Penalized Labour Reinsertion: The Case of Peru

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January 2009

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Abstract *Going through unemployment or forced inactivity may be a shocking experience for any worker. However, negative consequences might not end with the finding of a new job. This paper shows that a new job implies, in most cases, lower real wages and fewer fringe benefits with respect to the previous job in Peru. The average earnings penalty ranges between 9 and 20 per cent in real terms, and female workers are most affected. Losses in fringe benefits might be even more harmful. Moreover, this paper finds that none of the Peruvian public mechanisms of social protection effectively helps to achieve a better labour reinsertion.*

I. Introduction

This paper estimates indicators on labour reinsertion of male and female workers after having experienced unemployment or inactivity spells in urban areas in Peru. Indicators are related to earnings and fringe benefits, and we compare them across periods (before and after unemployment or inactivity) and across groups (workers who had an intermediate period of unemployment or inactivity, and workers who did not lose their jobs during the period under analysis).

In addition, we analyse the individual, family, and public policy determinants behind an adequate reinsertion in the job market. Our hypothesis is that a significant percentage of individuals go through relatively short unemployment or inactivity spells, but with the cost of a penalised reinsertion in terms of income and other labour characteristics. This penalty may be even more drastic for female workers.

Open unemployment rates in Metropolitan Lima had fluctuated around 8 per cent (INEI 2001-2007). Female unemployment was about 10 per cent, whereas male unemployment was about 7 per cent. These unemployment levels were similar to mean unemployment rates in Latin America, and lower than rates in various countries in the region, such as Argentina, Brazil, Colombia and Venezuela (ECLAC, 2005). Unemployment duration may not be an excessive problem either. MTPE (1996) estimated that in the first quarter of 1996 just 17.1 per cent of the unemployed in Metropolitan Lima were looking for a job at least during 10 weeks. Using a panel database for all quarters of 1996, unemployment duration of 10.6 weeks on average was estimated (MTPE, 1998). Diaz and Maruyama (2000), Chacaltana (2001) and Herrera and Hidalgo (2002) confirmed that finding with small quantitative variations due to differences in methodology and databases (for instance, Diaz and Maruyama reported a complete unemployment duration of 13 weeks).

II. Literature review

The neoclassical model of undistorted labour markets deems unemployment as a frictional phenomenon since it would be impossible that all labour demands and supplies match simultaneously (Ehrenberg and Smith, 2000). Moreover, in dynamic terms it could be even positive for efficiency and productivity of the economy to have a "natural unemployment rate", for it grants certain time to find an appropriate matching between firms and workers. Therefore, it makes sense to finance certain unemployment spell for individuals, in order to improve their matching with labour demand.

In fact, recent papers for the United States (Boushey and Wenger, 2005), Germany (Gangl, 2002), and Poland (Centeno and Novo, 2005) reported a positive relationship between the level and duration of the unemployment insurance and the quality of reinsertion, whether measured in terms of income or formality conditions. However, those same studies found that overly generous unemployment insurance programs increase unemployment duration.

On the other hand, a group of empirical studies initially undertaken to measure the impact of adverse macroeconomic shocks in developed economies in the 1980s, found that displaced workers from declining sectors had significant earnings penalties once they obtained a new job (OECD, 1990). Displacement was due to greater economic openness or accelerated technological change and caused an effective depreciation of human capital. On average, two thirds of displaced workers found a new job. However, in Canada, between 1981-84 and 1986, 55.7% of all reinserted workers received a lower wage than the wage they received before unemployment. In the United States, between 1981-1985 and 1988, 44% of reinserted workers had also been penalised in their earnings.

Hipple (1999) found large displacement of workers in declining industries in the United States, even in a sustained economic growth period such as the 1990s. Nevertheless, those workers suffered lower wage penalties than in the 1980s (an average penalty of 4.1% between 1995-96

and 1998). In addition, Hipple found no gender gaps but a race gap affecting the Afro-American population (9.7% of wage penalty compared to 4% for white workers and a premium of 1.3% for Hispanic workers). Regarding educational gaps, workers who only reached high-school education were the worst affected.

In Latin America, a study by Bucheli and Furtado (2001) analysed whether a wage loss was originated by a previous unemployment spell, in a context where unemployment rate increased from 8.5% to 11% between 1988-1994 and 1995-1999 in Uruguay. They found that average wage loss increased from 30% to 39% in the mid-nineties, using cross-section surveys and a dummy variable to measure the wage loss after unemployment.

IDB (2003) used panel data from Argentina and Mexico in order to estimate a wage loss of 15% and 8%, respectively, for reinserted workers compared to a control group. In addition, most of the jobs found were informal and in the self-employed sector. Wage losses may happen because specific skills developed in the previous job may not useful in the new job, which might explain the displacement of highly skilled workers. Wage losses could also be linked to the "stigma effect", since the unemployment or forced inactivity might reveal lower productivity. Therefore, these workers would be willing to accept a wage loss in order to be hired again (IDB, 2003).

