as 74% more than illiterates for non-rural areas, but 60% in rural areas (Table 6). Thus returns to schooling are lower in rural areas suggesting that the proportion of employment in Israel (typically lower skills and higher wages) may be contributing to this phenomenon.

Wooldridge's (1995) score test of exogeneity of employment in agriculture is rejected at high levels (5% or lower) giving support to the endogeneity of employment in agriculture. OLS results in in Tables 3 and 5 supports the argument that employment in agriculture contributes to decreasing wages; however, the magnitude is lower owing possibly to endogeneity bias.

5. Conclusions and Recommendations

Aiming to identify the role of agricultural and non-agricultural employment in improving the well-being of the Palestinian rural population through their impact on wages, this paper investigates the determinants of wages for rural and non-rural areas. The development literature postulates that the development process is likely to be associated with rural urban migration as a result of improvement in worker productivity in agriculture. At the same time, agglomeration effects will tend to make the urban-rural wage gap diminish due to the increased labor supply from rural areas. Our study hypothesizes that proximity to the Israeli labor market tends to raise rural wages due to the higher share of employment in Israel for the rural areas. However, employment in Israel and the settlements may be a cause for concern

with respect to rural -urban wage differential and the impact on unemployment resulting from closures. Given the lower average years of schooling for rural workers and the lower wage in agriculture rural wages may decline if employment in Israel continues to diminish in importance for rural workers. The political stalemate in the peace process (and Israeli policy) will deter many Palestinians from seeking employment in Israel in the long run.

Regression analysis leads us to the following findings. First, the results in Tables 3-6 all point that employment in agriculture lowers average wages by a range from 26% - 34% for the non-rural population and 30% - 37% for rural population. Meanwhile, Israeli closures (as measured by 2006 dummy coefficient in Table 2 for rural areas) tend to raise the probability of selecting agriculture as a sector for employment. This implies that special educational programs be designed to improve the wellbeing of farm workers especially rural areas.

Second, the return to education is lower for rural workers than non-rural ones, coupled with the information that average years of schooling is lower for rural workers and that the returns show signs of being higher at higher education levels (convexity); then rural areas require policies which encourage higher education to lower the gap with non-rural areas.

Third, geographic disparity in wages between the West Bank and Gaza has strong implications for ending the political divide between the two areas. If the governments in both areas agree on securing a safe passage between the West Bank and Gaza, labor market integration would mean the wage gap that exists would be lower.

Fourth, having a household head who works in agriculture is a highly significant factor in explaining the selection of agriculture as a sector of employment. Other factors that lead to a higher probability of selecting agriculture are household size, the 2006 period (following Hamas's control of the Palestinian Legislative Council elections), household wage income, and single individuals. Schooling significantly reduces the probability of selecting wage employment in agriculture.

Fifth, the gender wage gap is higher in non-rural areas. The literature review shows that part of this gap is unexplained by endowments (possibly a big share of the gap), thus, a thorough investigation is needed to understand the source of this gap, hence contributing to its reduction.

In light of the preceding, policies aimed at increasing productivity of workers in agriculture are required to reduce the wage gap between rural and non-rural workers particularly for those who choose agricultural employment. Employment in Israel and the settlement should not be a long term strategy for Palestinian workers despite its positive impact on rural wages; its long run impact on schooling might be devastating for it lowers the return on education making it an unattractive investment. Also, since periods of political unrest and conflict (characterized by closures and access restrictions) lead to labor market disruptions, the PA may consider lower dependence on the Israeli labor market for employment in favor of agricultural sector employment. The evidence on higher return for higher education (convexity of returns to education) implies that expenditure on higher education is an attractive option for both rural and non-rural areas.

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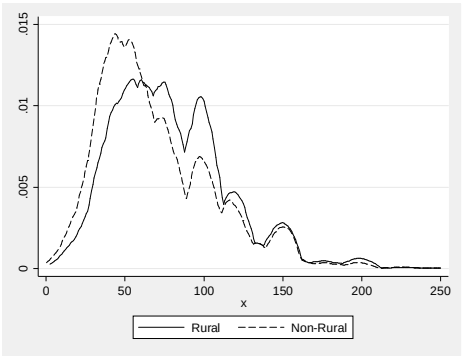
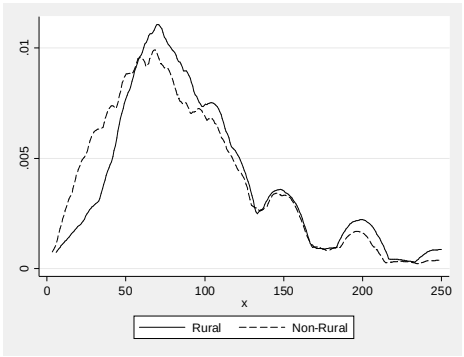
Figure 1: The Distribution of Average Daily Wage for Rural and Non-Rural Workers[16]

