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Measuring the permanent-temporary wage gap in Cyprus

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ABSTRACT

The aim of the paper is to analyse the wage gap between permanent and temporary workers in Cyprus. The use of 2009 and 2015 EU-SILC allows to get a first glimpse of the impact of recession on non-standard forms of employment. The size of the hourly unconditional wage gap is primarily sensitive to sample definitions and secondly to selection-correction procedures. Still, Cyprus can be classified among the countries with relatively high permanent-temporary gap, with the crisis having a rather marginal impact on the observed gap. The Oaxaca-Ransom decomposition technique has been deployed to decompose the wage gap into explained and unexplained components; and the latter into permanent employees' advantage and temporary employees' disadvantage. In all cases, the decomposition shows that almost half of the gap cannot be explained by productive characteristics and job attributes available in the data set. While, the unexplained component, whose absolute size is high but its relative size is close to European average, is driven by temporary employees' disadvantage. The study does not control for potential endogeneity in the form of contract-selection bias due to the absence of appropriate instruments. Still, the sheer magnitude of the wage gap and the unexplained component, alongside with other direct and indirect evidence, makes the case of wage discrimination as very plausible. The essay closes with a short discussion on relevant policies.

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Μετρώντας το μισθολογικό χάσμα μεταξύ μόνιμων και προσωρινών εργαζόμενων στην Κύπρο

Χρήστος Κουτσαμπέλας[*]

ΠΕΡΙΛΗΨΗ

Ο σκοπός του δοκιμίου είναι να αναλύσει το μισθολογικό χάσμα μεταξύ μόνιμων και προσωρινών εργαζόμενων στην Κύπρο. Η χρήση των βάσεων δεδομένων 2009 και 2015 του EU-SILC επιτρέπει μια πρώτη εξέταση των επιπτώσεων της οικονομικής κρίσης στις μη-τυπικές μορφές αποσχόλησης. Το μέγεθος του μη προσαρμοσμένου μισθολογικού χάσματος είναι πρωτίστως ευαίσθητο στον ορισμό του δείγματος και δευτερευόντως στις διαδικασίες στατιστικής διόρθωσης του σφάλματος μεροληψίας. Παρολαυτά, με αρκετή βεβαιότητα, η Κύπρος μπορεί να συμπεριληφθεί στις χώρες που χαρακτηρίζονται από υψηλό μισθολογικό χάσμα μόνιμων-προσωρινών υπαλλήλων, με την ύφεση να μη φαίνεται να έχει σημαντική επίπτωση στο παρατηρούμενο χάσμα. Τεχνικές τύπου Oaxaca-Ransom χρησιμοποιήθηκαν προκειμένου να αποδομηθεί το μισθολογικό χάσμα σε εξηγήσιμα και μη εξηγήσιμα τμήματα, καθώς και το μη εξήγησιμο τμήμα να αναλυθεί στο μέρος που οφείλεται στο πλεονέκτημα των μόνιμων εργαζομένων και στο μέρος που οφείλεται στο μειονέκτημα των προσωρινών εργαζομένων. Σε όλες τις περιπτώσεις, η ανάλυση έδειξε ότι περίπου το μισό του μισθολογικού χάσματος μπορεί να εξηγηθεί από τα παραγωγικά χαρακτηριστικά των ατόμων. Ενώ το μη εξηγήσιμο τμήμα, του οποίου το απόλυτο μέγεθος είναι αρκετά υψηλό και το σχετικό μέγεθος περίπου στο μέσο όρο των ευρωπαϊκών χωρών, οφείλεται κατά κύριο λόγο στο μειονέκτημα των προσωρινών εργαζόμενων. Η μελέτη δεν ελέγχει για πιθανά προβλήματα ενδογένειας που μπορεί να προκύψουν από την «αυτοεπιλογή» εργασιακού συμβολαίου, λόγω της έλλειψης κατάλληλων βοηθητικών μεταβλητών. Παρολαυτά, το μέγεθος τόσο του μισθολογικού χάσματος, καθώς και άλλες άμεσες και έμμεσες ενδείξεις, καθιστούν τις μισθολογικές διακρίσεις εις βάρος των προσωρινών εργαζόμενων ως ένα πολύ ευλογό σενάριο. Το δοκίμιο κλείνει με μια σύντομη συζήτηση πολιτικών που θα μπορούσαν να συνεισφέρουν στη διόρθωση του προβλήματος.

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1. Introduction

The recent economic crisis has had a deep impact on European labour markets mostly in terms of increased unemployment and wage compression. These conditions weakened the bargaining position of many workers, forcing them to accept unsatisfactory terms of employment. As a result the share of various types of non-standard employment, which is usually undesired by workers, rose in many countries (Spasova et al, 2017). An additional factor, whose influence extends beyond the recession, is the gradual digitalisation of the economy, which is based at large on flexible working arrangements.

The protection of non-standard employment has been a persistent legislative concern in the European Union to counterbalance the vulnerability of these workers. Relevant European directives have been transposed to national legislation in all EU Members for protecting workers under non-standard contracts against the various forms of discrimination such as unfair pay. However, the effectiveness of legislation in protecting non-standard workers from wage discrimination is debatable. As several studies have shown, the wage gap between observationally similar permanent and temporary workers is positive and significant in quantitative terms in most European countries (Comi and Grasseni, 2012; D' Agostino et al 2018; Da Silva and Turrini, 2015). Furthermore, as Lang et al (2013) have observed, the regulatory framework has been weakened during the recession in several countries in an effort to promote labour market flexibilisation. On the basis of the above, a reasonable hypothesis is that the wage gap might have further widened in the post-recession era; especially in those countries hardest hit by the crisis.