In Peru, a paper by Saavedra and Luque (2006) showed that, in Metropolitan Lima, wage decreased between 10% and 20% with respect to the wage workers would receive if were able to keep the same job. Nevertheless, the wage drop was lower (5%) if the previous job was formal. In addition, the authors found that the time used in job search was positively related to the future income in the new job. In order to do these estimations, Saavedra and Luque used panel data, comparing two points of time within a three month period, where unemployed or inactive individuals at the first period were employed again at the second period. Since the

period under analysis was short, individuals suffered only short unemployment or inactivity spells (between 0 to 12 weeks of duration).

We use in this paper panel data with three moments of time, which makes possible a broader scope of analysis. We also use two different household survey databases: *Encuesta Nacional de Hogares* (ENAHO) for urban areas in Peru and the *Encuesta Permanente de Empleo* (EPE) for Metropolitan Lima. Moreover, the use of three time periods enables the identification of the initial income before the unemployment or inactivity spell, the estimation of the wage penalty after reinsertion, and the assessment of the relationship between income changes and the number of weeks of job search.

III. Databases

We construct an unbalanced panel database using ENAHO information for the 1998-2005 period. Specifically, we capture information of all individuals who were employed in a first observation (T0), then unemployed or in inactivity (T1), and finally hired at a new job (T2). The sequence is important because the aim is to compare the characteristics of the new job (T2) with those of the previous job (T0). We found 589 individuals who met these requirements in the ENAHOs datasets. Also, 9,571 workers functioned as a control group because they were employed across all comparable times.

In addition, we use information from 2001 to 2006 from another panel data base, EPE, which is a monthly employment survey carried out in Metropolitan Lima. Of this survey, 2,264 individuals met the requirements of initial employment (T0), followed by unemployment or inactivity (T1), and finally by employment (T2). 27,788 individuals were used as a control group.

IV. Descriptive results

We construct 6 indexes for the first and third observation points, in order to compare the period pre and post unemployment or inactivity through two different methodologies.

i) Before and after: We calculate the percent change of six indexes of labour characteristics (I_Y^{eue}, I_H^{eue}, I_V^{eue}, etc.) in period "T2" against period "T0" for all individuals in the study group.

$$\Delta I_i = I_{i,T2}^{eue} - 1, \qquad \forall i = Y, H, P, V, G, U$$

where:

I_i^{eue}: Index for variable "i", in T2, for all individuals who had an intermediate spell of unemployment or inactivity between two periods of employment (study group).

Y: Labour income in the main occupation.

H: Access to health insurance.

P: Contribution to a pension plan.

V: Right to paid vacation.

B: Access to Christmas and Independence Day bonuses[1].

U: Access to job tenure bonus.

All initial variables (T0) are normalised to 1.

ii) Double differences: This analysis enables to isolate the effect of the macroeconomic context or additional factors, other than unemployment, which may have affected the indexes. Specifically, we measure the change in indexes of those who were reinserted in a new job, in relation to the change in indexes of the control group. Thus, the estimated change is:

$$\Delta I_i = \frac{I_i^{eue}}{I_i^{e}} - 1, \qquad \forall i = Y, H, F, V, G, U$$

where:

I_i^e: Index for variable "i" for all individuals who were employed during all the three periods under analysis (control group).

iii) Results with ENAHO datasets

As shown in Table 1, the average monthly income[2] in period T0 of members of the study group was 655.4 soles. After going through an intermediate spell of unemployment or inactivity, and then finding a new job in T2, their average monthly income was 623.4 soles. There was a mean penalty of 4.9 per cent in real terms. However, this penalty should not be entirely attributed to unemployment or inactivity, since other factors such as the macroeconomic context or excess supply in the labour market could have caused that drop in labour incomes in any case.

For this reason, we compare incomes in our study group with incomes in a control group of individuals who experienced all other factors but unemployment and inactivity, in the period under analysis. Thus, Table 1, second row, shows that the mean income in the control group was 677.1 soles in period T0 and 671.2 in T2. There was a small drop of 0.9 per cent in real incomes in this control group, in spite of not having experienced unemployment or inactivity in period T1.