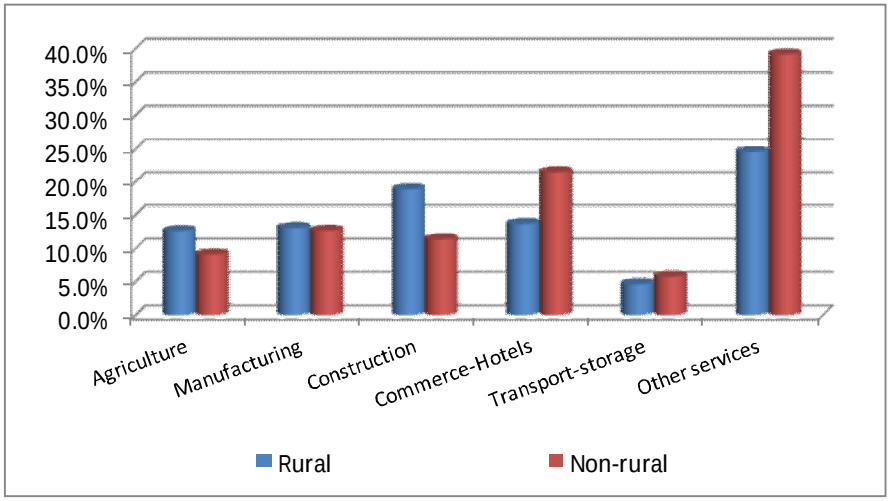


(1999)



(2012)

Figure 2: Employment Distribution by Industry and Type of Locality



[16] The density functions excluded observations where average daily wage is greater than 250 NIS, this accounts for 59 observations out of 22,249 total for 1999, and 330 out of 19,445 for the year 2012.