The undesirability of unjustifiably large wage gaps is easy to establish. First, unfair treatment is unwanted per se. Secondly, large wage gaps are associated with high job dissatisfaction (Carrieri et al, 2014) causing low productivity. Finally, wage inequality is associated with high risk of in-work poverty and wider pensions gaps in the future, burdening the already overloaded European social protection systems (Spasova et al, 2017).

Drawing motivation from the above, the aim of this study is to analyse the wage gap between temporary and permanent workers in the interesting context of Cyprus. Although temporary employment in Cyprus is a relatively frequent form of employment (according to Eurostat, in 2015, 15.8% of the total number of employees were in temporary contracts, EU28: 11.1%), the permanent-temporary wage gap has not been analysed[1]. Secondly, the topic is policy relevant as the in-work poverty among temporary workers in Cyprus is among the highest in Europe[2] (24.5% vs. EU28: 16.2%, 2016). Furthermore, by using data describing the labour market for the years 2009 and 2015, this study can be expected to be among the first to provide evidence on the impact of the recession on temporary workers.

The structure of the essay is the following: Section 2 provides a short literature review on the permanent-temporary wage gap in Europe. Section 3 describes the data and the methodology. The empirical results can be found in Section 4. Section 5 compares Cyprus with other countries. Finally, the essay concludes with a short discussion on policy implications.

2. Short literature review

The basic finding of the empirical literature is that temporary employees systematically earn less than permanent employees, even after controlling for individual characteristics relevant to wage determination such as education and work experience (Booth et al, 2002; Blanchard and Landier, 2002; Brown and Sessions 2005; Mertens et al 2007; Comi and Grasseni 2012; Da Silva and Turrini, 2015; D' Agostino et al 2018).

It is interesting that economic theory predicts the opposite in the context of fully competitive markets. Applying the theory of compensating wage differentials (Rosen, 1986) on this

[1] In general, issues related to non-standard employees in Cyprus have not been adequately investigated with the exception of Pashardes and Koutsampelas (2016) and Koutsampelas (2018) who basically focus on non-standard employees' access to social provisions.

[2] In particularly, second highest (27.3%) according to 2015 data and third highest (24.5%) according to 2016 data. The EU average stands at 16.2% (2016), while Cyprus is only surpassed by Hungary and Luxemburg (2016).

context, temporary employees should be better paid compared to permanent employees of the same characteristics to compensate them for the undesirability of the increased economic risk they incur. The introduction of market asymmetries produces a radically different outcome. Firstly, in asymmetric power environments, the better protected permanent employees are able to bargain for higher wages (Lindbeck and Snower, 2001). There is also evidence that increasing employment protection to permanent employees shifts the cost to temporary employees (Centeno and Novo, 2013). For example, Salvatori (2009) finds that the use of temporary workers increases in unionized industries. If permanent workers are well represented and protected, then their relative cost increases and firms have the incentive to hire more temporary workers. Finally, in asymmetric information environments, fixed-term contracts are used by firms as a screening device to test the abilities of employees before committing to long-term contracts associated with high separation costs.

Of course, actual markets are typically characterised by imperfections, therefore it is not surprising that the empirical literature so consistently finds large unadjusted and adjusted wage gaps between temporary and permanent workers in the overwhelming majority of countries that have been examined. It is noteworthy that even after controlling for observable characteristics, the wage gap is found to be substantial in many countries. This 'unexplained' component of the wage gap is often attributed to labour market discrimination by many authors (e.g. Comi and Grasseni, 2012). Another interesting finding of the literature is that the wage penalty associated with temporary employment is higher at the bottom of the wage distribution and decreases, or in some cases diminishes, at the top (Bosio, 2014; D'Agostino et al, 2018 and others).

The majority of studies focus on a single or very few countries; however, there are also cross-country analyses providing interesting comparative perspectives and offering benchmarks (or, at least, useful points of comparisons) for empirical researchers. In one of the most comprehensive studies in terms of country coverage, Da Silva and Turrini (2015) examine, for the European Commission, the permanent-temporary wage gap for 24 EU member states.

They find that, in 2009, permanent workers in Europe earned on average 15% more than workers on fixed term contracts with similar observable characteristics. Cyprus is found to have the largest wage premium for permanent employees altogether with Poland, Germany and Luxemburg. Additionally, they associate the wage gap with labour market institutions, suggesting that high premia for permanent workers are observed in countries with higher employment protection for permanent workers, high share of temporary employment (implying a regulatory framework that encourages the use of temporary employment), lengthy periods of unemployment benefit entitlement and low minimum wages.

Comi and Grasseni (2012) analyse the wage gap between temporary and permanent jobs in nine European countries and find evidence of discrimination across the entire wage distribution in almost all countries (although the wage gap decreases in higher quintiles). The magnitude of discrimination is higher in the Mediterranean countries of the sample (Italy, Greece, Portugal) where the proportion of the wage gap which cannot be explained by differences in returns to observable characteristics is around 80 per cent. Furthermore, their findings are in line with Da Silva and Turrini (2015) in suggesting that employment protection for standard workers is positively associated with the wage gap. D' Agostino et al (2018) focus their analysis on the 25 to 40 age group for Italy, France and Germany in 2009. The decomposition of the wage gap shows a very large unexplained component in Italy across the whole distribution, while the unexplained component is low in France for high-paid employees and insignificant in Germany.

