Gender and the Labour Market: An International Perspective and the case of Italy*

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Abstract

This paper provides an overview of the literature on international differences in the gender wage gap. It then focuses on the Italian case and analyzes differentials in gender wage and employment gaps across regions. The cross-regional variation reproduces the negative correlation between wage and employment gaps observed at the cross-country level. Using the methodology in Olivetti and Petrongolo (2008) the paper shows the importance of sample selection induced by non-employment in explaining the cross-regional variation. The results show that selection-adjusted wage gaps are higher than actual wage gaps in most cases. However, this difference is small in the northern Italian regions and becomes sizeable for central and southern regions. Selection correction can explain from 10% to most of the observed negative cross-regional correlation between wage and employment gaps across genders in Italy.

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1 Introduction

Women have made important advances in labour markets. Their employment rates in OECD countries have been steadily increasing since the post-war period, and their pay gap with respect to men has fallen. Also, the distinctions between the activities of single and married women are not as sharp as they used to be, and ambition to do well in a job is no longer restricted to men. However, there are some important gender inequalities still remaining in labour markets. Most importantly, convergence in women's employment and pay levels with respect to men is far from complete, and the remaining gaps cannot be completely explained by differences in observable characteristics such as education or labour market experience. This evidence suggests that, a few decades after the introduction of Equal Pay and Equal Employment Opportunity legislation in most European countries and the US, there is still potential underutilization of women's skills in the labour market.

The study of the gender wage gap has attracted considerable attention among economists. Studies of the gender wage gap and its evolution emphasize the importance of gender differences in human capital (education and experience), and in the occupational structure by gender. The residual wage gap, which is left unexplained after accounting for differences in observed characteristics of men and women, is typically attributed to discrimination in the labour market. In addition, a number of authors have discussed the link between the gender wage gap and aggregate changes in wage inequality and in industry composition during the 1980s and 1990s (see Altonji and Blank, 1999, for an extensive review, and references therein).

Despite the richness of this literature, there are only a small number of cross-country studies of the gender wage gap. Up to the early 1990s this was partly due to the absence of a fully comparable cross-sectional data set on the employment and earnings of men and women. However, recent studies by Blau and Kahn (1996, 2003) and OECD (2002) use comparable cross-country data to study the effects of differences in the wage structure on the corresponding gender wage gap. The idea behind the link between the wage structure and the gender wage gap is that a given level of dissimilarities between the characteristics of working men and women translates into a higher gender wage gap the higher the overall level of wage inequality. This explanation is particularly well-suited to the comparison of Anglo-Saxon and Scandinavian countries as inequality is much higher in the former set of economies. However, the inequality-adjusted wage gap in southern Europe remains substantially lower than in the rest of Europe and in the US.

More recently, Olivetti and Petrongolo (2008) argue that, besides differences in wage inequality

and therefore in the returns associated to characteristics of working men and women, a significant portion of the international variation in gender wage gaps may be explained by differences in characteristics themselves, whether observed or unobserved. The idea is that if women who are employed tend to have relatively high-wage characteristics, low female employment rates translate into low gender wage gaps simply because it is mostly high-wage women who feature in the observed wage distribution. This explanation is particularly well-suited to the comparison of Anglo-Saxon and southern European countries as female employment rates are much higher in the former set of economies. Interestingly, previous work emphasizing the importance of selection mostly focused on the US (see Neal, 2004, Blau and Kahn, 2006, and Mulligan and Rubinstein, 2008). No previous study had used data for southern European countries, where employment rates of women are lowest, and thus the selection issue should be most relevant.