Figure 3: Proportion of Workers Who Work and Reside in the Same District

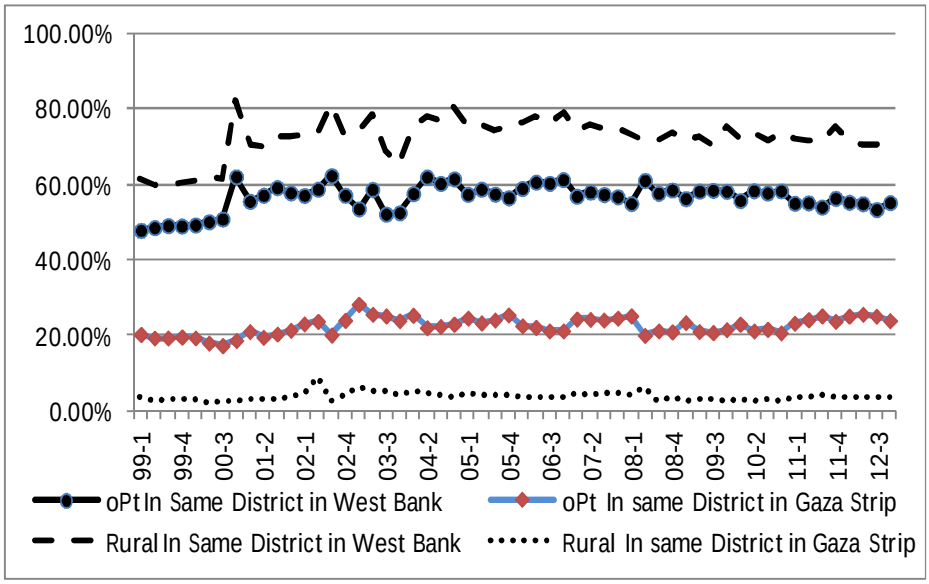


Figure 4: Schooling and Wages for Rural and Non-Rural Workers

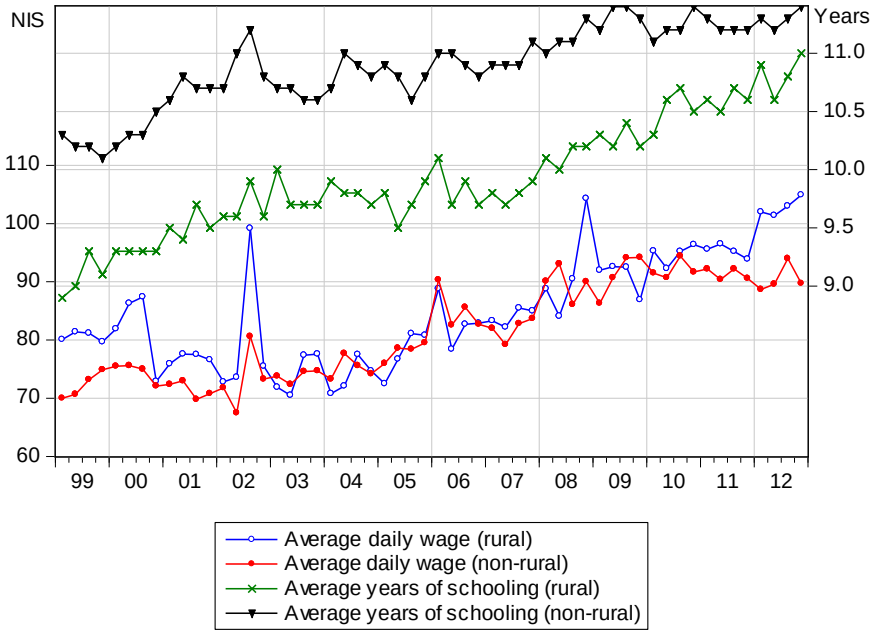


Figure 5: Employment in Israel and Wages

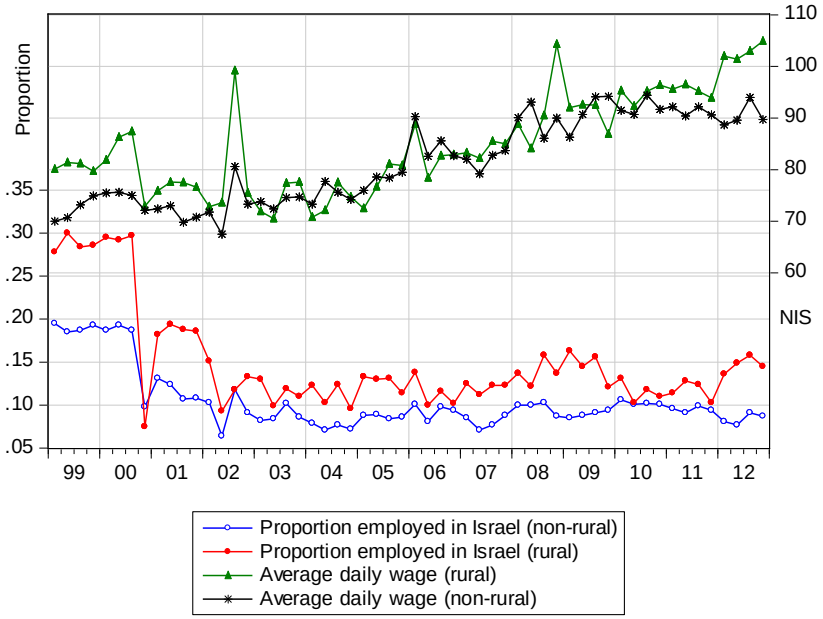


Table 1: Heckman Joint Maximum Likelihood Estimates of the Wage Equation**

	Non-rural Population			Rural Population		
	Coeff.	Se	P-Value	Coeff.	Se	P-Value
Schooling	0.0078	0.0019	0.0000	0.0069	0.0020	0.0010
Age	0.0270	0.0032	0.0000	0.0281	0.0038	0.0000
Age square	-0.0003	0.0000	0.0000	-0.0003	0.0000	0.0000
Female	-0.1493	0.0401	0.0000	-0.1209	0.0316	0.0000
Work in Israel	0.5928	0.0151	0.0000	0.4390	0.0147	0.0000
Occupation dummies*						
Legislators and senior administrators	0.8794	0.4129	0.0330	-0.1359	0.0506	0.0070
Professionals and clerks	0.4532	0.1179	0.0000	0.4596	0.1139	0.0000
Services and shop sales	0.1468	0.0863	0.0890	-0.1190	0.1218	0.3290
Skilled agricultural and fishery workers	-0.0106	0.0236	0.6510	0.0820	0.0232	0.0000
Crafts' workers	0.2197	0.1220	0.0720	-0.0313	0.0976	0.7490
Plant and machine operators	0.2561	0.0685	0.0000	0.2338	0.0733	0.0010
Governorate dummies*						
Jenin	0.6312	0.0334	0.0000	0.5724	0.0331	0.0000
Tubas	0.5664	0.0240	0.0000	0.3333	0.0325	0.0000
Tulkarem	0.5428	0.0256	0.0000	0.4939	0.0376	0.0000
Nablus	0.7052	0.0722	0.0000	0.4553	0.0420	0.0000
Qalqilia	0.6708	0.0357	0.0000	0.6496	0.0409	0.0000
Salfeet	0.8953	0.0785	0.0000	0.8024	0.0496	0.0000
Ramallah	0.8628	0.0991	0.0000	0.6479	0.0412	0.0000
Jericho	0.5522	0.0219	0.0000	0.3573	0.0303	0.0000
Jerusalem	1.0478	0.0459	0.0000	0.8206	0.0555	0.0000
41	1.0697	0.0464	0.0000			
Bethlahim	0.7395	0.0630	0.0000	0.7379	0.0525	0.0000
Hebron	0.6721	0.0307	0.0000	0.5415	0.0388	0.0000
GS-north	0.2208	0.0247	0.0000	0.2184	0.0669	0.0010
Gaza city	0.2416	0.0379	0.0000	0.1985	0.0443	0.0000
Deir Albalah	0.0719	0.0258	0.0050	0.0440	0.0624	0.4810
Khan younis	-0.0364	0.0219	0.0960	0.0837	0.0350	0.0170