Table 1. Average Monthly Income and Wage Penalty, 1998-2005

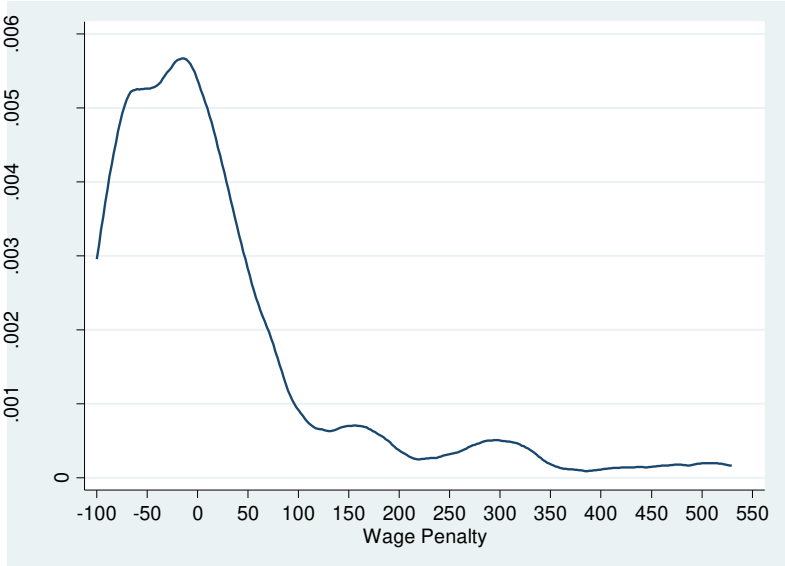
Group	Income T0	Income T2	Var. %	Obs.
Study (EUE)[1]	655.4	623.4	-4.9%	589
Control (EEE)[2]	677.1	671.2	-0.9%	9,572
Penalty 1[3]			-4.1%	
Penalty 2[4]			-5.1%	
Percentage of cases showing earnings penalty			52.1%	

1: All individuals in our sample who are first employed, then unemployed or inactive, and finally reemployed.
2: All individuals in our sample who are employed in all three periods under analysis.
3: Penalty 1 equals the ratio of the percent increase of mean incomes in the study group over percent increase in average income of control group, minus one.
4: Penalty 2 equals the median of ratios of percent increase in income of individuals in the study group and percent increase in income of individuals in the control group, minus one.
Source: ENAHO 1998-2005.

Therefore, the net penalty estimated for labour reinsertion was 4.1 per cent. We call this percentage Penalty Type 1. In addition, we estimated the value of another indicator called Penalty Type 2, which is the median of all income variations for each individual controlled for variations in the control group, and the result was about minus 5.1 per cent. In both cases, penalties are less than others reported for other Latin American countries as Argentina and Mexico (IDB, 2003). However, these descriptive averages are not enough to arrive to a final conclusion. A multivariate regression analysis is needed.

We also found that most workers (52.1%) who lost their job and found later a new job, experienced a net penalty in their real income. The other 47.9% of workers obtained a net premium after labour reinsertion, a positive achievement from job search and adequate skill matching. These mixed results are consistent with similar findings in Mexico and Brazil as reported by IDB (2003). The range of income change is broad, as shown in Figure 1, but since more than 50% of cases reports negative variations, we will refer to them as penalties in general terms.

Figure 1. Wage Change Distribution of Individuals in the Study Group, 1998-2005 (%)



Source: ENAHO 1998-2005. The figure does not include the top 5% of wage premiums in distribution.

Table 2 shows results for different population groups. First, the gender gap is evident since not only women receive lower income than men, but also have higher penalties after labour reinsertion. In fact, average female income in the initial period was less than male income for both the study and control group (529.1 and 569.6 compared to 743.3 and 716.3 monthly soles). After experiencing an episode of employment or inactivity, women suffered mean wage penalties of 23.8 and 18.4 per cent (Penalty Type 1 and Type 2, respectively). On the other hand, male workers had wage premiums from 5.5 per cent for Penalty Type 1 to penalties of 0.4 per cent for indicator type 2, so on average, men are clearly in a better situation than women.

Table 2. Average Monthly Income and Earnings Penalties in the Study and Control Group, by Gender and Maximum Attained Educational Level

Category	Group	Income T0	Income T2	Penalty 1	Penalty 2
Female	Study	529.1	413.3	-23.8%	-18.4%
	Control	569.6	584.2		
Male	Study	743.3	769.5	5.5%	-0.4%
	Control	716.3	702.9		
No education	Study	312.9	367.9	19.7%	3.7%
	Control	346.6	340.5		
Primary	Study	471.7	447.3	-8.1%	-8.7%
	Control	521.2	538.1		
Secondary	Study	605.2	596.2	3.1%	-1.5%
	Control	877.6	838.6		
Higher	Study	1,809.8	1,558.9	-14.4%	-9.2%
	Control	1,458.4	1,466.7		

Source: ENAHO 1998-2005.

Regarding the results by educational level, there seems to be no clear pattern in the wage penalties or premiums caused by labour reinsertion. For population with no education, a premium from 3.7 to 19.7 per cent was found. In turn, workers with primary education were penalized with an income drop by 8 per cent. Workers with secondary education had mixed results from a penalty of 1.5 percent to a premium of 3.1 percent. Finally, professional workers experienced large wage penalties of 9.2 to 14.7 per cent. This latter result might be

consequence of the divorce between higher education curricula and the needs of the productive sector causing low employability in the higher education graduates in Peru (Yamada, 2007).

Table 3. Average Monthly Income and Earnings Penalties in the Study and Control Group, by Initial Job Sector and Type of Worker

Category	Group	Income T0	Income T2	Penalty 1	Penalty 2
Public Sector	Study	1,219.7	1,103.1	-9.6%	-20.0%
	Control	1,168.1	1,168.3		
Private Sector	Study	617.0	596.7	-2.4%	-2.6%
	Control	624.9	619.3		
Self-employed	Study	400.3	492.9	24.7%	13.0%
	Control	496.5	490.1		
Salaried	Study	834.2	714.8	-13.8%	-11.7%
	Control	933.7	928.5		

Source: ENAHO 1998-2005.