Overall, the estimated gaps vary considerably across countries and studies, with mixed evidence regarding the origin of these differences, but with some consensus on the labour market institutions that shape the wage differentials between permanent and temporary workers. Yet, it should be noted that the study of the permanent-temporary wage gap is not so well developed compared to the study of other forms of wage inequality (e.g. gender and race gaps), causing a relative knowledge gap and offering some fertile ground for future research.

3. Data and Methods

Data

The analysis is based on the 2009 and 2015 EU-SILC. EU-SILC collects comparable cross sectional data on the households and the personal characteristics of each household member in the sample. Among a wealth variety of information, useful for this study are: age, education, marital status, number of children, information on the working status of the individual (including earnings), occupation and sector of economic activity. Crucially for the purpose of this study, information on the years of working experience is included (but not for all countries).

The dependent variable is the log of hourly earnings. Only gross earnings are reported in EU-SILC for Cyprus, while the variables for the number of months worked and the number of hours usually worked per week are used to convert annual to hourly earnings[3]. All explanatory variables are categorical except of work experience which is continuous. Educational attainment is aggregated in three groups based on International Standard Classification of Education. The first group includes those who have completed primary education the most, the second group includes those who have completed upper secondary or post-secondary non-tertiary education. Finally, the last group includes workers with tertiary qualifications. The occupational category is grouped according to the International Standard Classification of Occupations (ISCO). Eight occupational groups are used in the estimations: managers, professionals, technicians, clerical support workers, service and sales workers, skilled agriculture and fishery workers and craft and related trade workers, plant and machine operators, and elementary occupations. The economic activity sector is grouped in four broad categories that include industry, mining, manufacturing, industry and construction, wholesale and retail trade and accommodation, food services activities, financial, real estate and insurance activities, public administration and defense as well as other activities. The exact

[3] Note that the income reference period in EU-SILC is a fixed 12-month period (such as the previous calendar or tax year) for all countries (except UK). However, throughout this study, the year of the survey is referred, as all other data are collected on the date of the survey.

grouping of economic activity can be found in Tables A2 or A3 in the appendix. The basic variables used in the analysis are described in Table A1 in the Appendix.

The working sample consists of individuals who: (i) are aged between 22 and 55, (ii) work full-time as employees (employers, self-employed, part-time employees and apprentices are excluded), (iii) have not worked in a second job, have not shifted from full-time to part-time work (or vice versa) and have not changed jobs during the period of reference each dataset (iv) received an annual wage higher than €1000 (this is an ad hoc value to exclude a small number of unreliable observations).

The obvious disadvantage of imposing these restrictions is that they reduce the size of the working sample (2,050 and 2,538 observations[4] in 2009 and 2015 respectively). The advantage is that a relatively homogeneous sample of working persons is constructed and, additionally, complexities regarding further education, retirement and part-time employment are avoided. Furthermore, restriction (iii) is necessary for reliably calculating the hourly wage rate (the sample provides information only for individuals' annual earnings, alongside with information on months and hours worked). Similar restrictions have been employed in the literature (Christofides et al, 2013; Christofides and Michael, 2013).

Tables A2 and A3 in the Appendix provide basic summary statistics (mean, standard deviation, min and max) of the 2009 and 2015 samples.

Methods

The Oaxaca-Ransom (OR) decomposition[5] is applied on the data (Oaxaca and Ransom, 1994). Two Mincerian equations are estimated separately for the permanent and temporary workers, respectively:

[4] A larger sample was collected in 2015.

[5] Oaxaca-type decompositions can be found in several textbooks and other outlets. The presentation of this section is based on Jann (2008).

$$Y_P = X_P'\beta_P + \varepsilon_P, \qquad Y_T = X_T'\beta_T + \varepsilon_T$$

Where X is a matrix containing the predictors for each group, β contains the coefficients and the intercept and ε is the error term. In this study, a standard Mincerian equation is estimated that includes as explanatory variables; education, years of work experience and years of work experience squared, gender as well as controls for occupation and industry. The independent variable is the log of hourly wage rate.

The mean difference in wages can be expressed as the difference in the linear prediction at the group-specific means of the predictors:

$$G = E(Y_P) - E(Y_T) = E(X_P)'\beta_P - E(X_T)'\beta_T \quad (1)$$

Where, $E(Y_P)$ is the average wage of permanent workers and $E(Y_T)$ is the average wage of temporary workers. The aim is to identify the extent that differences in the explanatory variables affect the wage gap (G). The remaining part, i.e. what cannot be explained in terms of differences in the explanatory variables, is the 'unexplained' part of the gap, which might be attributed to discrimination.

This decomposition is based on the use of a nondiscriminatory coefficient vector which might be understood as representing the fair reward of productive characteristics in the market. The nondiscriminatory coefficient is estimated from the sample on the basis of reasonable assumptions.