In this paper we first provide an overview of the literature on international differences in the gender wage gap. We then analyze the case of Italy by exploring the cross-regional variation in gender employment and wage gaps using the same methodology as in Olivetti and Petrongolo (2008). This methodology is particularly relevant for this country because Italy displays the lowest female employment rate among OECD economies as well as one of the lowest gender pay gaps (see Table 1). Yet, as we will see in Section 4, the role of sample selection tends to be quantitatively less significant in Italy than in other southern European economies, with equally low female employment rates (and equally high employment gender gaps). Why is it the case? We find that, similar to other socio-economic variables, the aggregate statistics hide a strong regional variation in gender employment and wage gaps - with Emilia Romagna resembling Scandinavian economies, Lombardia and the other regions of the Nord Ovest resembling France and Belgium and southern Italy resembling Greece and Spain. The econometric analysis shows that selection-adjusted wage gaps are higher than actual wage gaps in most cases. However, this difference is small in the northern Italian regions and becomes sizeable for central and southern regions. That is, the reason for the higher actual wage gaps in the north than in the center and the south is mainly due to a different process of selection into employment. Female participation rates in the south are low and concentrated among high-wage women. Having corrected for lower participation rates, the wage gap there widens and, in some cases, becomes higher than that of the northern Italian regions. Depending on the specification, selection correction can explain from 10 percent to most of the observed negative cross-regional correlation between wage and employment gaps across genders in Italy.

The rest of the paper is organized as follows. Section 2 analyzes cross-country differences in

the gender wage gap for the countries in our sample. Section 3 discusses the existing literature on the role played by cross-country differences in the wage structure and country-specific institutions in explaining the cross-country variation in gender wage gaps. In Section 4 we turn to a discussion of how the issue of sample selection may be affecting cross-country comparisons of the gender wage gap. In Section 5 we conclude with a discussion of the potential role of employment selection in explaining differences in the gender wage gap across Italian regions.

2 Cross-country Evidence on Gender Gaps

There are substantial differences in the gender wage gap across countries. Column 1 in Table 1 presents 2000 data on the female\male hourly earnings ratio for all employees.[1] Women's hourly earnings are lower than men's in all countries. On average, women earn 86 percent of what mean earn. The gender gap is smallest (less than 10 percent) in Italy, Portugal, Norway and Sweden, and it ranges between 10 and 15 percent in Greece, Spain, Belgium, France, Ireland and the other Scandinavian countries. The gender gap is largest (around 20 percent) in the United States, the United Kingdom, Austria, Germany and the Netherlands. Note that some of the countries with the lowest gender gaps are characterized by the lowest female employment rate (see column 2 in Table 1). We will come back to this observation in Section 4.

Next, in Table 2 we report the female\male hourly earnings ratio by age groups. As shown in the table with the exception of Denmark, Italy, Spain, Austria, Germany and Portugal, the hourly female\male wage ratio is around 10 percentage points higher for younger women than for older women. Both age and cohort effects are at work here. First, young women tend to be more similar to young men in terms of accumulated labour market experience. Second, for the recent generations, the education gap has narrowed substantially.[2]

Finally, we turn to the analysis of how the gender wage gap has evolved between 1986 and 2000. Table 3 presents data on the growth of the female\male (median) earnings ratio for the subset of countries for which longer time series data are available. The female\male earnings ratio has been increasing in most of the countries in our sample since the early 1980s. The largest increase (around 2 percent per year) has occurred in Canada, Italy and the Netherlands followed by the US and the UK (where the ratio increased by approximately 1 percent per year). The wage gap was essentially constant in Finland and Sweden and increased only slightly in France

[1] Here we abstract from cross-country differences in flexible work arrangements, such as part-time work and its associated wage penalty. See Petrongolo (2004) for a detailed analysis of this issue.

[2] See Del Boca et. al. (2005) and Dolado, Felgueroso and Jimeno (2002).

and Germany. This is an interesting result because both the strong decline in the gender wage gap in the United States, and the stagnation in Scandinavia, occurred at a time of rising wage inequality in the United States that by itself would tend to increase the gender wage gap. It follows that while US women improved their position in the earnings distribution relative to men, so as to offset the effects of the general increase in inequality, women in Sweden and Finland (and, to a lesser extent in France and Germany) might have seen a worsening of their relative position.[3]

However, despite the increase in the female-male earnings ratio during the 1990s, the US gender ratio in 2000 is still below its level in Italy - where the gender gap in employment is almost three times as large as in the United States (see Figure 1) - and Scandinavia - where the job segregation index is much larger than in the United States. The next two sections discuss work by Blau and Kahn (1996, 2003), the OECD (2002) and Olivetti and Petrongolo (2008) which aims at reconciling these facts.