Table 3 indicates that workers who were employed in the public sector in T0 are the most negatively affected. If measured by Penalty Type1, ex - public workers have a wage penalty of 9.6 per cent when they are employed again (as compared to a 2.4% penalty for workers who lost a private job). Measured by Penalty Type 2, workers who lost a public job are penalized in 20 per cent in comparison with 2.6 per cent of penalty for private workers.

In addition, workers who were initially (T0) self-employed received in average wage premiums after reinsertion (24.7% and 13.0%, by Type 1 and II), whereas salaried workers were penalized after their reinsertion (13.8% y 11.7%). It seems to be that for self-employment labour skills are more transferable between occupations and significant returns are given to labour mobility. On the other hand, salaried jobs may be more rigid and specialized, so that higher training investments would be needed in order to reinsert properly in a different job.

We also found that younger workers (14-25 years) and eldest workers (over 45 years) are more penalised (10.7% and 5.6%, respectively), in comparison with the 2 per cent penalty received by workers between 26 and 45 years.

iv) Results with EPE datasets

Detailed descriptive results with this alternative database are not shown for brevity but are available upon request. An important indicator that could not be captured by ENAHO panel database is the number of weeks in unemployment. Using EPE we estimate the average unemployment duration in 22.6 weeks, more than 5 months, figure that surpasses previous estimates in Peruvian literature which were between 10.6 and 13.5 weeks (MTPS, 1998; Diaz y Maruyama, 2000). Moreover, more than 9 months have to elapse in order to have 80% of the target population reinserted in a new job.

Finally, we analyse if the length of unemployment duration is related to the earning penalty size. In that regard, two effects are operating in an opposite way. On one hand, the larger the unemployment duration, the greater the capability of the individual to find an adequate job due to a better job search, as observed in developed countries (Boushey and Wenger, 2005; Gangl, 2002; and Centeno and Novo, 2005); on the other hand, the longer the unemployment duration, the higher the "stigma" effect (IDB, 2003) and the greater the urge to accept a job due to lower remaining savings. Maybe because of these conflicting forces, Table 4 does not show a clear pattern on the relationship between unemployment weeks and earnings penalty. We will later readdress this issue with the econometric models.

Table 4. Monthly Income and Mean Wage Penalty, by Number of Unemployment Weeks

Unemployment weeks	Income T0	Income T2	Penalty 1	Penalty 2
Less than 10 weeks	625.5	561.0	-10.3%	-10.3%
10 to 19 weeks	688.1	596.7	-13.3%	-13.3%
20 to 29 weeks	721.7	573.9	-20.5%	-20.5%
31 to 39 weeks	698.3	571.2	-18.2%	-18.2%
More than 39 weeks	626.4	667.0	6.5%	6.5%

Source: EPE 2001-2006.

v) Summary of penalties

Table 5 display average signs as well as sizes of income changes and variations in the fringe benefits coverage after labour reinsertion, by different population categories and surveys. For both surveys (ENAHO and EPE), female is the most evident loser regarding earnings penalties. However, male workers are the worst affected in all other analysed dimensions of fringe benefits.

Table 5. Average Penalties in Income and Fringe Benefits, ENAHO and EPE

Survey	Variable	Total		Female		Male	
		Penalty 1	Penalty 2	Penalty 1	Penalty 2	Penalty 1	Penalty 2
ENAHO	Income	-4.1%	-5.1%	-23.8%	-18.4%	5.5%	-0.4%
	Health Insurance	-6.6%	-1.2%	-14.9%	-4.1%	-1.1%	0.4%
	Vacation leave	-35.9%	-2.0%	-31.8%	-1.1%	-37.6%	-2.7%
	Bonuses	-11.3%	-4.5%	-9.3%	-0.3%	-21.2%	-8.6%
	Pension plan	-36.1%	-4.8%	-18.6%	2.9%	-42.3%	-9.6%
	CTS[3]	-44.4%	-6.5%	-38.9%	-4.0%	-46.4%	-7.9%
EPE	Income	-10.4%	-1.9%	-10.8%	-6.3%	-10.3%	-0.6%
	Health Insurance	-8.0%	-3.0%	-1.7%	-1.3%	-12.2%	-4.3%

Source: ENAHO 1998-2005 and EPE 2001-2006.

5) Regression Analysis

In order to control for economic and socio-demographic characteristics, we use an OLS regression model and a Propensity Score Matching model. We will consider that an individual was properly reinserted if she kept or increased her real earnings in the new job with respect to her previous job, or if she kept her fringe benefits or gained access to additional benefits in the new job.

i) OLS model

First, we estimate an empirical model that identifies the wage penalty or premium due to labour reinsertion by means of a dummy variable in an equation predicting the earnings variation through time (between T0 and T1), and controlling for a set of different socioeconomic variables:

$$I_y = \alpha + \beta O + \lambda X + \theta D + \phi A$$

where:

$$I_y = \log Y_{T2} - \log Y_{T0}$$

Y_i: Average labour income in period "i".