Using this approach, the gap can be expressed as follows:

$$R = \{E(X_P) - E(X_T)\}'\beta^* + E(X_P)'(\beta_P - \beta^*) + E(X_T)'(\beta^* - \beta_T) \quad (2)$$

Where β^* is the nondiscriminatory coefficient. The gap is decomposed into three parts:

(i) The first component $Q = \{E(X_P) - E(X_T)\}'\beta^*$ is the part of the differential explained by differences in the predictors. This is the explained component of the wage gap (an alternative term is the 'quantity effect').

The second and third part of equation (2) form the unexplained component of the wage gap (i.e. the part of the gap that cannot be explained in terms of differences in productive characteristics), which in turn can further decomposed into:

(ii) The second component which measures permanent workers' advantage.

(iii) The third component measures temporary workers' disadvantage.

There are several approaches in the literature for estimating the nondiscrimination factor. Reimers (1983) proposes the usage of the average coefficient over both groups:

$$\widehat{\beta^*} = 0.5 * \widehat{\beta_P} + 0.5 * \widehat{\beta_T}$$

Cotton (1988) proposes to weight the coefficients of the separate models with group sizes:

$$\widehat{\beta^*} = \frac{n_P}{n_P + n_T} * \widehat{\beta_P} + \frac{n_T}{n_P + n_T} * \widehat{\beta_T}$$

Neumark (1988) proposes to use the coefficient from a pooled regression over both groups. This paper uses Cotton's approach. The reason is that the subsample of temporary workers is small compared to the sample of permanent workers. Thus, using Neumark's approach, in practice, boils down to simply using permanent workers' coefficients as the nondiscrimination factor, while using Reimers' approach overvalues temporary employees' coefficient.

4. Results

Table 1 presents, by type of contract, the hourly wage rate, age, gender, education qualifications, work experience, occupation and sector of economic activity. In the working sample, for 2009, the average hourly earnings are €13.5 and €5.7 for permanent and temporary workers, respectively. Wage rates reduced for both groups during the period 2009-2015, thus keeping the unadjusted gap approximately at the same levels. Yet, it should be noted EU-SILC reports only gross earnings for Cyprus. Fiscal consolidation programmes were implemented in the period 2011-2014 through increases in taxes and contributions, affecting the net income of employees. The effect of fiscal consolidation on earnings is not captured by

the data, thereby escaping the attention of this study. Yet, fiscal consolidation mostly affected high paid permanent employees due to the progressive design of the implemented measures (Koutsampelas and Polycarpou, 2013). On that basis, a reasonable prediction is that the permanent-temporary wage gap is smaller in net terms than in gross terms.

Another noteworthy finding is the large difference in the average unadjusted hourly rates between the two types of employees in both samples. The magnitude of the gap is partly due to the relatively large population of foreign live-in domestic workers in Cyprus. These workers cohabit with their employers and provide several home services such as housekeeping, cooking and child caring. They are employed on temporary contracts and are granted temporary residence/working permits (typically they come from third countries such as Philippines and Sri Lanka). Their terms of employment differ substantially from those provided by the general employment regulatory framework (Pavlou, 2016). Their salary is set by law at only €460 (gross), almost half the minimum wage. Still, it might be argued that their monetary wage is not exactly comparable with those of other employees (nor an accurate measure of their material well-being) as they benefit from in-kind benefits (Koutsampelas, 2015).

Indeed, excluding these workers from the sample[6], narrows considerably the unadjusted gap between permanent and temporary employees as the hourly rate of temporary employees increases from €5.7 to €9.8 in 2009 and from €5.0 to €8.5 in 2015. Since, it is not clear whether these employees should be included in the analysis, this type of sensitivity analysis is repeated when applying the OR decomposition in the data.

[6] Domestic workers are indirectly identified in the sample as those individuals who fulfil the following criteria: (1) work in sectors R-U (Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies), (ii) are females, (iii) are non-EU citizens, (iv) do not live alone and (v) work on temporary contracts.

Table 1. Descriptive statistics, 2009 and 2015

	2009				2015			
	Perm	Temp	Perm %	Temp %	Perm	Temp	Perm %	Temp %
Hourly earnings	€13.5	€5.7			€12.5	€5.0		
Hourly earnings (exc. domestic workers)	€13.5	€9.8			€12.5	€8.5		
Male	985	48	54.3	19.8	1120	72	50	23.8
Female	828	195	45.7	80.2	1120	230	50	86.0
Age	40.7	37.2			40.0	37.6		
Primary	161	29	8.9	12.0	91	43	4.1	14.2
Secondary	926	138	51.1	57.0	1094	170	48.8	56.3
Tertiary	725	75	40.0	31.0	1055	89	47.1	29.5
Experience	18.4	12.1			17.5	12.4		
Professionals	318	31	17.8	36.9	460	38	20.9	35.8
Managers	44	1	2.5	1.2	68	1	3.1	0.9
Technicians	346	10	19.4	11.9	376	6	17.1	5.7
Clerical sup. workers	308	20	17.3	23.8	356	12	16.2	11.3
Service & sales workers	232	10	13.0	11.9	382	25	17.3	23.6
Skilled agri. workers & craft and related trades	263	3	14.8	3.6	246	3	11.2	2.8
Plant/machine operators	110	1	6.2	1.2	95	1	4.3	0.9
Elementary occupations	162	8	9.1	9.5	219	20	9.9	18.9
A-F	496	0	27.4	0.0	373	0	16.7	0.0
G-N	845	21	46.6	8.9	1198	52	53.5	18.4
O-Q	420	74	23.2	31.5	580	55	25.9	19.5
R-U	52	140	2.9	59.6	89	175	4.0	62.1

Notes: A-F includes Agriculture, forestry and fishing industry, construction, G-N: Wholesale and retail trade, transport, accommodation and food service activities, Information and communication, Financial and insurance activities, Real estate activities, Professional, scientific and technical activities, administrative and support service activities, O-Q: Public administration, defense, education, human health and social work activities, R-U: Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

Table 1 reports descriptive statistics from the working sample. These figures offer a useful information background for interpreting the results of the OR decomposition[7]. The first two columns in each year report frequencies (except of experience/age variables, for which averages are reported) and the next two columns percentages. Temporary employment is more frequent among women than men. The bulk of temporary contracts are found in the 25-45 age group; so on average temporary employees are younger than permanent employees.