3 Inequality and Institutions

The evidence presented in the previous section shows that although US women perform quite well in terms of human capital and occupational structure relative to their European counterparts, they face a much larger wage penalty relative to men. In this section we discuss the role of differences in wage compression and in the institutional setting of countries in explaining the observed cross-country patterns.

3.1 Income Inequality

Blau and Kahn (1996) highlight the importance of country differences in the overall wage structure in accounting for cross-country differences in the gender wage gap. Their argument is that since women tend to be more concentrated at the bottom of the wage distribution relative to men, due to poorer characteristics, institutions that compress the wage distribution, such as minimum wage legislation and highly centralized wage-setting, will also tend to decrease the gender wage gap.

In their 1996 study, Blau and Kahn use 1985-1989 International Social Survey Program (ISSP) data for 10 countries, supplemented by country-specific micro data sets for Italy, Sweden, and the United States, to analyze the importance of the overall wage structure in explaining cross-country differences in the gender wage gap. In particular, they study the reasons underlying the lower ranking of US women relative to their European counterparts on this dimension.

[3] See Blau and Kahn (1997), Datta Gupta, Oaxaca, and Smith (2002), Edin and Richardson (2002) and OECD, Employment Outlook (2002) for a discussion.

Blau and Kahn adapt the Juhn, Murphy and Pierce (1991) decomposition originally used to study wage differentials across demographic groups. The results obtained for this subset of countries show that US women perform better than their counterparts along the human capital dimension (except for Australia and Sweden). However, the US level of inequality in the wage structure makes their relative position worse. Wage inequality accounts for almost all the higher US pay gap relative to all countries except Sweden, where it accounts for 74 percent of the gap. The authors also analyze the relationship between cross-country differences in wage setting institutions, male wage inequality, and the wage gap and find some suggestive (although weak) evidence that supports their conjecture.

In a more recent paper Blau and Kahn (2003) use 1984-1994 ISSP data to test their hypothesis for a larger set of countries. In this paper they use a slightly different methodology to compare gaps across countries. They allow for the price of observable characteristics to differ across countries and across genders but use the observed characteristics of men and women in the United States as the benchmark. Moreover, they also include in the analysis measures of the net supply of labour by women across countries. In this case, they find stronger evidence that the variation in the gender wage gap across countries may be attributed to differences in the degree of inequality in the earnings distribution. They also show that, controlling for differences in the wage structure, the wage differential tends to be lower when the female supply of labour is lower with respect to its demand. This result is robust to the inclusion of institutional variables, collective bargaining, parental leave policies, unemployment insurance and employment protection. This evidence confirms that, to the extent that labour market institutions are an important component in explaining the degree of overall wage inequality, differences in labour market institutions can account for differences in the gender wage gap.[4]

A similar analysis is conducted in the 2002 OECD Employment Outlook for the EU-12 countries surveyed by the European Community Household Panel Survey (ECHPS). The OECD study uses the same decomposition method as in Blau and Kahn (1996) and considers an average of the 12 ECHPS countries as the benchmark economy. The results of this decomposition analysis show that the unadjusted wage gap would change in each country if its wage structure were similar to that of the benchmark economy. In particular, the gender wage gap in the UK would be reduced by between 2 and 4 percentage points under the benchmark (more compressed) wage structure. In contrast, the adjusted wage gap would increase in the Netherlands as a consequence of women's

[4]For example, they found that if collective bargaining coverage were to increase from 47 per cent to 82 per cent the gender wage gap would fall by about 10 per cent. Higher collective bargaining is known to compress the overall wage structure and so reduce inequality along all dimensions.

higher concentration in lower-paid occupational groups. The adjustment can explain (almost fully) the lower gender wage gaps in Denmark and Finland than in the benchmark economy. However, it cannot explain (almost any of) the difference in gender gaps for Italy, Spain, France, Germany and other central European economies. For these countries, the inequality-adjusted gender wage gaps are fairly similar to those computed using the country-specific wage distribution.

