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Publication date:
2006

UNIVERSITÀ POLITECNICA DELLE MARCHE

DIPARTIMENTO DI ECONOMIA

WAGE DIFFERENTIALS BETWEEN TEMPORARY AND PERMANENT WORKERS IN ITALY

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QUADERNI DI RICERCA n. 257

Aprile 2006

Abstract

The focus of this paper is to estimate the wage differentials between temporary and permanent workers using the 2002 wave of the Survey of Italian Households' Income and Wealth (SHIW) carried out by the Bank of Italy. A standard Mincer equation extended to a dummy variable for fixed term contracts, interaction terms, and further explanatory variables will be estimated.

Two hypothetical sources of misspecification may arise. Firstly, the potential endogeneity of the dummy variable for the contract type. Indeed, it seems plausible that those who end up in temporary jobs are not a random draw from the population and that this selection generates biased estimates. We will propose two methods to overcome the self-selectivity bias: the first one is an instrumental variables approach, the second one consists in the Heckman's (1978) dummy endogenous variable model estimator. The second possible source of misspecification is the "classical" Heckman's (1979) sample selection bias. We will present a procedure in order to test the presence of such a sample selection bias taking into account the endogeneity of the dummy variable for the contract type.

JEL Class.: C20, C30, J31, M51

Keywords: temporary employment, wage differentials, single equation GMM, dummy endogenous variable, sample selection bias

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Wage Differentials between Temporary and Permanent Workers in Italy*

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1 Introduction

Temporary employment in Europe has been extensively debated both by researchers and policy makers. Policy makers often see these contracts as an instrument of labour market flexibility and a response to the high level of unemployment. During the 1990s, the share of employees with temporary contracts rose in almost all European countries, in particular in those showing relatively high levels of employment protection.

Indeed, in Southern European countries the introduction of "flexibility at the margin", i.e. deregulation of non-permanent contracts leaving the discipline of permanent work unchanged, has generated a stronger spread of temporary contracts. This may explain the temporary jobs growth in France, Italy and Spain, where the proportion of temporary workers doubled between 1985 and 1997 (Booth *et al.*, 2002).

Although temporary contracts may provide an instrument to increase labour market flexibility and a "stepping-stone" into longer employment relationships (Booth *et al.*, 2002a), they often imply important and combined disadvantages. Firstly, temporary workers are related to higher turnover and probability of unemployment (Dolado (2002), Farber (1999)) since fixed term contracts expire automatically at the end of the agreed period. Secondly, they seem to receive lower wages than permanent employees with the same qualifications and jobs. Such wage differentials vary between a high of 47% in Spain and a low of 17% in Germany (OECD Employment Outlook, 2002).

Temporary contracts are at higher risk of job loss and labour market ex-

* *The author is grateful for the financial support from the Università Politecnica delle Marche (doctoral scholarship). The author wish to thank Bart Cockx, Bruno Van der Linden, Stefano Staffolani, and Riccardo Lucchetti for their useful comments and suggestions. All remaining errors are mine.*

clusion so, according to the theory of compensating differentials, they should receive risk premiums in terms of wages. Nevertheless, only Rosen (1986) found some evidence in the USA for compensating wage differentials for jobs with higher probability of unemployment. Recent research from Britain, Spain and Germany (Booth *et al.* (2002a), Davia and Hernanz (2002), Jimeno and Toharia (1993) and Hagen (2002)) has examined the wages and conditions attached to fixed term employment. In general, it has been found out that temporary workers earn significantly less than comparable permanent employees.

An interesting question is whether the wage dynamics are affected by having held temporary jobs. Booth *et al.* (2002a) found that having had fixed term contracts at the beginning of career does not permanently damage the wage profile. Rather, men who had fixed term contracts show the highest real wage profile. Temporary contract seems to be a "stepping stone" to permanent work, i.e. there is some evidence of positive long-term income effects.

The focus of this paper is the analysis of wage determination using the 2002 wave of the Survey of Italian Households' Income and Wealth (SHIW) carried out by the Bank of Italy. A standard Mincer equation extended to a dummy variable for fixed term contracts, interaction terms, and further explanatory variables will be estimated. In this case two hypothetical sources of misspecification may arise. Firstly, the potential endogeneity of the dummy variable for the contract type. Indeed, it seems plausible that those who end up in temporary jobs are not a random draw from the population and that this selection generates biased estimates. We will propose two methods to overcome the self-selectivity bias: the first one is an instrumental variables approach, the second one exploits the Heckman's (1978) dummy endogenous variable model which provides a consistent and asymptotically efficient estimator. The second possible source of misspecification is the "classical" Heckman's (1979) sample selection bias: this kind of bias arises when we are interested in estimating a wage offer equation for people of working age and there are unobserved characteristics affecting both the work decision and the wage. The sample selection bias is also called incidental truncation because we cannot observe the wage offered to nonworking people. We will present a procedure in order to test the presence of such a sample selection bias taking into account the potential endogeneity of the dummy variable for contract type.

In Section 2 a descriptive analysis dealing with the growth of temporary contracts will be carried out. We will briefly look at the individual characteristics and pay levels of temporary workers in Italy.

Section 3 presents a survey of the economic literature dealing with tem-

porary contracts. This growing literature focuses on the impact of fixed term contracts on several aspects of the labour market. Hence, we will quickly see the main results of the adoption of fixed term contracts on labour market performances, welfare, job quality and career advancement. Then, we will address the topic of wage differentials. Indeed, Section 3.1 presents some theoretical frameworks explaining wage differentials between temporary and permanent workers, whereas Section 3.2 displays empirical evidence.

In Section 4 we will estimate the wage differential between temporary and permanent workers. The OLS estimate of the wage equation will be the starting point. The endogeneity of the contract type due to a self-selective process will be faced using an instrumental variables procedure and specifying the dummy endogenous variable model proposed by Heckman (1978). Finally, we will test the presence of the "classical" sample selection bias (Heckman, 1979).

2 A Picture of Temporary Work

The European labour markets have changed dramatically in recent years. Traditionally, the European standard work arrangement has been dependent, full-time, and permanent (indefinite duration). However, in the last decade, pursuing higher level of flexibility, atypical employment forms have been growing in importance and temporary work has been the latest area of employment to become subject to new regulation from the European Union.

The performance of the Italian labour market is an example of the trend toward flexibility which has characterized most of the European countries. The major steps have been the so called "Treu Law" (Law 196/1997) and Legislative Decree No. 368/2001 , which introduced and regulated new forms of contracts, in particular part-time, fixed term, and temporary work agency employment.

The descriptive statistics displayed in this Section to draw a picture of temporary work in Italy have been computed using the Survey of Italian Households' Income and Wealth (2002) conducted by the Bank of Italy.[1] The data allows us to distinguish two types of temporary workers: fixed term workers and workers for temporary job agencies. We consider these two types of temporary workers in the same category, which we will indifferently called temporary works or fixed term contracts (FTCs). Table 1 reports the distribution of jobs and temporarily rates by personal characteristics, introducing the temporary workers' profiles.[2] First, we note that the

[1] See Subsection 4.1 for more information about the survey.

[2] Both Table 1 and Table 2 have been obtained using the SHIW cross-sectional sampling

temporarily rate is decreasing with age: 17.1% of young employed workers (up to 30 years) are temporary workers and the temporarily rate decreases up to 5% for older workers. This illustrates the "flexibility at the margin", namely the deregulation of non-permanent contracts leaving the discipline of permanent work unchanged. The flexibility at the margin has generated a stronger spread of temporary contracts among the youngest and the new entrants into the labour market. Although the temporarily rate is higher for women, the gender gap is not so wide (10.1% for women and 8.2% for men). The percentage of temporary workers is especially high for low skill workers. This is elucidated by high temporarily rate for low educated workers (21.4% for none or elementary), for employees in small firms (16.7%) or in industries which are not tipycally characterized by high technological levels (27.6% for agricolture, 20.2% for building and construction, and 13.7% for domestic services), and for blue collars (12.5% against 6.5% and 2.8% for white collars and managers, respectively). Finally, temporary employment is unequally spread across geographical areas. The most dynamic and developed regions register the highest portions of permanent workers, while the depressed areas of the South of Italy displays higher temporarily rates (15.4% for the South and 15.7% for the Islands).

Table 2 shows the average net hourly wages and the relative wage differentials for permanent and temporary workers disaggregated for different personal and job features. The average wage gap between permanent and fixed term workers is 18.9% (19.5% for men and 17.8% for women). We can also note that the largest gaps are for the oldest workers and for blue collars. A wage penalty for FTCs is always registered, except for people working in firms with more than 500 employees and in small firms (5–19 employees).

3 Review on Temporary Employment

The literature focusing on the impact of fixed term contracts on several aspects of the labour market is increasing. One line of research has tried to understand the effect of the extensive use of temporary contracts on labour market performance. As a matter of fact, some authors (Blanchard and Landier (2002), Cahuc and Postel-Vinay (2002)) argue that the effects of the introduction of fixed term contracts may be perverse, leading to higher turnover and lower welfare. The excess turnover induced by the coexistence of temporary and regular contracts can be sufficient to offset the efficiency gains of improved flexibility; the higher job destruction and job creation is seen as a potential source of unemployment.

weights given at household level.