[7] It should be mentioned that these figures are derived from the working sample, thus they differ from quantitatively point of view of from official Eurostat statistics which are derived from the full EU-SILC and the EU Labour Force Survey. Still, from a qualitative point of view, the conclusions are very similar. For a detailed secondary analysis of official Eurostat statistics, the reader is directed to Koutsampelas (2018).

They have also less work experience (12.4 years vs. 17.5 years, 2015). The disaggregation of temporary employees by education shows that high educational qualifications do not provide effective protection against job insecurity. Indeed, almost one out of three temporary employees in the working sample has completed tertiary studies. In terms of economic activity, it appears that most temporary employees are concentrated in the last group that includes among others arts, entertainment and recreation and activities of households. A significant number of temporary employees are found in public administration, health and education sectors, too.

Oaxaca Ransom decompositions

Table 2 provides the decomposition results based on equation (2). The set of explanatory variables in the wage equations includes a constant, work experience (continuous variable), work experience squared, education (up to primary, secondary and tertiary), gender, type of contract, occupation (8 categories) and sector of economic activity (4 categories). The total ln wage differential is decomposed into (1) the part that is explained by individual characteristics (work experience, education, gender) and job characteristics (occupation and sector of economic activity), (2) permanent employees' advantage (i.e. unexplained higher returns to permanent contracts) and (3) temporary employees' disadvantage (i.e. unexplained lower returns to temporary contracts, possibly due to discrimination or other similar reason).

The Table presents the results of the decompositions in ln wage points (top part) and in percentages (bottom part). As we discussed already, the hourly wage differential between permanent and temporary employees is very large (1.02 log points in 2015). It marginally decreased from 2009 and 2015 (however the change is negligible from a statistical point of view). A substantial part of the wage gap is actually explained by individual characteristics. Between 2009 and 2015 the explained part increased, reaching 54.3% of the total gap in 2015. The unexplained component is clearly dominated by temporary employees' advantage, while

permanent employees' disadvantage is low (although statistically significant). As it will be discussed later, the size of the unexplained component is of significant policy interest.

Table 2: Oaxaca-Ransom Decomposition (2009, 2015)

	2009	2015
Hourly gross wage	Coefficient	Coefficients
Permanent employees	2.45***	2.30***
Temporary employees	1.39***	1.28***
Difference	1.06****	1.02***
Explained	0.37***	0.55***
Permanent empl. advantage	0.03***	0.03***
Temporary empl. disadvantage	0.66***	0.44***
Percent explained	34.9%	54.3%
Permanent empl. advantage	3.0%	2.8%
Temporary empl. advantage	62.1%	42.9%
Observations	2,050	2,539

Note: Three stars indicate significance at the 1%, two stars at the 5% and one star at the 10% level.

As we discussed above, a particular characteristic of the Cypriot labour market is the large population of foreign live-in domestic workers who are on temporary visas/contracts. In the next Table, the estimations of Table 2 are repeated by excluding those workers from the sample. This is not to claim that domestic workers are not discriminated against (most probably they are), but that their terms of employment are fundamentally different from other employees and, on this basis, such a sensitivity exercise makes sense.

Indeed, as Table 2 shows, the wage gap narrows considerably in both years as the average hourly earnings of temporary employees is now much higher. The wage gap increases from 2009 to 2015 (both in its adjusted and unadjusted form) and again a significant part of the gap cannot be explained by observable characteristics. The findings that 'survive' this sensitivity analysis is that the explained component increased significantly from 2009 to 2015 and that the unexplained component is predominantly driven by temporary employees' disadvantage (48.0% of the total gap in 2015).

Table 2: Oaxaca-Ransom Decomposition (exc. domestic workers)

	2009	2015
Hourly gross wage	Coefficient	Coefficients
Permanent employees	2.45***	2.30***
Temporary employees	2.15***	1.93***
Difference	0.30***	0.37***
Explained	0.06	0.18***
Permanent empl. advantage	0.02***	0.01***
Temporary empl. disadvantage	0.23***	0.19***
Percent explained	19.1%	47.7%
Permanent empl. advantage	6.1%	2.6%
Temporary empl. advantage	74.8%	49.7%
Observations	1,920	2,375

Note: Three stars indicate significance at the 1%, two stars at the 5% and one star at the 10% level

The literature of the estimation of the wage gap between permanent and temporary workers has identified two types of potential selectivity bias. The first arises from the fact that certain individuals are excluded from the sample since their earnings are not observed (e.g. unemployed, economically inactive persons). This is the classical sample selection bias typically met in censored data. The second reflects the possibility of selection into particular type of contract (contract selection bias). The contract selection bias might be driven by differences in unobserved characteristics (e.g. innate ability, preferences) which affect the probability of accepting to work on temporary terms. In the absence of panel data and convincing instruments, the present analysis does not correct for this form of endogeneity.