These studies emphasize the importance of differences in wage compression in accounting for the lower gender wage gaps in most European countries than in the US or the UK- with the strongest, more robust, results obtained when comparing the US to Sweden or Finland. This emphasis seems reasonable since all widely used indexes of wage dispersion unanimously predict higher inequality in the US than in European countries. However, as employment levels – not just wage distributions – vary substantially across the Atlantic, measures of wage dispersion may not be informative enough, especially in some countries, and both prices and quantities in the labor market need to be taken into account in order to evaluate gender inequalities across countries. This is the contribution of the paper by Olivetti and Petrongolo (2008) which we will discuss in Section 4.

3.2 Institutions

We next present evidence on the role of differences in a number of institutions, namely employment protection legislation, parental leave policies, and product market regulation, in explaining the observed cross-country differences in the gender wage gap. Besides affecting overall wage dispersion, some institutions may have an effect *per se* on the level of the wage gap in a country, over and above the role played by wage dispersion. This discussion summarizes findings reported in Pissarides, Garibaldi, Olivetti, Petrongolo and Wasmer (2005).

They find that more generous measures of the unemployment insurance system and measures of employment protection for temporary jobs both tend to decrease gender wage gaps. However, these effects disappear once they control for the degree of product market regulation. It is also interesting to discuss how their results vary by age groups. For the group of 35 to 44 year old women they find that, consistent with Blau and Kahn (2003), larger bargaining coverage decreases the gender gap in wages. However, this is not the case for younger women (25 to 34). In this case, a lager degree of bargaining coverage tends to *increase* the gap. Stricter EPL for regular contracts has the same effect. This is consistent with the story that these institutions, designed to protect the "insiders" in the labour market, have a larger negative impact on the employment and pay opportunities of the young. The results suggest that the negative effect is larger for young women

than for young men. Also, for this age group, they find that stricter EPL for temporary contracts and a larger UI benefit replacement ratio both tend to decrease the gap. Finally, for women 35 to 44 year old, more generous parental leave entitlements tend to significantly increase the gender wage gap. This finding is consistent with the evidence provided by Ruhm (1998) and Del Boca and Pasqua (2005) who shows that parental leave is associated with higher overall female employment but with reductions in the female\male wage ratio. These results are obtained on a relatively small set of countries, and should thus be interpreted as suggestive evidence of relevant associations rather than firm conclusions.

In order to ease this concern, Pissarides et al. (2005) also use a variety of data sources to construct a data set of repeated cross-country observations. This analysis confirms some of the previous results. They find that union bargaining coverage tends to decrease the gender wage gap. This is consistent with the argument put forth by Blau and Kahn (2003) that, since women tend to be more concentrated at the bottom of the wage distribution relative to men, institutions that compress the wage distribution will also tend to decrease the gender wage gap. They also find that more generous parental leave policies tend to significantly increase the wage gap (although this effect disappears when country fixed effects are included in their regressions). Finally, they find that none of these institutions has a significant impact on cross-country differences in the gender wage gap once they control for the occupational distribution by gender. So again it seems that while a number of institutions have the expected relationship with the gender wage gap, their role is substantially diminished once relative characteristics of working men and women are taken into account. The next section explores the importance of cross-country differences in selection along wage characteristics in explaining the observed international variation in gender pay gaps.

4 Selection

An alternative view on the cross-country variation in the gender wage gap investigates the role of different selection pattern of women into employment across countries, with the consequent differences in the composition of employment. This view, developed by Olivetti and Petrongolo (2008) (henceforth OP), is supported by the striking international variation in gender and employment gaps. As shown in Figure 1 these two statistics are negatively correlated across countries. Gender pay gaps range from about 30 percentage points in the US and the UK, to 10-20 percentage points in central and northern Europe, down to 10 percentage points or less in Scandinavia and southern Europe. Interestingly, countries with very high wage gaps tend to have low employment gaps and

vice versa, with the exception of Scandinavian countries were both employment and wage gaps are low. Variation in employment gaps is mostly driven by variation in female employment rates (from 40-50 percent in southern Europe, to 75-85 percent in the UK, the US and Scandinavia). If women's selection into employment is non-random, one needs to worry about the way in which selection may affect the resulting gender wage gap. In particular, if women who are employed tend to have relatively high-wage characteristics, low female employment rates may become consistent with low gender wage gaps simply because low-wage women would not feature in the observed wage distribution. This idea could thus be well suited to explain the negative correlation between gender wage and employment gap that is observed in the data.