Table 1: *Distribution of Jobs and Temporarily Rates by Personal and Job Characteristics in Italy, 2002.*

	Distribution		Temporarily		Distribution		Temporarily
	Temporary	Permament	rate‡		Temporary	Permament	rate‡
			9.00				
	Gender				*Area*		
Men	54.02	59.54	8.23	North-East	21.64	30.8	6.50
Women	45.98	40.46	10.10	North-West	18.35	23.26	7.23
	Education			Centre	13.76	21.08	6.06
None or Elementary	19.80	7.17	21.44	South	29.7	16.11	15.42
Middle school	31.51	33.61	8.48	Islands	16.54	8.75	15.74
Professional school	7.66	9.49	7.40				
High school	29.68	37.37	7.28	*Occupation*			
University degree or more	11.35	12.36	8.33	Blue collar	64.29	44.33	12.54
	Age			White collar	33.29	47.41	6.49
Up to 30 years	40.73	19.52	17.10	Manager	2.42	8.26	2.81
From 31 to 40	29.62	31.92	8.40				
From 41 to 50	20.2	32.33	5.82	*Industry*			
From 51 to 65	9.44	16.23	5.44	Agricolture	16.02	4.15	27.60
	Firm size			Industry & Mining	22.42	30.21	6.84
Up to 4	18.97	9.39	16.65	Building & Construction	13.22	5.16	20.20
From 5 to 19	30.08	19.4	13.29	Wholesale & Retail trade	9.51	9.73	8.81
From 20 to 49	13.45	13.13	9.19	Transport & Communication	3.69	4.36	7.72
From 50 to 99	9.16	9.22	8.94	Credit & Insurance	1.54	3.83	3.82
From 100 to 499	7.19	10.34	6.43	Business services	4.68	3.66	11.22
500 or more	3.74	10.44	3.42	Domestic services	8.36	5.2	13.70
Public Sector	17.42	28.07	5.78	Public administration	20.58	33.69	5.70

Source: SHIW - Bank of Italy, 2002.

Notes:‡The temporarily rate is computed as the ratio of the number of temporary workers to the number of employed workers. Data are percentages of total employment.

Table 2: *Average Net Hourly Wage by Contract Type and Personal Characteristics in Italy, 2002.*

	€		Wage
	Permanent	Temporary	differential (%)
Total	8.75	7.10	-18.9
Gender			
Men	8.90	7.16	-19.5
Women	8.54	7.02	-17.8
Education			
None or Elementary	7.15	6.17	-13.7
Middle school	7.46	7.25	-2.9
Professional school	8.00	6.03	-24.7
High school	9.02	6.22	-31.1
University degree or more	12.95	11.31	-12.7
Age			
Up to 30 years	6.50	6.29	-3.2
From 31 to 40	8.60	7.29	-15.3
From 41 to 50	9.28	8.05	-13.3
From 51 to 65	10.70	7.94	-25.8
Firm size			
Up to 4	6.50	5.11	-21.4
From 5 to 19	7.31	7.43	+1.6
From 20 to 49	7.59	6.87	-9.5
From 50 to 99	7.90	6.56	-17.0
From 100 to 499	9.22	6.53	-29.2
500 or more	10.82	11.69	+8.1
Public Sector	10.38	8.39	-19.2
Occupation			
Blue collar	7.12	6.22	-12.6
White collar	9.35	8.36	-10.6
Manager	14.06	13.01	-7.5
Industry			
Agricolture	7.30	6.25	-14.4
Industry & Mining	8.03	7.13	-11.2
Building & Construction	7.32	6.10	-16.7
Wholesale & Retail Trade	7.27	5.84	-19.7
Transport & Communication	8.56	7.23	-15.5
Credit & Insurance	11.48	13.16	+14.7
Business services	8.79	6.27	-28.7
Domestic services	6.41	5.69	-11.3
Public administration	10.29	9.22	-10.4

Source: SHIW - Bank of Italy, 2002.

Dolado *et al.* (2002) provide a discussion of these effects for the Spanish case. They affirm that the most evident effects of the rise of fixed term contracts are higher job turnover rates and lower unemployment duration for those workers holding fixed term contracts. As for the unemployment rate, the evidence is more mixed. Nevertheless, there have been some negative consequences stemming from the existence of a dual market: lower investment in human capital, higher wage pressure, unequal distribution of unemployment duration, lower labour mobility and fertility rates, and larger wage dispersion.

Another line of research has expressed concern about the quality of fixed term contracts. The working conditions of temporary workers are worse than the permanent workers' ones: physical constraints, noise, repetitive work, monotonous work and less opportunity to acquire new skills (Letourneux, 1998). Guadalupe (2003) finds a difference of 5 percentage points in accident probabilities. This gap might be explained by different investment in human capital and different effort levels. Analysing the behavior of temporary versus permanent workers, Engellandt and Riphahn (2003) show that temporary workers provide significantly more effort, in particular those in positions with potential for "upward mobility".

Apart from the lower job quality, fixed term contracts may be also associated with lower wages. The literature dealing with the wage differentials between temporary and permanent workers is based on different approaches. The following subsections present the main theoretical frameworks explaining wage differentials for temporary workers (Subsection 3.1) and the results from empirical studies (Subsection 3.2).

3.1 Theoretical Explanations for Wage Differentials between Temporary and Permanent Jobs

According to the theory of compensating differentials, introduced by Adam Smith in the first ten chapters of Book I of the *Wealth of Nations* and recently formalized by Rosen (1974), in a competitive labour market with mobility between jobs and perfect information, we should observe a wage premium for temporary workers. Indeed, temporary jobs seem to be linked to bad working conditions, in particular to higher probability of unemployment, thus the employee accepts a temporary contract if higher wages compensating for the job insecurity are received.

However, the theory of compensating differentials has not been of great value in explaining wage variation and, until now, only wage penalties have been found for temporary jobs. As a matter of fact, there are a number of

reasons for negative effects on temporary workers' wage:

- In the dual labour market framework characterized by perfect substitution between temporary and permanent workers, difficulties in monitoring the workers, and uncertainty about product demand, Rebitzer and Taylor (1991) show that the optimal strategy for the firm may consist in hiring both permanent and temporary, with a lower wage for fixed term workers.

- Fixed term contracts can be viewed as a probationary period and a sorting mechanism for firms. In this context Loh (1994) developed a model showing that the firm can attract workers characterized by higher levels of ability by paying a low wage during the probationary period, but promising higher wages in the future.

- In the insider-outsider wage bargaining framework, Bentolila and Dolado (1994) suggest that if unions are dominated by permanent workers (the insiders) then the presence of fixed term workers (the outsiders) increases the permanent workers' bargaining power. Therefore, the unions can ask for higher wages, without affecting the survival probability of permanent workers because temporary workers are the first ones to be laid off.

3.2 Empirical Evidence

If we look at the empirical evidence on wage differentials between temporary and permanent workers, we realize that so far only negative effects on wages have been found for temporary contracts; the theory of compensating differentials is not of great value in explaining wage differentials. In recent years, several empirical studies for different European countries have been conducted on this topic. But so far, there does not exist any Italian empirical study investigating wage effects of fixed term contracts.

In Table 3 we collect the main empirical findings on wage differentials between temporary and permanent workers. We can note that fixed term workers always suffer a significant wage penalty. Only Hagen (2002), applying matching estimators, and McGinnity and Mertens (2002), with an instrumental variables technique in a fixed effect model, found a wage penalty for permanent workers not significantly different from zero.

Half of the empirical evidence presented in Table 3 derives from panel data models and often the results are obtained performing a pooled ordinary least squares (POLS) estimate. Blanchard and Landier (2001) and Booth *et al.* (2002a and 2002b) get very similar results: the French fixed term workers

have a wage penalty of 20%, while British temporary workers around 17%. With a POLS method, the consistency of the estimator of the coeffcient associated to the dummy variable for contract type hinges on the independency of the time-invariant unobserved effects on the explanatory variables. Thus, ability, which is unobserved and time-invariant, must be incorrelated with contract choice and other explanatory variables. Therefore, some doubts on the consistency of the POLS estimator of the parameter associated to the dummy variable for contract type arise. This suspicion is confirmed by the results obtained by Booth *et al.* (2002a) when they apply a fixed effect (FE) estimator instead of the POLS estimator. The wage penalty for British fixed term workers reduces in modulus: from -17% to -7% for male temporary workers and from -14% to -11% for female temporary workers.

If we are in cross-section we lose the possibility to take into account, in a very simple way, unobserved individual effects. Hagen (2002) tried to overcome the problem proposing two different approaches: (i) Heckman's (1978) dummy endogenous variable model, getting a wage penalty for temporary workers equal to -26.7%; (ii) several matching estimators, obtaining a wage penalty around -8% (but not significant). Hagen (2002) controlled also for potential participating selection bias, but he did it assuming predeterminess of the dummy variable for contract type. A procedure to test the presence of sample selection bias taking into account the endogeneity of the dummy variable for contract type will be proposed and applied in Subsection 4.5.

4 Empirical Analysis

4.1 Data and Sample

The descriptive analysis in Section 2 and the estimates carried out in this Section are based on the 2002 wave of the Survey of Italian Households' Income and Wealth (SHIW). The SHIW is a nationally representative survey conducted by the Bank of Italy every two years since 1989 and covering 8,011 Italian households, composed of 22,148 individuals and 13,536 income-earners.[3] It provides information about the contract type (temporary versus permanent) since 2000, the average monthly wage and the average working hours.

The 2002 wave of the SHIW covers 7,459 employed workers, 5,817 employees and 1,642 self-employed workers. Since the self-employed workers are deemed to be structurally different from employees, they are removed

[3]The Survey and further details are available on the Web-server of the Bank of Italy (http://www.bancaditalia.it/statistiche/consultazione).