That said, in the next table, the estimates have been corrected for sample selection using a typical two-stage heckman correction. In the first-stage a probit equation is estimated using age, age squared, gender, marital status, citizenship (native or not), education, number of children and a dummy specifying whether childcare is provided or not as predictors. The Mills ratio is predicted and included in the wage equations as an additional regressor.

The results show the existence of sample selection bias which is corrected by the procedure. As it can be seen, the difference between the corrected and the non-corrected wage differential is rather moderate (from 1.06 to 0.93 in 2009 and from 1.02 to 0.89). The explained component, as it was the case before, increases significantly from 2009 and 2015 (reaching 60.7% in 2015), while the unexplained component is mostly driven by temporary employees' disadvantage.

The overall conclusion is that selection correction does not influence the findings of the decomposition in a quantitatively important way. On the other hand, it is without doubt, that the correction improves the statistical accuracy of the model.

Table 3: Oaxaca-Ransom Decomposition (with sample selection correction)

	2009	**2015**
Hourly gross wage	Coefficients	Coefficients
Permanent employees	2.45***	2.30***
Temporary employees	1.39***	1.28***
Difference	1.06***	1.02***
Adjusted difference	0.93***	0.89***
Explained	0.34***	0.54***
Permanent empl. advantage	0.02***	0.02***
Temporary empl. disadvantage	0.57***	0.33***
Percent explained	36.3%	60.7%
Permanent empl. advantage	2.6%	1.8%
Temporary empl. advantage	61.1%	37.4%
Observations	2,050	2,539

Note: Three stars indicate significance at the 1%, two stars at the 5% and one star at the 10% level

5. Comparisons with other European countries

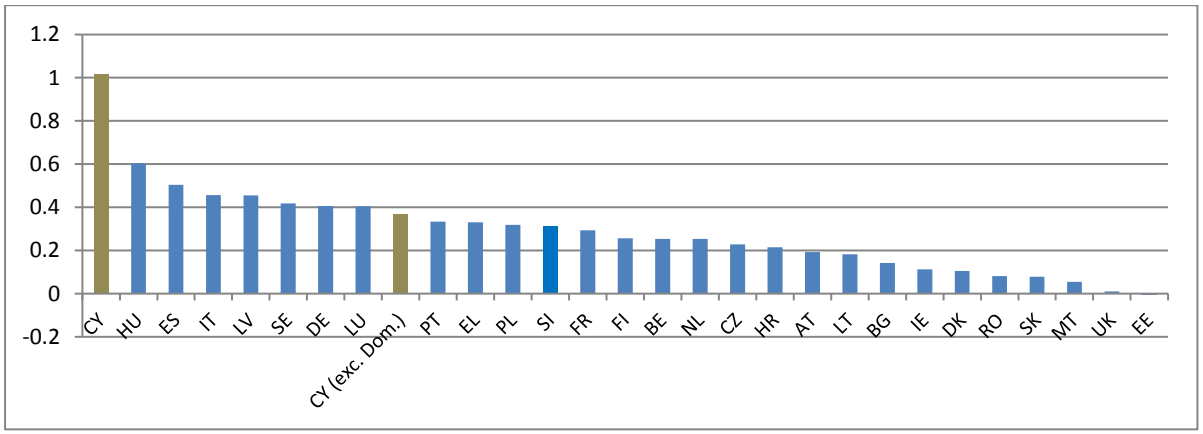
In this section, the estimates for Cyprus are compared with other European countries. This is done by estimating equation (2) for 28 European countries for which information is provided in the EU-SILC dataset. The same methodological assumptions, described in detail in section 3, are applied on the cross-sectional data. The comparability of EU-SILC data makes this

exercise feasible and meaningful; however, certain limitations arise[8]. Full results are offered in the Appendix.

Initially, Figure 1 depicts the log wage differentials in European countries including Cyprus. Cyprus exhibits by far the largest wage gap, followed by Hungary, Spain, Italy and Latvia. Interestingly, all these countries are also characterised by high in-work poverty among temporary employees (Hungary, 32%; Spain 23.3%; Italy 19.1%, Latvia 26.7%). When excluding from the sample the domestic workers, the wage gap reduces significantly and accordingly the ranking of Cyprus among countries. Still, the wage gap in Cyprus stands higher than the median of the sample, confirming that the country is characterised by a high permanent-temporary wage gap not only in absolute terms, but also in relative terms.

Another interesting feature of the results is that the wage gaps are high in almost all Mediterranean countries of the sample (Italy, Greece, Portugal) which share, in general, the commonality of problematic labour markets in terms of high unemployment and institutional rigidities.