This view is explored by estimating selection-corrected wage gaps. The main goal is to recover the counterfactual wage distribution that would prevail in the absence of non-random selection into work - or at least some of its characteristics. In order to do this, OP recover information on wages for those not in work in a given year using alternative imputation techniques. This approach is closely related to that of Johnson, Kitamura and Neal (2000) and Neal (2004), and simply requires assumptions on the position of the imputed wage observations with respect to the median. The attractive feature of median regressions is that, if missing wage observations fall completely on one or the other side of the median regression line, the results would only be affected by the position of wage observations with respect to the median. Importantly, it does not require assumptions on the actual level of missing wages, as typically required in the matching approach, nor it requires arbitrary exclusion restrictions often invoked in two-stage Heckman sample selection correction models.[5]

More formally, let w denote the natural logarithm of hourly wages and $F(w|g)$ the cumulative log wage distribution for each gender, where $g = 1$ denotes males, and $g = 0$ denotes females. The variable of interest is the difference between (log) male and female median wages:

$$D = m\left(w|g=1\right) - m\left(w|g=0\right), \tag{1}$$

where $m()$ is the median function. The (log) wage distribution for each gender is defined by:

$$F\left(w|g\right) = F\left(w|g, I=1\right)\Pr(I=1|g) + F\left(w|g, I=0\right)\left[1 - \Pr(I=1|g)\right], \tag{2}$$

where $I = 1$ for the employed and $I = 0$ for the non-employed.

Estimated moments of the observed wage distribution are based on the $F\left(w|g, I=1\right)$ term alone. If there are systematic differences between $F\left(w|g, I=1\right)$ and $F\left(w|g, I=0\right)$, cross-country

[5] See Olivetti and Petrongolo (2008) for a discussion of alternative sample selection methodologies and imputation rules.

variation in $\Pr(I = 1|g)$ may translate into misleading inferences concerning the international variation in the distribution of potential wage offers. This problem typically affects estimates of female wage offer distributions; even more so when one is interested in cross-country comparisons of gender wage gaps, given the cross-country variation in $\Pr(I = 1|g = \text{male}) - \Pr(I = 1|g = \text{female})$, measuring the gender employment gap. But $F(w|g)$, the term of interest, is not identified, because data provide information on $F(w|g, I = 1)$ and $\Pr(I = 1|g)$, but clearly not on $F(w|g, I = 0)$, as wages are only observed for those who are in work.

In particular, using (2), the median log wage for each gender, m, is defined by

$$F(m|g, I = 1)\Pr(I = 1|g) + F(m|g, I = 0)[1 - \Pr(I = 1|g)] = \frac{1}{2}. \tag{3}$$

The goal of this methodology is to retrieve gender gaps in median (potential) wages, as illustrated in equation (1), with gender medians defined in equation (3). This amounts to retrieving information on $F(m|g, I = 0)$, representing the probability that non-employed individuals have potential wages below the median.

OP use panel data sets for the US (the Panel Study of Income Dynamics, PSID) and for European countries (ECHPS) for the period 1994-2001 to estimate median wage gaps under alternative imputation rules, i.e. under alternative conjectures over $F(m|g, I = 0)$. The impact of selection into work is assessed by comparing estimated wage gaps on the sample of employed workers with those obtained on the samples enlarged with wage imputation for the non-employed, in which selection issues are alleviated.

Imputation is performed in several ways. First, they exploit the panel nature of the data sets available, and for all those not in work in some base year, search backward and forward to recover hourly wage observations from the nearest wave in the sample. The underlying identifying assumption is that, for a given individual i, the latent wage position with respect to her predicted (gender-specific) median when she is non-employed can be proxied by her wage in the nearest wave in which she is employed. That is, they assume that

$$F(m|g_i, I_{it} = 0) = F(m|g_i, I_{it'} = 1) \tag{4}$$

where t is the base year, and t' is the wave nearest to t in which a non-missing wage observation is available. As the position with respect to the median is determined using alternative information on wages, as opposed to measured characteristics, this imputation rule amounts to allowing for selection on unobservables.