Table 3: *Wage Penalties for Temporary Workers.*

Author	Data	Estim.	Wage penalty %		
			Total	Male	Female
Jimeno & Toharia (93)	Spain (INE)	OLS	-9/-11		
Segal & Sullivan (98)	USA	FE	-15/-20		
Blanchard & Landier (01)	France	POLS	-20.0		
Brown & Session (01)	Britain (BSAS)	OLS	-14.0		
Gustafsson *et al.* (01)	Britain (BHPS)	OLS	-11.7	-17.8	-6.4
Gustafsson *et al.* (01)	Netherlands	OLS	-17.7	-20.0	-13.2
Gustafsson *et al.* (01)	Sweden	OLS	-8.3	-10.6	-7.3
Booth *et al.* (02a)	Britain (BHPS)	POLS		-17.0	-14.0
Booth *et al.* (02a)	Britain (BHPS)	FE		-7.0	-11.0
Booth *et al.* (02b)	Britain (BHPS)	POLS		-14.7	-7.6
Booth *et al.* (02b)	Britain (RES)	POLS		-16.0	-17.4
Booth *et al.* (02b)	Britain (AUT)	POLS		-23.5	-17.0
Hagen (02)	West Germany	DEVM	-26.7		
Hagen (02)	West Germany	Match	-7.8†		
McGinnity & Mertens (02)	West Germany	FE		-6.2	-4.3
McGinnity & Mertens (02)	East Germay	FE		-5.7	-1.8
McGinnity & Mertens (02)	West Germany	IV & FE		-5.2†	-10.3†
McGinnity & Mertens (02)	East Germay	IV & FE		-2.4†	-2.4†

Notes: †Statistically non significant at the 10% level.
OLS=Ordinary Least Squares Estimator; POLS=Pooled Ordinary Squares Estimator; FE=Fixed Effect Estimator; IV & FE=Fixed Effect & Instrumental Variables Estimator; DEVM=Heckman's Dummy Endogenous Variable Model Estimator; Match=Matching Estimator.

from the sample. We excluded observations lying in the first and in the last percentiles of the wage and weekly working hours distributions, respectively. Thus, our sample is made up of individuals with an average hourly wage between 2.26€ and 130€, and weekly working hours between 5 and 59. We limited the sample to those of working age between 15 and 65 years. Finally, we excluded observations with missing values for some of the variables, ending up with a sample of 5,546 dependent workers.[4]

In Subsection 4.5 the sample of 5,546 dependent workers has been expanded to the whole labour force and active population of working age in the range 15–65.[5] Excluding again observations with missing values for some of the variables explaining the participation to the labour market, we ended up with a sample of 8,983 individuals.

The variable of primary interest is the type of contract, C_i: it is a dummy variable equal to 0 if the individual is a permanent worker and equal to 1 if the individual is a fixed term worker or a worker for a temporary work agency.[6] The dependent variable is the natural logarithm of the average net hourly wage, $\ln(wage)$, computed using information provided by the SHIW on the average net monthly wage and the average working hours.[7]

[4]See the Appendix, Table 10, for descriptive statistics of the variables used in the econometric analysis.

[5]We added to dependent workers people declaring to be not employed for one of the following reasons: first-job seeker, unemployed, homemaker, and well-off.

[6]More precisely, the dummy variable C_i has been built using question 1, section "CONTRATT" of the annex B1 (information on the activity of employees) of the questionnaire of the SHIW. The question requires to indicate your contract choosing between permanent, fixed term, and worker for temporary job agency. Thus, the dummy variable for contract type is equal to 0 when the employee answers to be a permanent worker ,it is equal to 1 if (s)he replies to belong to the last two categories.

[7]The dependent variable $\ln(wage)$ has been computed using question 1 sections "TUTTANNO" or "MESILAV", question 3, and question 7 of the annex B1 of the questionnaire of the SHIW. In question 1 section "TUTTANNO" employees are asked to specify whether they have worked for all the year long (12 months) or not. If not, they are asked to specify how many months they have worked in question 1 section "MESILAV". In question 3 employees are asked to report the average of the weekly working hours including overtime, considering the activity she is performing. In question 7 they are asked to display the total earned income for the activity that has been performed in 2002 summing the average monthly net earnings (including overtime) times the number of months worked, the additionally monthly salary ("13th month" salary, "14th month"salary, etc...), bonuses or special emoluments, and other compensation (productivity bonuses, commissions, etc...). Fringe benefits are excluded and the total earned income reported in question 7 is net of taxes and social security contributions. With this information we computed the natural logarithm of the average net hourly wage applying the following formula:

$$\ln(wage_i) = \ln\Big(\frac{\text{total earned income}}{\#\text{ of months} \cdot \text{average weekly hours} \cdot 4}\Big).$$

4.2 The OLS Estimate of the Wage Differential

The first step of our empirical analysis is an OLS regression ot the wage equation. The wage equation is a standard Mincer equation augmented by a dummy variable for the contract type and further explanatory variables:

$$\ln(wage_i) = \mathbf{w}_i\boldsymbol{\delta} + C_i\gamma + u_i \tag{1}$$

where $\ln(wage_i)$ is the natural log of average net hourly wage, C_i is the dummy variable for contract type and $\mathbf{w}_i$ is a $(K-1)$-dimensional vector containing $K-1$ control variables: the constant, age, labour market experience, job tenure (and their quadratic form), and dummy variables for education, geographical area, firm size, occupation, industry, gender and household position.

The estimated results are presented in the first column of Table 4. The robust variance matrix estimator has been computed since heteroskedasticity has been detected. The OLS estimate of the coefficient associated to the contract type is equal to -0.0314: the wage penalty for temporary workers is around 3%, but not significantly different from zero. This is an unexpected result compared to the ones arising for European countries: such a wage penalty is much lower than those estimated for other countries (see Table 3). But the RESET test indicates some misspecification, most likely omitted variables.[8]

Indeed, the OLS results may be biased due to the endogeneity of contract type, but also due to the sample selection bias (Heckman, 1979). Those who end up in temporary jobs might not be a random draw from the population. This means that there could be unobserved individual characteristics affecting simultaneously wages and acceptance of fixed term contracts. The self-selection into fixed term contracts is faced with two different techniques. The first method (Subsection 4.3.1) is the usual IVs technique and the consistency of the IV estimator hinges on the orthogonality between instruments and the error term of the wage equation. The second method (Subsection 4.3.2) was proposed by Heckman (1978) and, under further assumptions, generates consistent and efficient estimates of our parameters.

The second possible source of inconsistency may occur because wages are observed only for those individuals who participate to the labour market accepting the wage offer. If the error term of the labour market participation

[8]The Ramsey's (1969) specification of the RESET test has been computed. Ramsey suggests regressing $\hat{u}_i$ on $\hat{y}_i$, $\hat{y}_i^2$, $\hat{y}_i^3$, and $\hat{y}_i^4$ and doing a standard F test. Thus, we got $\mathcal{F}_{3,5509} = 3.11$ with p-value$= 0.0252$, meaning that we reject the null hypothesis of correct specification.

equation is correlated with the error term of the wage equation, selectivity bias into the workforce rises and the observed sample does not represent the underlying population. Namely, the estimated coefficients of the equation may be biased, even though the endogeneity of contract type has been addressed. In Section 4.5 we will deal with this issue, testing for the presence of sample selection bias taking into account the potential endogeneity of the dummy variable for contract type.

4.3 The Endogeneity of FTC

The orthogonality condition between explanatory variables and the error term, necessary for the consistency of the OLS estimator, is not credible if we believe that there are some unobserved variables affecting wages and contract choice. The limit in probability of the OLS estimator for the coefficient associated to the contract type can be written as

$$\text{plim } \hat{\gamma} = \gamma + \theta\pi_K = \gamma + \theta\frac{\text{Cov}(C_i, q_i)}{\text{Var}(C_i)},$$

where θ is the coefficient associated to worker's unobservables (like ability). It is plausible to suppose a positive relationship between wage and ability, so that $\theta > 0$. According to the Loh's (1994) model, more able workers are more likely to accept a fixed term contract, since their probability of being fired at the end of the agreed period is lower than less able workers' one. The dummy variable for contract type is equal to 1 for temporary workers and 0 for permanent workers. Thus, according to Loh's (1994) model the covariance between C_i and q_i should be positive. This could justify the low and not significant OLS wage penalty for Italian temporary workers. In other words, if we did not take into account the potential endogeneity of the contract type, we could underestimate the wage penalty.

In the following two Subsections we will provide the empirical results deriving from the IVs and the Heckman's (1978) dummy endogenous variable model estimators of the wage equation, allowing the dummy variable for contract type to be correlated with the error term.

4.3.1 Instrumental Variables Estimators

The estimation results from IV estimator and efficient GMM for different vectors of instruments are depicted in Table 4 (column 2, 3, and 4). The three specifications differ on the instruments used to perform the instrumental variables estimate. In the last specification (column 4) we have used the following three dummy variables as instruments:

- "Searching", which is equal to 1 if the employee is looking for another job, 0 otherwise.[9]

- "Sick", which is equal to 1 if there were any days in which the employee has took sick (apart from maternity leave), while it is equal to 0 if the employee has never took sick.[10]

- "Contributions", which is equal to 0 if the employee has never paid pension contributions, while it is equal to 1 if the worker has paid pension contributions at least for a short period.[11]

The consistency of the instrumental variables estimator hinges on the correlation between the instruments and the dummy variable for contract type and on the predeterminess of the instruments. The dummy variable "Searching" is supposed to be positively correlated to the dummy variable for contract type. Indeed, since temporary workers have a higher probability to be laid off at the end of the agreed period, they should have a higher incentive to search for another job. The first stage of the 2SLS estimate confirms that on-the-job searching and FTCs are positively correlated: the estimated coefficient is positive and significantly different from zero.[12]

The dummy variable "Sick" is supposed to be negatively correlated to the dummy variable for contract type. If we consider FTCs as probationary period, the renewal of the contract depends on the performance of the worker. Therefore, a temporary worker will avoid to stay at home in case of sickness in order to demonstrate her ability and effort level to the employer. Thus, we should observe a negative relationship between contract type and sick leave. The empirical evidence supports this idea and the estimated coefficient from the first stage of the 2SLS estimate is negative and significantly different from zero.