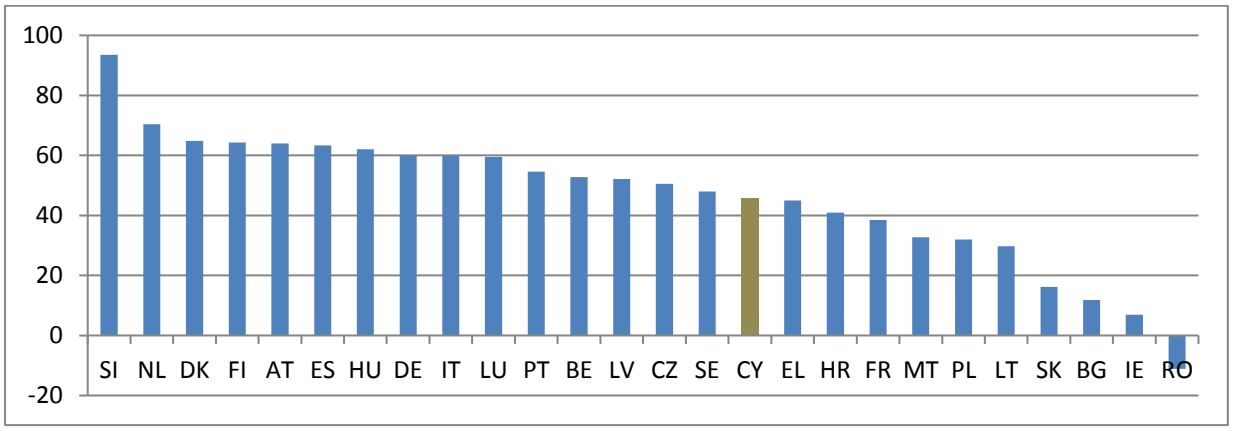
Figure 1: Log wage differentials in European countries (2015)



[8] To say an example, information on work experience is not reported for all countries. In this cases an imputation was applied. In particular, work experience is approximated by the following formula: work experience=age-year when the highest level of education was attained (variable: pe030).

The next Figure presents the unexplained part as percentage of the total wage gap in European countries. With very few exceptions (e.g. Romania, Ireland, Bulgaria), the observed individuals' productive characteristics can only partially explain the differences in observed earnings. The general conclusion is that on average, about 50% of the wage gap can be explained by observable characteristics in the countries of the sample, while the remaining part of the gap can be attributed to wage discrimination and unobservable characteristics not accounted for in the econometric model. Cyprus stands close to the European average in that respect. However, it should be noted that the unadjusted wage gap in Cyprus is higher than in most other countries.

Figure 2: Unexplained part as % of the total gap in European countries (2015)



6. Discussion

The purpose of this study is to examine the hourly unconditional wage gap between permanent and temporary employees using data from the 2009 and 2015 EU-SILC. Roughly speaking, the wage gap has remained relatively stable between the two reference years. One could have anticipated a widening of the wage gap, given the large increase in unemployment (unemployment rate in Cyprus skyrocketed from 3.7% in 2008 to 16.1% and 15.0% in 2014 and 2015, respectively) and the resulting rise in economic uncertainty; however, in practice, both groups experienced reduction in their wages. Furthermore, the estimates are based on gross earnings. Measuring the wage gap using net earnings might have produced a different result.

The unconditional wage gap was found to be very high, ranging between 0.89 and 1.02 ln wage points in 2015, depending on whether the estimate is corrected for sample selection or not. Furthermore, the size of the wage gap is very sensitive to the inclusion of a particular group of temporary employees, namely live-in domestic workers. After excluding this group from the estimations, the derived wage gap is closer to the European average (although it still remains high).

The OR decomposition showed that about half of the wage gap can be explained in terms of productive characteristics and job attributes. The unexplained part is predominantly driven by temporary employees' disadvantage in the labour market. These findings are policy relevant insofar it indicates the economic and social desirability of narrowing the gap.

There is a general consensus in the literature that high levels of employment protection for permanent workers are associated with high permanent-temporary wage gaps. In highly regulated environments, employers substitute costly permanent staff with cheaper temporary employment. This way, part of the cost of the former is indirectly transferred to the later through lower wages. Although, Cyprus is classified among the "highly regulated" countries in Europe (Du Caju et al, 2009), thus the possibility of overuse of temporary employment in certain sectors where permanent stuff is overprotected remains open to be examined.

Possibly, a more effective and feasible policy option is to review employment protection aiming specifically at protecting temporary employees. In particular, the employment legislation protecting non-standard employees should be more effectively enforced[9]. To improve compliance, the state should increase direct investigations instead of reacting to complaints and focus on sectors where non-standard workers tend to concentrate. Initiatives should be also undertaken to outreach temporary employees as well as other non-standard employees (especially immigrants and those in elementary occupations) to inform them about their labour

[9] In Cyprus, temporary employees are protected by the Law on Employees with Fixed-Term Work (Prohibition of Less Favourable Treatment) of 2003 to 2007", 98(I)/2003.

rights. Furthermore, the representation of non-standard employees in industrial relations is weak and could be strengthened.

Finally, Cyprus lacks a universal minimum wage, as the current legislation covers only specific occupations. Adequate minimum wages reduce the size of the permanent-temporary wage gap by imposing a lower bound to the remuneration of workers at the bottom part of the distribution. Extending minimum wage legislation to all occupations without exceptions might have several benefits, including the reduction of the wage gaps.

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APPENDIX

Table A1: Basic EU-SILC variables used in the analysis

EU-SILC Code	Short description	Notes
PY010G/PY010N	Annual gross/net employee cash or near cash income	Net amounts are not available for all countries
PL073	Number of months spent at full-time work as employee	
PL060	Number of hours usually worked per week in main job	
PL140	Type of contract	
PB140	year of birth	
PB150	Gender	
PB220A	Citizenship	
PB190	Marital status	
PE040	Highest ISCED level attained	
PL031	Self-defined current economic status	
PL111	NACE Rev. 2	NACE - Statistical Classification of Economic Activities)
PL051	Occupation (ISCO-08-COM)	
PL160	Change of Job since last year	
PE010	Current education activity	
RL030, RL040, RL050, RL060	Childcare at centre-based services, Childcare at day-care centre, Childcare by a professional child-minder, childcare by grandparents or other household members.	