Constant	2.6862	0.0790	0.0000	2.7360	0.0949	0.0000

Notes: *The base groups for occupation dummies is elementary occupations, for quarter dummies is the 3rd quarter of 2012, and for governorate is Rafah. ** Quarter dummies are removed for brevity, can be made available at request

Table 2: Heckman Joint Maximum Likelihood Estimates of the Selection Equation (Robust Standard Errors)

Variable	Non-rural Population			Rural		
	Coeff.	Se	P-Value	Coeff.	Se	P-Value
Household head works in agriculture	10.078	0.036	0.000	9.201	0.065	0.000
Household size	0.056	0.003	0.000	0.043	0.004	0.000
Total household wage income	-0.001	0.000	0.000	-0.003	0.000	0.000
2001 dummy	-0.046	0.050	0.360	-0.101	0.057	0.079
2006 dummy	-0.063	0.052	0.232	0.189	0.042	0.000
Never Married	0.609	0.033	0.000	0.751	0.037	0.000
Schooling	-0.045	0.003	0.000	-0.038	0.003	0.000
Constant	-3.048	0.045	0.000	-2.662	0.053	0.000
Rho	-0.017	0.019		-0.010	0.024	
Sigma	0.381	0.005		0.346	0.006	
Lambda	-0.006	0.007		-0.003	0.008	
Chi2 (1)	0.760		0.384	0.170		0.679

Table 3: OLS Estimates of the Wage Equation (Robust SE)

Variable*	Non-rural		Rural	
	Coeff.	P-value	Coeff.	P-value
Schooling	0.029	0.000	0.019	0.000
Age	0.054	0.000	0.038	0.000
Age square	-0.001	0.000	0.000	0.000
Female	-0.304	0.000	-0.387	0.000
Work in Israel	0.710	0.000	0.587	0.000
Occupation dummies*				
Legislators and senior administrators	0.492	0.000	(Omitted)	
Professionals and clerks	0.203	0.000	-0.268	0.000
Services and shop sales	0.009	0.570	-0.439	0.000
Skilled agricultural and fishery workers	(Omitted)		-0.336	0.000
Crafts' workers	0.009	0.547	-0.267	0.000
Plant and machine operators	-0.051	0.001	-0.375	0.000
Elementary Occupations	-0.070	0.000	-0.409	0.000
Work In Agriculture	-0.259	0.000	-0.300	0.000
Constant	2.478	0.000	3.771	0.000
N	156647		68609	
R-Squared	0.6805		0.6973	

Notes: *Quarterly dummies and governorate dummies are not reported for brevity, the set of instruments include the wage plus selection equation variables.