Finally, the motivation for having chosen the dummy variable "Contributions" as instrument lies on the fact that in Italy a dependent worker is forced to pay pension contributions to the national pension institute. Indeed,

[9]The dummy variable "Searching" has been built using question B04 of the questionnaire of the SHIW. Members of the household report whether they have looked for a job in the interview year.

[10]The dummy variable "Sick" has been built exploiting question B14 of the questionnaire. Individuals are asked whether there were some days in which they took sick leave, apart from maternity leave, during 2002.

[11]The dummy variable "Contributions" has been constructed using question B08 of the questionnaire: "Considering the lifetime work experience, did he/she ever pay, or his/her employer pay, pension contributions, even for a short period (and even if long ago)?".

[12]The first stages of the 2SLS estimate are available from the author but not reported for sake of brevity.

dependent workers receive a net wage and the employers have to remit to the pension institute, in place of the workers, the difference between the gross and the net wage. Therefore, a worker that has never paid pension contributions might be an illegal worker and the dummy variable could capture the black economy in the labour market and disadvantaged realities, where the FTCs could more easily spread out.[13] According to that, we should observe a positive correlation between the dummy variable for contract type and the one for pension contributions. The estimated coefficient associated to "Contributions" is, indeed, positive and significant.

The test (F test) for excluded instruments as suggested by Staiger and Stock (1997) is reported in Table 4, showing no sign of joint instrument weakness. Hence, the first requirement for valid instruments is satisfied.

More problematic is the orthogonality condition, since it is not possible to test it. The consistency of our estimates relies on the absence of a direct impact of the instruments on the hourly wage. Thus, doubts on "Contributions" rise: indeed, if it is able to capture the black economy in the labour market, one could argue that, since both the employer and the employee do not have to pay any pension contribution or labour tax and the wage cost is lower for the employer, the wage offer could be higher. Therefore, column 3 of Table 4 reports the efficient GMM estimates using only "Searching" and "Sick" as instruments.

In column 2 of Table 4 the IV estimates are reported, as we use only the dummy variable "Searching" as valid instrument.[14] Indeed, we could not be confident on the orthogonality of the dummy variable "Sick" to the error term of the wage equation. Even if there are no direct costs related to the sick leave for the worker,[15] one could argue that the possibility of sick leave for permanent workers without any risk of being laid off could be considered as non-monetary remuneration, which is taken into account by the worker when a wage offer has been received. Furthermore, in order to provide incentives to employees not to exploit the national sick leave system employers often provide premiums to workers who have never taken sick leaves during the working year. Since the dependent variable contains also bonuses and special emoluments, the instrument "Sick" is likely to have a direct impact on the average net hourly wage of the dependent workers.

Thus, the estimated results depicted in column 2 of Table 4 seem to be the more confident and reliable. Indeed, the on-the-job searching should not

[13] As a matter of fact, FTCs are more widespread in the South of Italy (see Table 1), where the black economy in the labour market is a plague.

[14] Since we have only one excluded instrument and one endogenous variable we fall into the just identified case, and every GMM estimator reduces to the IV estimator.

[15] The national medical assistance completely refund sick leaves.

Table 4: *Wage Differentials for FTCs, OLS (column 1), IV (column 2), and Efficient GMM (columns 3 and 4) Estimates with Robust Standard Errors.*

	OLS		**IV**		**Effic. GMM**		**Effic. GMM**	
	(1)		**(2)**		**(3)**		**(4)**	
Ln(Wage)	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.	Coeff.	*t*-stat.
FTC	**-0.031**	**-1.44**	**-0.200**	**-2.22**	**-0.204**	**-2.17**	**-0.196**	**-2.45**
Age	0.004	0.70	0.004	0.90	0.004	0.77	0.004	0.77
Age^2	0.000	0.31	0.000	0.24	0.000	0.22	0.000	0.21
Experience	0.013	4.41	0.012	4.34	0.012	3.97	0.012	4.00
Experience^2	-0.030	-5.14	-0.028	-4.94	-0.028	-4.68	-0.028	-4.70
Tenure	0.007	3.80	0.005	2.63	0.005	2.64	0.005	2.74
Tenure^2	-0.008	-1.68	-0.005	-0.94	-0.005	-0.93	-0.005	-0.98
Education - Reference: None or Elementary								
Middle school	0.049	2.48	0.042	2.16	0.042	2.04	0.043	2.12
Profes. school	0.088	3.63	0.080	3.25	0.080	3.20	0.080	3.30
High school	0.113	5.11	0.105	4.70	0.105	4.59	0.105	4.71
University or +	0.360	12.43	0.355	13.42	0.355	12.19	0.356	12.32
Area - Reference: North-East								
North-West	-0.010	-0.77	-0.010	-0.79	-0.011	-0.85	-0.011	-0.85
Centre	-0.054	-4.48	-0.053	-3.95	-0.053	-4.42	-0.053	-4.42
South	-0.095	-6.05	-0.085	-5.40	-0.085	-5.08	-0.085	-5.22
Islands	-0.022	-1.12	-0.008	-0.41	-0.007	-0.36	-0.008	-0.38
Firm size - Reference: Up to 4								
From 5 to 19	0.071	3.91	0.070	3.90	0.070	3.85	0.070	3.88
From 20 to 49	0.087	4.52	0.083	4.12	0.083	4.24	0.083	4.30
From 50 to 99	0.095	4.59	0.092	4.14	0.092	4.41	0.093	4.44
From 100 to 499	0.177	8.19	0.176	8.00	0.176	8.11	0.177	8.14
500 or more	0.231	9.77	0.227	10.18	0.227	9.54	0.227	9.60
Public Sector	0.192	7.73	0.187	7.97	0.187	7.40	0.187	7.44
Occupation - Reference: Blue collar								
White collar	0.114	9.02	0.106	7.35	0.106	7.84	0.106	8.05
Manager	0.308	12.15	0.300	13.25	0.300	11.76	0.300	11.67
Female	-0.074	-7.02	-0.069	-6.29	-0.069	-6.27	-0.069	-6.41
Head of Househ.	0.039	3.70	0.037	3.47	0.037	3.50	0.037	3.51
Constant	1.354	13.02	1.422	14.79	1.424	12.91	1.420	13.22
Sample size		5,546		5,546		5,546		5,546
R_c^2		0.38		0.37		0.37		0.37
	stat.	*p*-val.	stat.	*p*-val.	stat.	*p*-val.	stat.	*p*-val.
F-test for excl. instruments	-	-	77.99	0.00	42.89	0.00	44.77	0.00
Hansen J stat.	-	-	-	-	0.03	0.85	0.06	0.97
Hausman test	-	-	1.81	0.07	1.89	0.06	2.13	0.03
White/Koenker heterosk. test	25.63	0.00	26.59	0.00	27.48	0.00	26.60	0.00

Source: SHIW - Bank of Italy, 2002.
Notes: 8 industry dummies are included in the wage equation but not reported.

have a direct impact on the contemporaneous wage. On the other hand we cannot test this hypothesis, and one could argue that there could be a direct effect of the on-the-searching on the wage. For instance, if the employee is looking for another job, the employer could offer a higher wage in order to persuade her not to resign. If this is the case, the orthogonality fails and the IV estimator is no longer consistent.

Before commenting the estimated results for wage differentials between temporary and permanent workers deriving from the GMM approach, let us introduce some remarks. The t statistics in Table 4 have been computed using the robust variance matrix estimators. Indeed, the two degrees of freedom heteroskedasticity test has been performed, detecting evidence of heteroskedastic residuals.[16]

Table 4 reports the Hausman test for endogeneity.[17] The results of the Hausman test depend on the chosen instruments. For the three specifications (columns 2, 3, and 4), it detects a significant difference between OLS and GMM estimates,[18] meaning that the endogeneity suspicion of the dummy variable for contract type is well-founded. Finally, the Hansen-Sargan overidentification test allows us not to reject the null hypothesis of instrument validity confidently.

We have seen the reason why the results depicted in column 2 of Table 4 are supposed to be more confident and reliable. Using only "Searching" as instrument we get a significant and negative coefficient for the contract type. This means that there is a significant and negative wage differential for temporary workers in Italy. The estimated coefficient is equal to -0.20, so the main finding is that FTCs reduce the average net hourly wage by about 18.1%.[19] Another important finding is that the IV estimate of the wage penalty is higher than the one deriving from the OLS estimate. Therefore, if we do not take into account the endogeneity of the dummy variable for contract type, we underestimate the wage penalty for temporary workers. This may be interpreted as a positive correlation between unobservables (like

[16] The two degrees of freedom heteroskedasticity test is a regression-based test. We regressed the squared 2SLS residuals, say $\hat{u}^2_{2SLS}$, on 1, $\hat{\mathbf{x}}_i\hat{\boldsymbol{\beta}}$ and $(\hat{\mathbf{x}}_i\hat{\boldsymbol{\beta}})^2$, where the $\hat{\mathbf{x}}_i$ are the fitted values from regressing $\mathbf{x}_i$ on $\mathbf{z}_i$. NR^2_c of the auxiliary regression has a limiting χ^2_2 distribution under the null hypothesis of homoskedasticity. For each specification we get a p-value of 0.0000, meaning that we reject the null hypothesis of homoskedasticity.

[17] We have performed the Hausman regression-based test for endogeneity; it consists on two steps: (i) regress C_i on $\mathbf{w}_i$ and $\mathbf{z}_i$ and compute the OLS residuals, say $\hat{\omega}_i$; (ii) regress y_i on the exogenous regressors $\mathbf{w}_i$, on the endogenous variable C_i and on the OLS residuals $\hat{\omega}_i$. The t-statistic associated to $\hat{\omega}_i$ is the Hausman regression-based test for endogeneity.