O: Dummy variable. 1 if the individual is a member of the Study Group; 0 if the individual belongs to the Control Group.

X: Vector of individual and family characteristics (age, labour experience, educational level, gender, labour income quintile, family dependence ratio).

D: Duration of the unemployment or inactivity spell[4].

A: Access to public programs and social safety nets during the unemployment/inactivity period.

Using the panel database with information of the ENAHO surveys, we estimate that going through unemployment or inactivity causes a significant wage penalty of 20.8%, as shown in Table 6. That is, the earnings of the reinserted workers diminish by 20.8 percentage points with respect to the earnings they would obtained had they been kept employed. This average net penalty if much higher than penalties estimated in Argentina and slightly higher than in Mexico (IDB, 2003). Also, the penalty size is within the range identified for Peru in Luque and Saavedra work, using a panel with information of two points in time. In addition, we found no significant difference between in the penalty of workers who were unemployed or inactive.

Table 6: OLS Model with No Interactions, ENAHO Survey

(dependent variable: variation in the log of incomes) (1)

Independent Variables	Coefficient	T
Dummy for unemployment / inactivity	-20.8	-3.8***
Female	-17.9	-4.4***
Over 65 years	-9.4	-3.3***
Household head couple	-14.5	-2.8***
Other relative	-9.9	-2.3**
Change in education years	1.7	2.3**
Moved from self-employed worker to dependent	38.9	5.8***
Moved from dependent worker to self-employed	-33.0	-6.3***
Dependent	24.4	5.7***
Moved to mining sector	61.0	3.0***
Moved to farming sector	-74.9	-10.3***
Health insurance	9.2	2.3**
Access to Bonuses	31.0	6.0***
Labour training	17.8	2.8***
City – dweller	37.8	12.0***
Labour income in 2nd quintile	-150.3	-32.7***
In 3rd quintile	-186.7	-39.7***
In 4rd quintile	-207.3	-42.8***
In 5th quintile	-235.5	-44.7***
Period 2000-2002	10.9	2.0**
Period 2003-2005	13.8	4.1***
Constant	139.3	33.8***
Observations	9310	
R2	0.25	
Adjusted R2	0.25	

*** significant at 1%; ** significant at 5%; * significant at 10%.

(1) This table includes only control variables that result statistically significant. All income related variables where computed in the final period, with the exception of the income quintiles which were estimated for the initial period.

When explaining, the income evolution through time, various control variables turn out being significant. Female workers, for instance, are clearly in disadvantage when dealing with earnings variation. Also, being over 65 years old and remaining active in the labour market is penalized. Moreover, all household members but the head suffer a negative trend in their incomes. In turn, human capital investment (measured as a positive change in the number or education years) reinforces the increase in earnings.

Mobility between job types and employment sectors are also subject to significant penalties and premiums. Specifically, those who became salaried workers after being self-employed received significant wage premiums, while salaried workers who became self-employed suffered penalties in their earnings. This finding is consistent with the popular image in Peru of self-employment as an involuntary and underpaid residual sector. In addition, workers who enter the mining sector from any other economic activity gained a substantial wage premium due to the higher productivity in mining and its booming prices during last years of observation. On the other hand, workers who moved to farming sector were severely penalized. Moreover, variables related to job formality, such as access to bonuses and health insurance, had a positive effect in the improvement of earnings, as did residence in urban areas. Finally, workers whose income were at the top quintiles obtained a lower increase in their pay than workers at the lowest income quintiles, which might indicate a trend towards a better income distribution in Peru.

As done with the ENAHO database, we estimated an OLS model of income variation for individuals from the EPE survey data. In EPE's case, going through an intermediate period of unemployment reduced earnings by 10.9 percentage points, and being inactive between two jobs decreased earnings by 17.5 percentage points in the new job (see Table 7). Regarding the other control variables, results are mostly similar to the previous findings with ENAHO data. Being female, young, elder person, or self-employed reduce the income growth, whereas job formality and movement to a dependent job increase it. Also, some diminishment in labour income inequality is suggested.