Table 4: IV Estimates of the Wage Equation (Robust SE)

Variable*	Non-rural		Rural	
	Coeff.	P-value	Coeff.	P-value
Schooling	0.028	0.000	0.017	0.000
Age	0.050	0.000	0.037	0.000
Age square	0.000	0.000	0.000	0.000
Female	-0.247	0.000	-0.318	0.000
Work in Israel	0.721	0.000	0.577	0.000
Occupation dummies*				
Legislators and senior administrators	0.598	0.000	0.433	0.000
Professionals and clerks	0.298	0.000	0.147	0.000
Services and shop sales	0.106	0.000	0.000	0.971
Skilled agricultural and fishery workers	0.088	0.000	0.145	0.000
Crafts' workers	0.116	0.000	0.177	0.000
Plant and machine operators	0.022	0.000	0.037	0.000
Elementary Occupations	(Omitted)		(Omitted)	
Work In Agriculture	-0.344	0.000	-0.372	0.000
Constant	2.606	0.000	3.163	0.000
N	114059		48115	
R-Squared	0.689		0.7076	

Notes: *Quarterly dummies and governorate dummies are not reported for brevity, the set of instruments include the wage plus selection equation variables.

Table 5: OLS Estimates of the Wage Equation (Robust SE, Non-Linear Schooling)

Variable*	Non-rural		Rural	
	Coeff.	P-value	Coeff.	P-value
Illiterate	(Omitted)		(Omitted)	
Primary	0.133	0.000	0.107	0.000
Secondary and lower Diploma	0.246	0.000	0.172	0.000
College and higher Diploma	0.460	0.000	0.370	0.000
Graduate	0.784	0.000	0.602	0.000
Tenure	0.002	0.000	0.002	0.000
Tenure square	-2.000E-07	0.000	-1.600E-07	0.000
Female	-0.272	0.000	-0.364	0.000
Work in Israel	0.729	0.000	0.584	0.000
Occupation dummies*				
Legislators and senior administrators	(Omitted)		(Omitted)	
Professionals and clerks	-0.243	0.000	-0.231	0.000
Services and shop sales	-0.421	0.000	-0.363	0.000
Skilled agricultural and fishery workers	-0.417	0.000	-0.244	0.000
Crafts' workers	-0.436	0.000	-0.191	0.000
Plant and machine operators	-0.407	0.000	-0.265	0.000
Elementary Occupations	-0.470	0.000	-0.330	0.000
Work In Agriculture	-0.286	0.000	-0.312	0.000
Constant	4.135	0.000	3.990	0.000
N	160445		7066	
R-Squared	0.686		0.704	

Notes: *Quarterly dummies and governorate dummies are not reported for brevity, the set of instruments include the wage plus selection equation variables.

Table 6: IV Estimates of the Wage Equation (Robust SE, Non-Linear Schooling)

Variable*	Non-rural		Rural	
	Coeff.	P-value	Coeff.	P-value
Illiterate	(Omitted)		(Omitted)	
Primary	0.121	0.000	0.119	0.000
Secondary and lower Diploma	0.217	0.000	0.174	0.000
College and higher Diploma	0.416	0.000	0.360	0.000
Graduate	0.739	0.000	0.598	0.000
Tenure	0.002	0.000	0.001	0.000
Tenure square	-1.710E-07	0.000	-1.370E-07	0.000
Female	-0.229	0.000	-0.305	0.000
Work in Israel	0.734	0.000	0.576	0.000
Occupation dummies*				
Legislators and senior administrators	0.507	0.000	0.351	0.000
Professionals and clerks	0.251	0.000	0.103	0.000
Services and shop sales	0.080	0.000	-0.003	0.000
Skilled agricultural and fishery workers	0.055	0.002	0.134	0.662
Crafts' workers	0.079	0.000	0.175	0.000
Plant and machine operators	0.064	0.000	0.073	0.000
Elementary Occupations	(Omitted)		(Omitted)	0.000
Work In Agriculture	-0.331	0.000	-0.352	0.000
Constant	3.680	0.000	3.731	0.000
N	116938		49596	
R-Squared	0.700		0.715	

Notes: *Quarterly dummies and governorate dummies are not reported for brevity, the set of instruments include the wage plus selection equation variables.