[18] The difference between the OLS and the GMM estimates is significant at the usual 5% level for specification 4, while at the 10% level for specifications 2 and 3.

[19] $-18.127 = [\exp(-0.2) - 1] \cdot 100$

ability) and probability of holding a fixed term contract. This result is in line with the prediction of the Loh's (1994) model, according to which more able workers choose jobs with probationary periods and lower wages, since they anticipate that the contract will be renewed getting high-paid permanent jobs afterwards.

4.3.2 Dummy Endogenous Variable Model Estimators

We have already seen that, when selection into the type of contract is non-random, the OLS estimate of the casual effect of the contract type is inconsistent because of the correlation between C_i and u_i. The decision to accept a fixed term job offer can be described in terms of an index model. That is, the model becomes

$$\begin{aligned} y_i &= \mathbf{w_i}\boldsymbol{\delta} + C_i\gamma + u_i && (2)\\ C_i^* &= \mathbf{z_i}\boldsymbol{\alpha} + v_i && (3)\\ C_i &= \mathbf{1}[\mathbf{z_i}\boldsymbol{\alpha} + v_i > 0], && (4) \end{aligned}$$

where C_i^* is an unobserved continuous variable of the net benefits of being a temporary worker, and $[\mathbf{w_i}\ \mathbf{C_i}]$ and $\mathbf{z_i}$ are, respectively, $1 \times K$ and $1 \times L$ row vectors of variables. C_i^* is a function of observed variables $\mathbf{z_i}$. The vector $\mathbf{z_i}$ may contain all of the variables in $\mathbf{w_i}$ ($\mathbf{w_i} \subseteq \mathbf{z_i}$).[20] This model is commonly called the *dummy endogenous variable* (DEV) model (Heckman, 1978).

The basic assumptions of the model in order to get consistent and asymptotically efficient results are:

ASSUMPTION DEV.1: The unique and nonconstant elements of $\{y_i, \mathbf{w}_i, \mathbf{z}_i, C_i\}$ is i.i.d.

ASSUMPTION DEV.2: (u_i, v_i) is independent of $\mathbf{z_i}$.

ASSUMPTION DEV.3: u_i and v_i are bivariate normal random variables, that is

$$\begin{pmatrix} u_i \\ v_i \end{pmatrix} \sim N\left[\ \mathbf{0}, \begin{pmatrix} \sigma_u^2 & \rho\sigma_u \\ \rho\sigma_u & 1^{21} \end{pmatrix}\ \right], \qquad (5)$$

where ρ is the correlation between the disturbances.

[20] Suppose the extreme case $\mathbf{w_i} = \mathbf{z_i}$, i.e. there is no exogenous variable which determines the selection into fixed term contracts and which is excluded from the wage equation. Then, we can still perform the model we are going to present, but the identification would come only from distributional assumptions (non-linearity of the *hazard*).

Thus, the density function of the error term u_i and v_i is bivariate normal. Denote $h(u_i, v_i)$ the joint density of the disturbances. Since $C_i = 1$ if and only if $C_i^* > 0$ and $C_i = 0$ otherwise, the joint density of (y_i, C_i)[22] is given by

$$f(y_i, C_i) = \Big[\int_{-\mathbf{z_i}\boldsymbol{\alpha}}^{\infty} h(y_i - \mathbf{w_i}\boldsymbol{\delta} - C_i\gamma,\ v_i)dv_i \Big]^{C_i} \Big[\int_{\infty}^{-\mathbf{z_i}\boldsymbol{\alpha}} h(y_i - \mathbf{w_i}\boldsymbol{\delta} - C_i\gamma,\ v_i)dv_i \Big]^{1-C_i}. \tag{6}$$

Under Assumption DEV.1, the log-likelihood function for the dummy endogenous variable model is

$$\ell = \sum_{i=1}^{N} \ln f(y_i, C_i). \tag{7}$$

Under Assumptions DEV.1-DEV.3 the maximum likelihood estimators have desirable large sample properties: they are consistent and asymptotically efficient. Therefore, the dummy endogenous variable model motivated by Heckman (1978, 1979) is a full maximum likelihood estimator.

Under the assumptions of the model, the OLS estimator is inconsistent if ρ is different from 0. In order to show why, remember that C_i is the dummy variable for contract type which is equal to 1 if the worker has a fixed term contract. Then, the expected hourly wage of the temporary workers is given by

$$\begin{aligned} E(y_i \mid \mathbf{w_i}, C_i = 1) &= E(\mathbf{w_i}\boldsymbol{\delta} + C_i\gamma + u_i \mid \mathbf{w_i}, C_i = 1) \\ &= \mathbf{w_i}\boldsymbol{\delta} + \gamma + E(u_i \mid \mathbf{w_i}, C_i = 1) \\ &= \mathbf{w_i}\boldsymbol{\delta} + \gamma + E(u_i \mid C_i = 1) \quad \text{since } u_i \perp \mathbf{w_i} \\ &= \mathbf{w_i}\boldsymbol{\delta} + \gamma + E(u_i \mid C_i^* > 0) \\ &= \mathbf{w_i}\boldsymbol{\delta} + \gamma + E(u_i \mid v_i > -\mathbf{z_i}\boldsymbol{\alpha}). \end{aligned} \tag{8}$$

Hence, to derive the expected wage of the fixed term workers we have to compute $E(u_i \mid v_i > -\mathbf{z_i}\boldsymbol{\alpha})$; given Assumption DEV.3 and considering that $E(u_i|v_i) = E(u_i) + \rho\frac{\sigma_u}{\sigma_v}\big[v_i - E(v_i)\big]$ we obtain

[21] If C_i^* is multiplied by some constant $\eta \neq 0$, the latent variable model is not modified:

$$\begin{aligned} \eta C_i^* &= \eta \mathbf{z_i}\boldsymbol{\alpha} + \eta v_i \\ C_i^{**} &= \mathbf{z_i}\boldsymbol{\alpha}^* + v_i^* \end{aligned}$$

Hence, without loss of generality, we can normalize the model such that the variance of the error term is equal to one, $E(v_i^2) = \sigma_v^2 = 1$.

[22] See Heckman (1978), Appendix A, for details about the derivation of the density $f(y_i, C_i)$.

$$
\begin{aligned}
E(u_i|v_i > -\mathbf{z_i}\boldsymbol{\alpha}) &= E\Big[E(u_i|v_i)\big|v_i > -\mathbf{z_i}\boldsymbol{\alpha}\Big] \text{ by Law of Iterated Expectations} \\
&= E\Big\{E(u_i) + \rho\frac{\sigma_u}{\sigma_v}\big[v_i - E(v_i)\big] \mid v_i > -\mathbf{z_i}\boldsymbol{\alpha}\Big\} \\
&= \rho\sigma_u E(v_i \mid v_i > -\mathbf{z_i}\boldsymbol{\alpha}) \\
&= \rho\sigma_u\frac{\phi(\mathbf{z_i}\boldsymbol{\alpha})}{\Phi(\mathbf{z_i}\boldsymbol{\alpha})} \\
&= \rho\sigma_u\lambda(-\mathbf{z_i}\boldsymbol{\alpha}), \qquad (9)
\end{aligned}
$$

where $\lambda(\cdot)$ is the *hazard*,[23] ρ is the correlation between the disturbances, σ_u is the standard deviation of u_i, and $\phi(\cdot)$ and $\Phi(\cdot)$ are, respectively, the standard normal density and the standard normal cumulative distribution functions. Therefore, the expected wage for temporary workers is

$$
E(y_i \mid \mathbf{w_i}, C_i = 1) = \mathbf{w_i}\boldsymbol{\delta} + \gamma + \rho\sigma_u\frac{\phi(\mathbf{z_i}\boldsymbol{\alpha})}{\Phi(\mathbf{z_i}\boldsymbol{\alpha})}. \qquad (10)
$$

Using similar arguments, the expected wage for permanent workers is

$$
E(y_i \mid \mathbf{w_i}, C_i = 0) = \mathbf{w_i}\boldsymbol{\delta} - \rho\sigma_u\frac{\phi(\mathbf{z_i}\boldsymbol{\alpha})}{1 - \Phi(\mathbf{z_i}\boldsymbol{\alpha})}, \qquad (11)
$$

so that the difference in expected wage between temporary and permanent workers is

$$
E(y_i \mid \mathbf{w_i}, C_i = 1) - E(y_i \mid \mathbf{w_i}, C_i = 0) = \gamma + \rho\sigma_u\frac{\phi(\mathbf{z_i}\boldsymbol{\alpha})}{[1 - \Phi(\mathbf{z_i}\boldsymbol{\alpha})]\Phi(\mathbf{z_i}\boldsymbol{\alpha})}. \qquad (12)
$$

Equation (12) shows that if the correlation ρ between the two equations of the model is different from zero the OLS estimator does not converge to γ and the selection bias takes the form of an omitted variable specification error.

The Heckman's (1978) dummy endogenous variable model we have just described has been implemented and the estimation results of the wage equation for different specifications are reported in Table 5.[24] The identification

[23] $\lambda(\cdot) = \frac{\phi(\cdot)}{1-\Phi(\cdot)}$, thus $\lambda(-\mathbf{z_i}\boldsymbol{\alpha}) = \frac{\phi(-\mathbf{z_i}\boldsymbol{\alpha})}{1-\Phi(-\mathbf{z_i}\boldsymbol{\alpha})} = \frac{\phi(\mathbf{z_i}\boldsymbol{\alpha})}{1-[1-\Phi(\mathbf{z_i}\boldsymbol{\alpha})]} = \frac{\phi(\mathbf{z_i}\boldsymbol{\alpha})}{\Phi(\mathbf{z_i}\boldsymbol{\alpha})}$. The hazard function (or inverse Mills ratio) $\lambda(c)$ is convex and asymptotes to c as $c \to \infty$ and to zero as $c \to -\infty$.