This procedure of imputation makes sense if an individual's position in the wage distribution stays on the same side of the median when switching employment status. While imputation based

on this procedure arguably uses the minimum set of potentially arbitrary assumptions, it has the disadvantage of not providing any wage information on individuals who never worked during the sample period. In order to recover wage observations also for those never observed in work, OP use observable characteristics of the non-employed, such as (un)employment status, education and experience, to make educated guesses concerning their position with respect to the median. This amounts to allowing for selection on observable characteristics only, assuming that the non-employed would earn wages "similar" to the wages of the employed with matching characteristics, where "similar" means on the same side of the base-year, gender-specific median. Formally this can be illustrated with a simple example. Suppose that we assume that people who are looking for a job tend to have worst characteristics than those who are employed. Under this assumption the information on the unemployment status of individuals with missing wages is used to place them below their (gender-specific) median. More formally, this amounts to assuming

$$F(m|g_i, I_i = 0, u_i = 1) = 1 \tag{5}$$

where $u_i = 1$ if the individual is unemployed.[6] Having done this, earlier or later wage observations for those with imputed wages in the base year can shed light on the goodness of this imputation method.[7]

Table 4 presents a subset of results from the paper. Column 1 reports the actual wage gap for reference: this is the median wage gaps for individuals with an hourly wage in 1999, which is the base year. Wage gaps of column 1 replicate very closely those plotted in Figure 1, with the only difference that Figure 1 plotted mean as opposed to median wage gaps.[8] As in Figure 1, the US and the UK stand out as the countries with the highest wage gaps, followed by central Europe, and finally Scandinavia and southern Europe.

In column 2 (selection on unobservables) missing wage observations in 1999 are replaced with the real value of the nearest wage observation in the whole sample period, meaning a window of [-5, +2] years. Moving across from column 1 to column 2, gender wage gaps tend to increase as more wage observations are included into the imputed sample. This is indicative of positive sample selection, or, in other words, estimated wage gaps on the observed wage distribution are downward biased due to non-random sample selection into employment because low-wage women

[6] All variables in (5) refer to the (same) base year, so time subscripts are omitted.

[7] See OP for results on goodness of the alternative imputation method and additional analysis. This includes using probability models for assigning individuals on either side of the median of the distribution of wages and estimating *bounds* to the distribution of wages (Manski, 1994).

[8] Since this approach is based on the recovery of selection-corrected median wage gaps, the absence of any important difference between mean and median wage gaps on the observed wage distribution is quite reassuring.

are less likely to feature in the observed wage distribution. But there is important cross-country variation in the role of selection. In particular, one can see that the median wage gap remains substantially unaffected or marginally affected in the US, the UK, Scandinavia, Germany and the Netherlands; it increases by around 25 percent in Austria, Ireland, Italy and Portugal; by 40percent in Belgium; and by more than 60 percent in France, Spain and Greece. As expected, gender wage gaps tend to respond more strongly to selection correction in countries with high employment gaps. This can be clearly grasped by looking at the cross-country correlation between employment and wage gaps. In column 1 such correlation is -0.329, and it falls by 45 percent in column 3. Employment selection thus explains nearly a half of the observed correlation between wage and employment gaps. Note that this imputation method is relatively more conservative in assessing the effect of non-random employment selection in southern Europe than elsewhere. This is because (non)employment status tends to be relatively more persistent in southern Europe than elsewhere, and much more so for women than for men. Thus one can recover relatively fewer less-attached women in these countries.

In column 3 OP impute a wage below the median to all those who are unemployed (as opposed to non participants) in 1999. The unemployed by definition are receiving wage offers (if any) below their reservation wage, while the employed have received at least one wage offer above their reservation wage. At constant reservation wages, the unemployed have lower potential wages than the observed wages of the employed, and are thus assigned an imputed wage value below the median. This imputation leaves the median wage gap roughly unchanged with respect to the base sample in the US, the UK, Scandinavia, Germany, Austria and Ireland, and raises it substantially elsewhere, especially in southern Europe. Selection now explains 64 percent of the correlation between wage and employment gaps.