Source: EU-SILC Methodological Guidelines and Description of Variables.

Table A2: Sample statistics (2009)

Variable	Mean	Std. dev.	Min	Max
Ln Hourly wage	2.32	0.67	0.30	4.27
Work experience	17.62	9.23	0	41
Primary education	0.09	0.29	0	1
Secondary education	0.52	0.50	0	1
Tertiary education	0.39	0.49	0	1
Male	0.50	0.50	0	1
Female	0.50	0.50	0	1
Occupations				
Professionals	0.17	0.38	0	1
Managers	0.02	0.15	0	1
Technicians	0.17	0.38	0	1
Clerical support workers	0.16	0.37	0	1
Service and sale workers	0.12	0.32	0	1
Skilled agricultural & fisher workers, craft and related trades worker	0.13	0.34	0	1
Plant and machine operators	0.05	0.23	0	1
Elementary occupations	0.15	0.36	0	1
Economic activity sector:				
A-F	0.25	0.43	0	1
G-N	0.42	0.49	0	1
O-Q	0.24	0.43	0	1
R-U	0.09	0.29	0	1
Observations	2,056			

Notes: A-F includes Agriculture, forestry and fishing industry, construction, G-N: Wholesale and retail trade, transport, accommodation and food service activities, Information and communication, Financial and insurance activities, Real estate activities, Professional, scientific and technical activities, administrative and support service activities, O-Q: Public administration, defence, education, human health and social work activities, R-U: Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

Table A3: Sample statistics (2015)

Variable	Mean	Std. dev.	Min	Max
Hourly wage	2.18	.708	.44	6.35
Work experience	16.89	9.10	0	40
Primary education	0.05	0.22	0	1
Secondary education	0.50	0.50	0	1
Tertiary education	0.45	0.50	0	1
Male	0.47	0.50	0	1
Female	0.53	0.50	0	1
Occupation				
Professionals	0.20	0.40	0	1
Managers	0.03	0.16	0	1
Technicians	0.15	0.36	0	1
Clerical support workers	0.14	0.35	0	1
Service and sale workers	0.16	0.37	0	1
Skilled agricultural & fisher workers, craft and related trades worker	0.10	0.30	0	1
Plant and machine operators	0.04	0.19	0	1
Elementary occupations	0.17	0.37	0	1
Economic activity sector:				
A-F	0.08	0.26	0	1
G-N	0.40	0.49	0	1
O-Q	0.25	0.43	0	1
R-U	0.10	0.31	0	1
Observations	2,538			

Notes: A-F includes Agriculture, forestry and fishing industry, construction, G-N: Wholesale and retail trade, transport, accommodation and food service activities, Information and communication, Financial and insurance activities, Real estate activities, Professional, scientific and technical activities, administrative and support service activities, O-Q: Public administration, defence, education, human health and social work activities, R-U: Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

Table A4. OR Decomposition in European countries

	Sample	Perm.	Temp.	Gap	Explained part	Perm. adv.	Temp. disadv.
AT	2288	2208	80	0.192	0.069	0.017	0.106
BE	2454	2311	143	0.253	0.120	0.022	0.112
BG	2488	2428	60	0.142	0.125	0.006	0.010
CY	2539	2237	302	1.019	0.553	0.029	0.437
CZ	4353	3954	399	0.228	0.113	0.013	0.103
DE	3833	3674	159	0.406	0.162	0.025	0.219
DK	2453	2423	30	0.105	0.037	0.029	0.039
EE	2981	2958	23	-0.006	0.043	-0.015	-0.034
EL	4687	4035	652	0.331	0.182	0.019	0.130
ES	5029	4239	790	0.504	0.185	0.038	0.281
FI	4568	4411	157	0.257	0.092	0.023	0.142
FR	5168	4714	454	0.294	0.181	0.017	0.097
HR	3065	2598	467	0.215	0.127	0.010	0.078
HU	3930	3637	293	0.603	0.229	0.025	0.349
IE	1869	1800	69	0.113	0.103	0.005	0.005
IT	6683	6126	557	0.457	0.183	0.035	0.239
LT	1943	1916	27	0.183	0.128	0.002	0.052
LU	2060	1944	116	0.405	0.164	0.028	0.213
LV	2717	2695	22	0.455	0.218	0.009	0.229
MT	2377	2236	141	0.054	0.036	0.000	0.018
NL	2363	2296	67	0.253	0.075	0.015	0.163
PL	5439	4140	1299	0.318	0.216	0.014	0.088
PT	4579	4015	564	0.333	0.151	0.024	0.158
RO	3755	3721	34	0.081	0.090	-0.005	-0.004
SE	2498	2471	27	0.417	0.217	-0.029	0.230
SI	6026	5838	188	0.314	0.020	0.032	0.261
SK	4179	3810	369	0.078	0.066	0.001	0.012
UK	3807	3726	81	0.010	0.066	-0.004	-0.052

Source: Author's calculations using EU-SILC.

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