[24] The selection equation estimation results are not reported for sake of brevity but they are available on demand.

of the model is obtained through distributional assumptions and through exogenous variables determining the selection into FTCs and excluded from the wage equation. Three different specifications are presented and they differ in the variables through which the identification is obtained. As in the GMM approach in column 4 "Searching", "Sick", and "Contributions" are supposed to be exogenous, in column 3 "Contributions" is eliminated, and in column 2 only "Searching" is used for the identification. Therefore, the application of this strategy does not avoid the problem of finding "valid instruments".

However, one advantage deriving from this procedure is that the identification can be obtained only through distributional assumptions. Intuitively, this is due to the non-linearity of the inverse Mills ratio. Thus, in the extreme case in which $\mathbf{w_i} = \mathbf{z_i}$, i.e. there is no exogenous variable which determines the selection into fixed term contracts and which is excluded from the wage equation, we can still perform the model even if we could have large standard errors. Table 6 reports the estimation results for the dummy endogenous variable model identified only through distributional assumptions.[25] The specifications of both the wage and the selection equation into FTCs are different from the ones presented up to now, since we have added several interactions between the control explanatory variables and further dummy variables for geographical areas. The aim was to avoid large standard errors better explaining the selection into FTCs. Indeed, the problem of large standard errors is less severe the better a selection model can discriminate between workers who has accepted the treatment (temporary workers) and the ones who has rejected it (permanent workers).

Looking at the main findings deriving from Table 5, we can note that FTCs reduce the average net hourly wage by about 7%, *ceteris paribus* and given the selection into FTCs. The estimated coefficients associated to the dummy variable for contract type are, in the three specifications, significantly different from zero. The likelihood-ratio tests, which reveal that at the 10% significance level the wage and the selection equation for FTCs are not independent, tell us that the estimated OLS wage differential may be biased. Indeed, $\hat{\rho} \neq 0$ means that the OLS estimator does not converge to the the parameter of interest, as shown by equation (12). An alternative endogeneity test, which is robust to the bivariate normality assumption, has been performed according to the Heckman's (1978) two-stage procedure: again, we find that the coefficient associated to the inverse Mills ratio is significantly different from zero, meaning that the estimated OLS wage differential may

[25]The selection equation estimation results of the dummy endogenous variable model identified only through distributional assumptions are not reported for sake of brevity but they are available on demand.

Table 5: *Wage Differentials for FTCs, Dummy Endogenous Variable Model – Maximum Likelihood Estimates.*

	(2)		(3)		(4)	
Ln(Wage)	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
FTC	**-0.068**	**-2.17**	**-0.067**	**-2.12**	**-0.074**	**-2.37**
Age	0.004	0.72	0.004	0.72	0.004	0.72
Age^2	0.000	0.29	0.000	0.29	0.000	0.29
Experience	0.012	4.35	0.012	4.35	0.012	4.34
Experience^2	-0.030	-5.08	-0.030	-5.08	-0.030	-5.06
Tenure	0.007	3.58	0.007	3.58	0.007	3.55
Tenure^2	-0.007	-1.52	-0.007	-1.53	-0.007	-1.50
Education - Reference: None or Elementary						
Middle school	0.048	2.40	0.048	2.40	0.048	2.39
Professional school	0.086	3.56	0.086	3.56	0.086	3.55
High school	0.111	5.05	0.111	5.05	0.111	5.04
University degree or more	0.359	12.44	0.359	12.44	0.359	12.44
Area - Reference: North-East						
North-West	-0.010	-0.78	-0.010	-0.78	-0.010	-0.78
Centre	-0.054	-4.48	-0.054	-4.48	-0.054	-4.48
South	-0.093	-5.91	-0.093	-5.91	-0.092	-5.89
Islands	-0.019	-0.97	-0.019	-0.98	-0.018	-0.94
Firm size - Reference: Up to 4						
From 5 to 19	0.071	3.92	0.071	3.92	0.071	3.91
From 20 to 49	0.086	4.49	0.086	4.49	0.086	4.48
From 50 to 99	0.094	4.57	0.095	4.57	0.094	4.57
From 100 to 499	0.177	8.21	0.177	8.21	0.177	8.21
500 or more	0.230	9.76	0.230	9.77	0.230	9.76
Public Sector	0.191	7.69	0.191	7.70	0.191	7.69
Occupation - Reference: Blue collar						
White collar	0.113	8.90	0.113	8.90	0.112	8.87
Manager	0.306	12.14	0.306	12.14	0.306	12.12
Female	-0.073	-6.90	-0.073	-6.90	-0.073	-6.89
Head of Household	0.038	3.68	0.038	3.68	0.038	3.67
Constant	1.369	13.19	1.441	13.83	1.444	13.87
$\hat{\rho}$ (SE)	0.059	0.035	0.058	0.035	0.035	0.003
$\hat{\sigma}_u$ (SE)	0.341	0.007	0.341	0.007	0.341	0.007
$\hat{\lambda}$ (SE)	0.020	0.012	0.020	0.012	0.024	0.012
Sample size		5,546		5,546		5,546
Wald $\chi^2_{33} =$	3085.3	0.000	3086.5	0.000	3093.2	0.000
LR test of independence of		p-value		p-value		p-value
the equations ($\hat{\rho} = 0$): $\chi^2_1 =$	2.83	0.092	2.70	0.100	4.13	0.042
Two step endogeneity test: $t =$	1.98	0.047	1.93	0.054	2.33	0.020

Source: SHIW - Bank of Italy, 2002.
Notes: 8 industry dummies are included in the wage equation but not reported.

Table 6: *Wage Differentials for FTCs, Dummy Endogenous Variable Model – Maximum Likelihood Estimates, Identification only through Distributional Assumptions.*

Ln(Wage)	Coefficient	Std. Err.	z-stat.	p-value
FTC	**-0.0784**	**0.0311**	**-2.52**	**0.0120**
Age	0.0175	0.0063	2.78	0.0050
Age^2	-0.0001	0.0001	-1.82	0.0680
Experience	0.0069	0.0040	1.70	0.0880
Experience^2	-0.0169	0.0069	-2.47	0.0140
Tenure	0.0017	0.0026	0.67	0.5000
Tenure^2	-0.0025	0.0050	-0.50	0.6170
Education - Reference: None or Elementary				
Middle school	0.0397	0.0562	0.71	0.4800
Professional school	0.0269	0.0612	0.44	0.6600
High school	0.0310	0.0575	0.54	0.5900
University degree or more	0.2651	0.0675	3.93	0.0000
Firm size - Reference: Up to 4				
From 5 to 19	0.0656	0.0179	3.67	0.0000
From 20 to 49	0.0835	0.0191	4.38	0.0000
From 50 to 99	0.0963	0.0206	4.67	0.0000
From 100 to 499	0.1798	0.0215	8.36	0.0000
500 or more	0.2240	0.0234	9.56	0.0000
Public Sector	0.1902	0.0247	7.71	0.0000
Occupation - Reference: Blue collar				
White collar	0.0950	0.0226	4.20	0.0000
Manager	0.2505	0.0618	4.06	0.0000
Female	-0.0532	0.0193	-2.76	0.0060
Head of Household	0.0391	0.0129	3.04	0.0020
Female × Head of Household	-0.0005	0.0210	-0.02	0.9810
Female × Experience	-0.0011	0.0009	-1.22	0.2210
Constant	1.2261	0.1233	9.94	0.0000
			95% Conf.	Interval
$\hat{\rho}$ (SE)	0.0724	0.0329	0.0077	0.1366
$\hat{\sigma}_u$ (SE)	0.3376	0.0067	0.3246	0.3510
$\hat{\lambda}$ (SE)	0.0245	0.0111	0.0027	0.0462
Sample size				5,546
Wald $\chi^2_{59} =$			3352.1	0.000
LR test of independence of the equations ($\hat{\rho} = 0$): $\chi^2_1 =$			4.81	0.028
Two step endogeneity test: $t =$			2.75	0.006

Source: SHIW - Bank of Italy, 2002.

Notes: 19 regional dummies, 8 industry dummies, and 11 interactions dummies between occupation and experience, education and experience, and education and tenure are included in the wage equation but not reported.

be biased.

The consistency of the previous estimator of the wage penalty hinges on the bivariate normality assumption (Assumption DEV.3) and on the independence of the disturbances of the wage and selection equations on the "instruments" (Assumption DEV.2). The estimation results reported in Table 6 do not lie on the exogeneity of the "instruments" used in the previous specifications of the dummy endogenous variable model. The estimated coefficient associated to the dummy variable for contract type is significant and equal to -0.0784; therefore FTCs reduce the hourly wage by about 7.5%.[26]

Another important finding, which is consistent with the estimation results previously obtained and with those ones obtained by Hagen (2002) for West Germany, is that the estimated correlation $\hat{\rho}$ between the error terms of the wage and selection equations is significant and positive. A reasonable interpretation of this result may be the following: unobservables (like ability) which positively affect wages also increase the probability of accepting a temporary job. As we have seen before, this result is in line with the prediction of the Loh's (1994) model, according to which more able workers choose jobs with probationary periods and lower wages since they anticipate that the contract will be renewed getting high-paid permanent jobs afterwards.