Table 7: OLS Model with No Interactions, EPE Survey

(dependent variable: variation in the log of incomes) (1)

Independent variables	Coefficient	T
Unemployment	-10.9	-7.3 ***
Inactivity	-17.5	-6.8 ***
Female	-11.6	-16.5 ***
Under 25 years	-4.5	-4.6 ***
Over 65 years	-4.5	-5.8 ***
Self-employment	-32.7	-22.9 ***
Moved from self-employed worker to dependent	20.5	13.8 ***
Health insurance	16.8	21.8 ***
Labour income in 2nd quintile	-55.8	-38.6 ***
In 3rd Quintile	-76.0	-53.3 ***
In 4th Quintile	-89.0	-61.5 ***
In 5th Quintile	-106.1	-71.8 ***
Year 2004	-2.2	-1.7 *
Year 2002	-4.2	-4.8 ***
Constant	83.8	56.9 ***
Observations	27528	
R2	0.16	
Adjusted-R2	0.16	

*** significant at 1%; ** significant at 5%; * significant at 10%.

(1) This table includes only control variables that result statistically significant. All income related variables where computed in the final period, with the exception of the income quintiles which were estimated for the initial period.

ii) M*atching model*:

We use the "propensity score matching" methodology, by means of which we are able to compare changes in the variable of interest (labour reinsertion indexes) with a counterfactual group (in this case, individuals who did not go through an intermediate unemployment or inactivity spell)[5]. Thus, every individual reinserted into a new job is compared to a control with similar characteristics. Specifically, we use two types of estimators for computing the propensity score: "the nearest neighbour" and the "Kernel estimator". The first implies the assignment to every reinserted person of a control person with the most similar score. Therefore, it is possible that a same individual would be a control for more than one reinserted

person. On the other hand, the Kernel estimator uses information of all the individuals in the Control Group, granting a higher weight to controls with more similar scores to the specific reinserted person.

We first estimate the counterfactual using a nearest neighbour matching. Table 8 shows results for ENAHO and EPE panel databases, respectively. When using the ENAHO panel database, there are large penalties, especially of Type 1. Moreover, 53% of individuals are penalized when compared to the Control Group. On the other hand, when using EPE panel database, both types of penalties (1 and 2) are similar (17% y 18.7%, respectively). Also, 62% of individuals receive penalized earnings when compared to the Control Group.

Table 8. PSM Model, Nearest Neighbour Matching, ENAHO and EPE

Group	ENAHO			EPE		
	Income T0	Income T2	Var. %	Income T0	Income T2	Var. %
Study (EUE)	655.4	623.4	-4.9%	765.6	675.5	-11.8%
Control (EEE)	740.1	720.7	-2.6%	807.2	786.5	-2.6%
Penalty 1			-2.3%			-9.5%
Penalty 2			-10.3%			-16.4%
Percentage of cases with a wage penalty			53.8%			63.0%

By using Kernel estimators, we obtain similar penalties. Type 1 is about 9% (ENAHO) and 16% (EPE), Type 2 is slightly higher than 10% (ENAHO) and 12% (EPE).

iii) Summary of earnings penalties and access to fringe benefits

Table 9 summarizes all wage penalties found. For both ENAHO and EPE databases, we can state that labour reinsertion after unemployment or inactivity is a harsh experience, since we found wage penalties in all databases and for all estimation methods used. With ENAHO database, estimated penalties are within the range of 9.1% to 20.3%, whereas with EPE

database wage penalties fluctuate between 12.1% and 18.7%. Note also that the "descriptive" average penalties even after controlling by the double differences method, largely underestimated wage penalties in the Peruvian labour market.

Table 9. Penalties Summary by Estimation Method

Survey / Estimation Method	Total		Male		Female	
	ENAHO	EPE	ENAHO	EPE	ENAHO	EPE
Double differences	-5.1%	-1.9%	-0.4%	-0.6%	-18.4%	-6.3%
OLS	-20.3%	-10.8%	-12.8%	-7.8%	-41.3%	-16.3%
PSM – Nearest Neighbour	-10.3%	-18.7%	0.1%	-12.9%	-30.9%	-25.7%
PSM – Kernel	-9.1%	-12.1%	-5.4%	-8.4%	-28.5%	-17.6%

In addition, Table 10 reports the impact of unemployment or inactivity on the probability of access to certain fringe benefits, as estimated through a Logit model. Specifically, the model was:

$$p_i = \frac{1}{1 + e^{(-\alpha - \beta O - \lambda X - \theta D - \phi A)}}, \quad \forall i = H, F, V, G, U$$

where:

p_S = dummy variable for access to health insurance. 1 if the individual has health insurance; 0 otherwise.

p_F = dummy variable for access to retirement plan. 1 if the individual contributed to a pension plan in T2; 0 otherwise.

p_V = dummy variable for right to vacation leave. 1if the individual had vacation leave in the period T2, 0 otherwise.

p_G = dummy variable for Christmas and Independence Day bonuses. 1 if the individual received bonuses; 0 otherwise.

$p_U =$ dummy variable for access to job tenure compensation (CTS). 1 if the individual received this compensation account; 0 otherwise.

Thus, by estimating a logit model for each variable, we found no effect of unemployment or inactivity on the access to health insurance, but we did estimate large penalties (30.5% to 63.3%) in the other fringe benefits analysed using the ENAHO database. Using EPE database however, we estimate a penalty of 37.2% in the probability of access to health insurance in the new job.

Table 10. Summary of Penalties in the Access to Fringe Benefits, Logit Model, ENAHO & EPE

Survey / Estimation	ENAHO	EPE
Health insurance	0.0%	-37.2%
Pension plan	-30.5%	n.a.
Vacation leave	-59.7%	n.a.
Bonuses	-63.3%	n.a.
CTS	-50.4%	n.a.

n.a.: EPE database does not include information for these variables.

iv) Model with interactions

We test a second version of the multiple regression models with interactions in order to evaluate whether there were statistically significant differences in the penalties received by certain groups, socioeconomic characteristics or access to public programs or policies. Therefore, we add interaction variables between the main dummy variable (1 if the individual is a member of the Study Group; 0 if she belongs to the control group) and other variables, in the OLS model as reported in the previous section.

As shown in Table 11, female gender and movement from a salaried job to self-employment are the two main socioeconomics characteristics that contribute the most to the earnings penalties after labour reinsertion. Therefore, emphasis should be put on supporting these workers types[6].

Table 11: OLS Model with Interactions, ENAHO (1)

Independent Variables	Coefficient	t
Objective x Female	-25.3	-2.2 **
Objective x Movement from salaried to self-employment	-38.5	-2.5 **
Objective x Access to program "A Trabajar Urbano" (ATU)	-30.2	-2.2 **
Objective: Unemployment/Inactivity	6.6	0.7
Objective x Access to CTS	-26.0	-1.0
Objective x Access to Social Programs	-14.6	-1.3
Objective x Labour Training	-6.4	-0.2
Female	-16.1	-3.9 ***
Over 65 years	-9.9	-3.4 ***
Couple of Household head	-14.8	-2.9 ***
Other relative	-10.7	-2.5 **
Change in education years	1.6	2.3 **
Move from self-employment to a dependent job	38.7	5.7 ***
Move from a dependent job to self-employment	-28.7	-5.2 ***
Salaried	24.1	5.6 ***
Move to mining sector	60.4	3.0 ***
Move to farming sector	-75.7	-10.4 ***
Bonuses	31.5	6.1 ***
Insurance health	9.2	2.3 **
Labour training	18.6	2.8 ***
City dweller	37.0	11.7 ***
Labour income in 2nd quintile	-150.6	-32.7 ***
In 3rd quintile	-186.8	-39.7 ***
In 4th quintile	-207.6	-42.9 ***
In 5th quintile	-235.8	-44.7 ***
Period 2000-2002	10.3	1.9 *
Period 2003-2005	13.6	4.1 ***
Constant	139.6	33.7 ***
Observations	9,310	
R2	0.25	
Adjusted-R2	0.25	

*** significant at 1%; ** significant at 5%; * significant at 10%.

(1) This table includes only control variables that result statistically significant, plus policy variables (whether significant or not).

Also, we find a significant negative coefficient for the interaction term between the access to ATU program[7] and the objective variable. This finding would suggest that this temporary work program "A Trabajar Urbano" for poor workers (Chacaltana, 2005) may help to overcome the unemployment or inactivity period, but do not aid to a better labour reinsertion. On the contrary, participation in the program causes a higher penalty in the new job, maybe due to a "stigma effect". Another explanation could be that participation in the temporary work program reduces time for an effective job search. Consequently, the program would be improved if it were tied to a labour information system and employment bureau services in order to guarantee a better job search, even in the informal sector. Also, there should be special emphasis on the transfer of useful labour skills.

After taking into account those first three variables, the objective variable alone loses statistical significance, as can be seen on Table 11, which means those previous variables are the most important ones to explain earnings penalties in labour reinsertion. However, the lack of significance of other policy variables is also worth commenting. So, CTS, the job tenure compensation account, reports no effect on the improvement of income in the new job. It seems to be that having access to a CTS account in the initial period does not facilitate a better job search and finding of an adequate salaried job[8]. These results clearly diverge from the situation in developed economies where the unemployment insurance is an effective tool to encourage an adequate labour reinsertion, as mentioned previously. Free disposal of a large share of CTS funds before unemployment seems to hinder its original aim as a financial aid during job search times. Other causes could be the low coverage of CTS and the short duration of fixed term jobs in Peruvian economy[9].

Interaction between the objective variable and access to social program is no significant either, maybe due to the reduced value of assistance received (due to excessive administrative costs

and targeting problems discussed by Vasquez, 2007)[10] that impels individuals to accept any job offer even if the cost is some earnings penalty. Finally, access to labour training is not significantly helping to achieve a proper labour reinsertion, failing then to improve employability. Low coverage, bad quality and inappropriateness of training might be behind the fact that receiving labour training in the first job o during unemployment does not increase future earnings.

We also test a model with interactions using EPE panel database. Results are reported in Table 12. Again, female and self-employed workers are severely penalised after labour reinsertion. However, in EPE panel database, not only dependent workers who move to self-employment are penalized but, on average, self-employment reduces earnings no matter what the occupation type in the final job was. In addition, interaction between access to social security and the objective variable does not result statistically significant, so formality does not seem to help towards a better reinsertion.