4.4 Comparison between Estimators

The main empirical findings reveal that in Italy temporary workers are worse paid than permanent ones. The estimation results and the magnitude of the wage penalties differ between methods. Table 7 summarizes the estimated coefficients for the dummy variable of contract type. The OLS method, which does not take into account the potential endogeneity of the variable for the contract choice, leads to a negative wage effect of about 3% but not significantly different from zero. Using IVs methods we get a significant and negative wage effect of about 20%, while performing a dummy endogenous variable model under distributional assumptions the wage penalty reduces to about 7%. The consistency of these estimators depends on the validity of the instruments used in the model specifications. The consistency of the dummy endogenous variable model estimator is based on distributional assumptions. If the bivariate normal distribution of the disturbances fails the maximum likelihood estimators are inconsistent. If the normality assumption holds we get consistent and asymptotically efficient estimators. The difference between the IVs estimators and the dummy endogenous variable estimators may be interpreted as a signal of the failure of the bivariate normalilty assumption.

[26] $-7.54 = [\exp(-0.0784) - 1] \cdot 100$

Nevertheless, the dummy endogenous variable model estimator can be computed relaxing the bivariate normality assumption and using the two-stage procedure as described by Heckman (1978, 1979). The two-stage estimators are consistent, more robust but less efficient than the maximum likelihood estimators. Consistency hinges only on the exogeneity of the variables excluded from the wage equation and included in the selection equation. Relaxing the normality requirement we find a wage penalty of about 15%, more similar to those ones from IVs methods. The estimation results for the variable of primary interest are shortly reported in Table 7 while the full set of estimation results are excluded for sake of brevity and available, on demand, from the author.

According to these considerations, the IVs estimator using the dummy variable "Searching" seems to be the more reliable and confident.

Performing a dummy endogenous variable model where the identification is obtained only through distributional assumptions we get a negative and significative wage effect associated to FTCs of about 7.5%. Relaxing again the normality requirement and performing the two-stage procedure, we get a wage penalty for temporary workers of about 21.6%.[27]

4.5 Sample Selection Bias Test

Another possible source of misspecification may occur because the wage is observed only for those individuals who participate to the labour market accepting the wage offer. If the error term of the labour market participation equation is correlated with the error term of the wage equation, selectivity bias into the workforce rises and the observed sample does not represent the underlying population. Namely, the estimated coefficients of the equation may be inconsistent, even though the endogeneity of contract type has been addressed.

The classical sample selection model can be formalized as follows:

$$
\begin{aligned}
y_i^* &= \mathbf{x_i}\boldsymbol{\beta} + u_i && (13)\\
d_i^* &= \mathbf{g_i}\boldsymbol{\xi} + \varepsilon_i && (14)\\
d_i &= \mathbf{1}[\mathbf{g_i}\boldsymbol{\xi} + \varepsilon_i > 0] && (15)\\
y_i &= y_i^* \cdot d_i, && (16)
\end{aligned}
$$

where y_i^* is the unobservable dependent variable with y_i as observed counterpart, d_i^* is an unobserved continuous variable of the net benefits of being

[27] $-21.651 = [\exp(-0.244) - 1] \cdot 100$

Table 7: *Summary of the Estimation Results (Standard errors in Parenthesis).*

Estimator		Specification **(2)**	Specification **(3)**	Specification **(4)**
OLS	-0.031[†]	-	-	-
	(0.02)			
Efficient GMM & IV	-	-0.196	-0.204	-0.200
		(0.08)	(0.09)	(0.09)
DEVM[§]–ML	-	-0.074	-0.067	-0.068
		(0.03)	(0.03)	(0.03)
DEVM[§]–2 Stage	-	-0.154	-0.144	-0.149
		(0.055)	(0.06)	(0.06)
DEVM[‡]–ML	-0.078	-	-	-
	(0.03)			
DEVM[‡]–2 Stage	-0.244	-	-	-
	(0.08)			

Source: SHIW - Bank of Italy, 2002.

Remarks: Specification **(2)**="Searching" as unique excluded instrument.
Specification **(3)**="Searching" and "Sick" as excluded instruments.
Specification **(4)**="Searching","Sick", and "Contributions" as excluded instruments.
OLS=Ordinary Least Squares Estimator; GMM=Generalized Method of Moments Estimator; IV Instrumental Variables Estimator; DEVM–ML=Dummy Endogenous Variable Model Maximum Likelihood Estimator; DEVM–2 Stage= Dummy Endogenous Variable Model 2 Stage Estimator.

Notes: [†]Statistically non significant at the 5% level.
[§]Identification through distributional assumptions and exogenous variables.
[‡]Identification only through distributional assumptions.

employed (or a measure of the individual's propensity for work), and $\mathbf{x_i}$ and $\mathbf{g_i}$ are respectively $1 \times K$ and $1 \times M$ row vectors of exogenous variables. The sample selection bias can be tested (and solved) applying the Heckit procedure: in the first step we have to estimate the participation equation and using the probit estimates $\hat{\boldsymbol{\xi}}$ we obtain the inverse Mills ratios $\hat{\lambda}_i \equiv \lambda(\mathbf{g_i}\hat{\boldsymbol{\xi}})$; in the second step we introduce the inverse Mills ratios $\hat{\lambda}_i$ in the wage equation as explanatory variable, and we compute the OLS estimators, which are consistent and $\sqrt{N}$-asymptotically normal. The t-statistic of the OLS estimator of the coefficient associated to the inverse Mills ratios is a very simple test of selection bias.

In our model one of the element of $\mathbf{x_i}$, the contract type C_i, is thought to be correlated with u_i. Therefore, the exogeneity requirement fails and we have to find another procedure in order to test the presence of selection bias. The model can be rewritten as

$$\begin{aligned} y_i &= \mathbf{w_i}\boldsymbol{\delta} + C_i\gamma + u_i && (17)\\ C_i &= \mathbf{z_i}\boldsymbol{\alpha} + v_i && (18)\\ d_i &= \mathbf{1}[\mathbf{g_i}\boldsymbol{\xi} + \varepsilon_i > 0]. && (19) \end{aligned}$$

The first equation is the wage equation, the second equation is a linear projection for the endogenous variable (contract type) and the third equation is the selection equation into employment. Assume that: (i) $(\mathbf{z_i}, d_i)$ is always observed, (y_i, C_i) is observed when $d_i = 1$; (ii) (u_i, ε_i) is independent of $\mathbf{z_i}$; (iii) $\varepsilon_i \sim N(0,1)$; (iv) $E(u_i|\varepsilon_i) = \theta\varepsilon_i$; and (v) $\mathbf{z_i}$ are valid instruments.

Assumption (i) identifies the incidental truncation problem; Assumptions (ii), (iii) and (iv) are identical to the corresponding assumptions for the two-step procedure in the Heckman dummy endogenous variable model (Subsection 4.3.2); Assumption (v) is necessary to perform an IV estimate. Under these assumptions we can consistently estimate the parameter vector and we can test the presence of sample selection performing the following two-step procedure:

Stage 1: Perform the probit model for the selection into employment and using the probit estimates $\hat{\boldsymbol{\xi}}$ compute the inverse Mills ratios $\hat{\lambda}_i \equiv \lambda(\mathbf{g_i}\hat{\boldsymbol{\xi}}) \equiv \frac{\phi(\mathbf{g_i}\hat{\boldsymbol{\xi}})}{\Phi(\mathbf{g_i}\hat{\boldsymbol{\xi}})}$.

Stage 2: Using the selected subsample estimate the equation

$$y_i = \mathbf{w_i}\boldsymbol{\delta} + C_i\gamma + \varphi\hat{\lambda}_i + error_i$$

by 2SLS, using instruments $(\mathbf{z_i}, \hat{\lambda}_i)$.

At this point, a very simple test of no-selection bias is available. No-selection bias means $\varphi = 0$, and the null hypothesis $H_0 : \varphi = 0$ can be easily tested using the 2SLS t-statistic for $\hat{\varphi}$.

Table 8 displays the probit estimation results for the selection into employment, through which the inverse Mills ratio has been computed. Table 9 reports the estimation results of the second stage of the procedure: the wage equation augmented by the inverse Mills ratio $\hat{\lambda}_i$ is estimated using an IVs technique. In this case the wage equation has been estimated using the dummy variable "Searching" as instrument, since it seems to be the most confident and reliable procedure.

The selection equation includes variables that may affect the reservation wage such as age, gender, education, presence of children in pre-scholar age (less than 6 years of age),[28] number of income earners in the household,[29] dummy for marital status and its interaction with gender. The variables related to age, gender, household position, marital status, education, and geographical area have the expected signs and are statistically different from zero.[30]

The dummy variable for the presence of children is supposed to capture the head of household and/or his/her spouse's (partner) supplied time to the labour market. As a matter of fact, childcare is likely to be a time-consuming activity affecting in different ways women and men's labour market supply. Thus, we introduced the interaction term between children's presence and gender. The joint significance test for the dummy variables for the presence of children, gender and their interactions terms rejects the null hypothesis of jointly being equal to zero.[31] We observe a different impact of the presence of children between male and female members of the household. Childcare related to the presence of pre-scholar children reduces the female supply time to the market, while the added income necessary in presence of children increases the likelihood that a male worker accepts a job offer. The problematic requirement is the uncorrelation between these dummy variables and the error term of the wage equation.

The number of income earners in the household might have a negative impact on the individual's labour supply, since we would expect a positive

[28] These dummy variable is equal to 1 if the individual is the head of the household or his/her spouse and if he/she has at least one child, 0 otherwise.

[29] Excluding the observed individual.

[30] The Wald statistics for exclusion restrictions of the dummy variables related to marital status, education, and geographical area are $\chi^2_4 = 398.48$ (p-value=0.0000), $\chi^2_4 = 455.61$ (p-value=0.0000), and $\chi^2_4 = 712.56$ (p-value=0.0000), respectively.

[31] The joint significance test for the coefficients associated to gender, presence of children in pre-scholar age, and their interaction term is $\chi^2_3 = 1121.00$ with p-value=0.0000.

relationship between the number of income earners in the household and the household level of income, and through this channel a negative correlation between the selection equation into employment and the number of income earners. As a matter of fact, the probit estimated coefficient associated to the number of income earners is negative and statistically significant at the 10% level.

Under the assumptions (i)–(v) the t-statistic associated to the inverse Mills ratio $\hat{\lambda}_i$ and presented in Table 9 provides a simple test of no-selection bias. Nevertheless, we must be confident about the independence of the variables we have included in the selection equation and excluded from the wage equation. In other words, the test is available if we believe that the excluded variables from the wage equation do not have a direct impact on the offered wage. The excluded variables must not be correlated to the error term of the wage equation and, at the same time, they must be able to explain the participation in the labour market. Thus, in order to get a consistent procedure to test the sample selection bias we have to assume that:

- Having a children does not directly affect the wage, meaning that there should not be any correlations between unobservables, like ability, and the probability of having at least one child. It seems plausible; nevertheless one could argue, for instance, that the productivity (and so the wage) of a worker decreases when he/she has children because of the effort exerted to provide childcare.

- The number of income earners in the household (excluding the observation) should not be correlated to unobservables, like ability, affecting wages.

Since we cannot reject the null hypothesis that the coefficient associated to the inverse Mills ratio is equal to zero (t-stat.$= -0.29$ with a p-value$=$ 0.774), we may conclude that the sample selection bias due to labour market participation is not an issue. The result of this test is in line with the Hagen's (2002) findings for West Germany.

5 Concluding Remarks

The main empirical results show that in Italy temporary workers are worse paid than permanent ones. The theory of compensating differentials again is not of great value in explaining wage differentials. The estimation results and the magnitude of the wage penalties differ between methods. The OLS method, which does not take into account the potential endogeneity of the

Table 8: *Labour Market Participation, Probit Estimate.*

Participation	Coefficient	Std. Err.	z-stat.	p-value
Age	0.1477	0.0104	14.24	0.0000
Age^2	-0.0018	0.0001	-14.60	0.0000
Head of Household	0.1730	0.0421	4.11	0.0000
Education - Reference: None or Elementary				
Middle school	0.4072	0.0514	7.92	0.0000
Professional school	0.8284	0.0763	10.86	0.0000
High school	0.9273	0.0540	17.17	0.0000
University degree or more	1.1519	0.0708	16.26	0.0000
Area - Reference: North-East				
North-West	0.0929	0.0522	1.78	0.0750
Centre	-0.1967	0.0495	-3.97	0.0000
South	-0.9768	0.0472	-20.68	0.0000
Islands	-0.8287	0.0539	-15.37	0.0000
Female	-1.8385	0.0609	-30.20	0.0000
Child (<6 years)	0.0431	0.1164	0.37	0.7110
Female $\times$ Child (<6 years)	-0.2130	0.1271	-1.68	0.0940
Marital Status - Reference: Married				
Single	-0.9868	0.0756	-13.05	0.0000
Ex-married	-0.6172	0.1669	-3.70	0.0000
Marital Status $\times$ *Gender* - Reference: Married $\times$ Female				
Single $\times$ Female	1.5678	0.0810	19.36	0.0000
Ex-married $\times$ Female	1.3531	0.1908	7.09	0.0000
# of income earners†	-0.0410	0.0212	-1.94	0.0530
Constant	-1.3868	0.2240	-6.19	0.0000
Sample size				8,983
Pseudo-R^2				0.3167
Log-likelihood				-4072.8
LR: $\chi^1_2 9 =$			3775.57	0.0000

Source: SHIW - Bank of Italy, 2002.
Notes: †Excluding the individual.

Table 9: *Testing Sample Selection Bias, IV Estimate*[†] *of the Wage Equation with Robust Standard Errors.*

Ln(Wage)	Coefficient	Rob.Std.Err.	z-stat.	p-value
FTC	-0.2003	0.0962	-2.08	0.0370
Age	0.0039	0.0060	0.65	0.5180
Age^2	0.0000	0.0001	0.31	0.7600
Experience	0.0117	0.0029	3.96	0.0000
Experience^2	-0.0285	0.0061	-4.70	0.0000
Tenure	0.0054	0.0021	2.64	0.0080
Tenure^2	-0.0049	0.0052	-0.95	0.3430
Education - Reference: None or Elementary				
Middle school	0.0407	0.0209	1.95	0.0510
Professional school	0.0769	0.0258	2.97	0.0030
High school	0.1016	0.0239	4.26	0.0000
University degree or more	0.3515	0.0304	11.55	0.0000
Area - Reference: North-East				
North-West	-0.0106	0.0127	-0.83	0.4040
Centre	-0.0528	0.0122	-4.32	0.0000
South	-0.0822	0.0189	-4.35	0.0000
Islands	-0.0055	0.0223	-0.25	0.8040
Firm size - Reference: Up to 4				
From 5 to 19	0.0703	0.0183	3.84	0.0000
From 20 to 49	0.0833	0.0197	4.24	0.0000
From 50 to 99	0.0925	0.0210	4.40	0.0000
From 100 to 499	0.1766	0.0218	8.10	0.0000
500 or more	0.2275	0.0240	9.49	0.0000
Public Sector	0.1876	0.0254	7.39	0.0000
Occupation - Reference: Blue collar				
White collar	0.1061	0.0136	7.79	0.0000
Manager	0.2997	0.0258	11.63	0.0000
Industry - Reference: Agricolture				
Industry & Mining	0.0214	0.0351	0.61	0.5430
Building & Construction	0.0401	0.0364	1.10	0.2700
Wholesale & Retail Trade	-0.0015	0.0356	-0.04	0.9650
Transport & Communication	0.0590	0.0409	1.44	0.1500
Credit & Insurance	0.1614	0.0436	3.70	0.0000
Business services	0.0045	0.0404	0.11	0.9120
Domestic services	-0.0473	0.0358	-1.32	0.1870
Public administration	0.0343	0.0372	0.92	0.3560
Female	-0.0653	0.0162	-4.04	0.0000
Head of Household	0.0354	0.0112	3.15	0.0020
$\hat{\boldsymbol{\lambda}}$	**-0.0079**	**0.0274**	**-0.29**	**0.7740**
Constant	1.4370	0.1173	12.25	0.0000
Sample size				5,546
R_c^2				0.3712
F(34, 5511) =			88.25	0.0000

Source: SHIW - Bank of Italy, 2002.
Notes: [†]The IV estimate has been performed using "Searching" as instrument.

variable for the contract choice, leads to a negative but not significant wage effect of about 3%. Using IVs methods we get a significant and negative wage effect of about 20%, while performing a dummy endogenous variable model under distributional assumptions the wage penalty reduces to about 7%. The consistency of these estimators depends on the validity of the instruments used for the identification of the models. Performing a dummy endogenous variable model where the identification is obtained only through distributional assumptions we get a negative wage effect associated to FTCs of about 7.5%.

A further interesting finding of this piece of work is that if we do not take into account the endogeneity of the contract choice, we underestimate the wage penalty for temporary workers. This evidence has been interpreted as a positive correlation between unobservables like ability, which positively affects wages, and probability of accepting a temporary job. This result is in line with the prediction of the Loh's (1994) model, according to which more able workers choose jobs with probationary periods and lower wages because they anticipate that the contract will be renewed getting high-paid permanent jobs afterwards.

Finally, we test for the presence of the classical sample selection bias. Indeed, if the error term of the labour market participation equation is correlated with the error term of the wage equation, selectivity bias into the workforce rises and the observed sample does not represent the underlying population. Namely, the estimated coefficients of the equation may be inconsistent, even though the endogeneity of contract type has been addressed. Performing the test we have found that there is no evidence of sample selection bias. Therefore, we may conclude that the sample selection bias due to labour market participation is not an issue.

Given that in Italy there is evidence for wage penalties for permanent workers and that the results are in line with the Loh's (1994) probationary interpretation of temporary contracts, an interesting question for further research is whether permanent workers are compensated by a steeper path of the wage dynamic.

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Appendix

Table 10: *Descriptive Statistics of the Variables, 2002.*

Variables	Mean	Std. Dev.	Variables	Mean	Std. Dev.
Gender	0.410	0.492	North-East	0.300	0.458
Age	39.371	10.175	North-West	0.228	0.420
Experience	19.258	10.963	Centre	0.228	0.420
Tenure	14.513	10.765	South	0.173	0.379
FTC	0.090	0.286	Islands	0.095	0.293
Searching	0.066	0.248			
Sick	0.326	0.469	None or Elementary	0.083	0.276
Contributions	0.035	0.185	Middle school	0.334	0.472
Child (< 6years)	0.164	0.370	Professional school	0.093	0.291
Child (6 <years< 18)	0.323	0.468	High school	0.367	0.482
Spouse not employed	0.012	0.109	University degree or +	0.123	0.328
# of income earners	1.112	0.879			
Ln(benefits)	0.220	1.297	Married	0.625	0.484
			Single	0.318	0.466
Blue collar	0.461	0.499	Ex-married	0.057	0.231
White collar	0.461	0.499			
Manager	0.077	0.267	Agricolture	0.052	0.222
			Industry & Mining	0.295	0.456
Up to 4	0.102	0.303	Building & Construc.	0.059	0.235
From 5 to 19	0.204	0.403	Wholesale & Retail	0.097	0.296
From 20 to 49	0.132	0.338	Transport & Comm.	0.043	0.203
From 50 to 99	0.092	0.289	Credit & Insurance	0.036	0.187
From 100 to 499	0.101	0.301	Business services	0.038	0.190
500 or more	0.098	0.298	Domestic services	0.055	0.228
Public Sector	0.271	0.445	Public administrat.	0.325	0.468

Source: SHIW - Bank of Italy, 2002.