Table 12: OLS Model with Interactions, EPE (1)

Independent Variables	Coefficient	t
Objective x Female	-8.8	-3.3 ***
Objective x Self-employment	-12.0	-4.3 ***
Number of weeks of unemployment	-0.3	-2.8 ***
Objective: Unemployment	-1.6	-0.7
Objective: Inactivity	-16.6	-5.9 ***
Female	-10.8	-14.9 ***
Under 25 years	-4.6	-4.7 ***
Over 65 years	-4.4	-5.6 ***
Self-employed to dependent	19.4	12.9 ***
Independent	-30.9	-21.0 ***
Insurance Health	16.8	21.8 ***
Quintile 2	-55.9	-38.6 ***
Quintile 3	-76.3	-53.3 ***
Quintile 4	-89.3	-61.4 ***
Quintile 5	-106.1	-71.6 ***
Year 2004	-2.1	-1.6 *
Year 2002	-4.2	-4.8 ***

Constant	83.3	56.3 ***
Observations	27,350	
R2	0.16	
Adjusted-R2	0.16	

*** significant at 1%; ** significant at 5%; * significant at 10%.
(1) This table includes only control variables that result statistically significant, plus policy variables (whether significant or not).

Finally, by using EPE database we are able to estimate the effect of unemployment duration measured as the number of weeks of unemployment. We found a significant and negative relationship between unemployment duration and earnings in the new job. Hence, at least in Metropolitan Lima labour market, a "stigma" effect seems to gain importance as unemployment duration increases. Again, it is evident the workers' need of having enough funds to be able to undertake a proper job search and increase the probability of finding a better paid job.

For this reason, we propose that CTS funds be entirely intangible at least for a cumulative amount equivalent to 5 monthly wages (the average duration of unemployment). Regarding the informal labour market, the improvement of social protection mechanisms to the unemployed is required to grant them more time to engage in an effective job search. Also, it is important the strengthening of labour information systems and employment bureau services to reduce duration of frictional unemployment for both formal and informal workers.

In summary, the most affected by a penalised labour reinsertion are female, self-employed workers, and the long term unemployed. Current public programs are not effectively helping to achieve a less penalized reinsertion.

6. Concluding remarks

Going through unemployment or forced inactivity period may be a harsh experience for any worker. Besides the shortage of money, it also provokes negative psychological consequences and low self-esteem (Tarazona y Maisch, 2002). We have estimated an additional risk of unemployment or forced inactivity. Related problems do not end with finding a new job, since in most cases the new job entails lower real wages and less access to fringe benefits as compared with the previous job.

On average, earnings penalty fluctuates between 2% and 5%. Nevertheless, once the estimation in controlled for another factors, range of penalties increases to 9%-20%, alike other wage penalties found in Latin American countries. Moreover, up to 62% of cases report earnings penalty. We also found losses in access to fringe benefits. In both cases, female and self-employed workers are the largest penalized groups. A longer duration of unemployment also has a significant effect in the size of earnings penalty. Regarding public social protection mechanism, none of the evaluated public policies in Peru turned out significant as a useful device for achieving a more successful labour reinsertion.

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[1] In Peru, formal employees receive two additional salaries: one in Independence Day and one in Christmas. We will refer to theses additional salaries just as “bonuses” in the remaining text.

[2] Monthly incomes are computed as labor earnings in the main occupation. All incomes were deflated to 2005 values in Metropolitan Lima. All references to earnings, income or wage relate to this same concept.

[3] CTS (*Compensación por Tiempo de Servicios* or Compensation for Time in Service) is the Peruvian proxy for unemployment insurance in the formal sector. Every formal employee has a CTS account in a bank

where their employers must make contributions every semester for an amount equal to half a monthly wage. Initially, this fund was intangible and the workers could only access to it when they terminated a job. However, now workers can make use of most of the fund before job termination, distorting so the initial aim of this mechanism.

[4] This variable is only available in the EPE survey for all periods.

[5] Rosenbaum, Paul and Donald Rubin (1983).

[6] In additional regressions not included in this paper, we added other characteristics such as number of children at home or change in marital status, interacted with unemployment or inactivity spells, in order to evaluate if female earnings penalties were due to family conditions which caused flexible but penalized labour reinsertions. However, no significant result was obtained.

[7] ATU is the name of a Peruvian temporary public works program. Currently, the program is called "Construyendo Peru" and it has been extended to include rural areas.

[8] It would have been desirable to use as an additional regressor an interaction between the objective variable and credit access. However, ENAHO did not include this last variable until the first semester of 2004. We also tried interaction variables between the objective dummy and the individuals´ poverty status but were not statistically significant.

[9] The average employment duration for workers hired for fixed terms was 20 months, compared to the 137 months of duration for workers hired for indefinite term (ENAHO 2005).

[10] Reverse causality between level of earnings penalty and access to social programs could potentially cause an econometric bias. However, this potential problem is minimized in the Peruvian case since social programs are targeted according to structural poverty indicators and not to temporary unemployment or inactivity periods. Moreover, earnings penalty is estimated using the income after labour reinsertion (that is, after receiving any social benefit).