In column 4 they follow standard human capital theory and assume that all those with less than upper secondary education and less than 10 years of labor market experience have wage observations below the median for their gender. Those with at least higher education and at least 10 years of labor market experience are instead placed above the median. In the four southern European countries the gender wage gap increases enormously with respect to the actual wage gap of column 1, and as a consequence the correlation with employment gaps turns positive.

To broadly summarize these findings, one could note that whether one corrects for selection on unobservables (Column 2) or on observables (Columns 3 and 4), the results are qualitatively consistent in identifying a clear role of sample selection in countries with high employment gaps, and especially France and southern Europe. Quantitatively, the correction for sample selection is

smallest when wage imputation is performed using wage observation from other waves in the panel, and increases when it is instead performed using observed characteristics of the non-employed. As argued in OP, this is mainly due to different sizes of the imputed samples. While only individuals with some degree of labor market attachment feature in the imputed wage distribution in the first case, the use of observed characteristics may in principle allow wage imputation for the whole population, thus including individuals with no labor market attachment at all.

5 The case of Italy

The results in OP show that, while the raw wage gap is much higher in Anglo-Saxon countries than in southern Europe, the reason is probably not to be found in more equal pay treatment for women in the latter group of countries, but mainly in a different process of selection into employment. Female participation rates in Italy and the other Mediterranean countries are low and concentrated among high-wage women. In this section we use the same methodology, and data, as in the previous section to analyze the case of Italy. The ECHPS classifies Italian regions in 11 groups - that is, disaggregate information is only available for the following "regions": Nord Ovest, Lombardia, Nord Est, Emilia-Romagna, Centro, Lazio, Abruzzo-Molise, Campania, Sud, Sicilia and Sardegna (in Italian in the ECHPS data set and codebook).[9]

Figure 2 plots raw gender gaps in log gross hourly wages and employment rates for these regions. All estimates refer to 1999 which, for ease of comparison, will also be the base year in this analysis. We find that, consistent with our cross-country analysis, gender wage and employment gaps display a negative correlation across regions of Italy. Figure 2 seems to 'reproduce' figure one at a lower level of disaggregation.

At the risk of some oversimplification, one can classify regions in three broad categories according to their levels of gender employment gap and compare them to the countries in figure 1. Emilia-Romagna - with a female employment rate of 72 percent and a 15 percentage points gap in employment rates across genders - is similar to the US the UK, Finland and Denmark. Next, in Nord Ovest regions and Lombardia the gender employment gap is below 30 percentage points. These gaps are are comparable to those observed for central\northern European countries and Ireland. Finally, the employment gap is above 30 percentage points in the remaining regions with a maximum of 42 points in Apulia, Basilicata and Calabria. These gaps are similar to those

[9] "Nord Ovest" includes Trentino Alto Adige, Friuli Venezia Giulia and Veneto, "Nord Est" aggregates Aosta Valley, Piedmont and Liguria, "Centro" includes Tuscany, Umbria and Marche and "Sud" pools together Apulia, Basilicata and Calabria.

observed for Italy as a whole, Greece and Spain. Such gaps in employment to population ratios display a negative correlation with gaps in (log) hourly wages. Gender wage gaps in hourly wages are lowest, less than 5 log points, in central Italy (excluding Lazio,) Abruzzo-Molise, Campania, Sud and Sicilia where women's hourly wages are about 10 log points *higher* than men's hourly wages although the difference is not statistically significant. Next we have central and northern regions (excluding Emilia-Romagna) and Sardinia where the gender gap in hourly wages ranges from a minimum of 7 log points in Nord-Est, to a maximum of 13 log points in Lombardia. Finally, at 17.4 log points, Emilia-Romagna displays the largest gender wage gap across all the regions (but still lower than the one observed in Germany and Austria).

As in the cross-country analysis, such negative correlation between wage and employment gaps may reveal significant sample selection effects in observed wage distributions. The negative relationship between the two series across regions is even stronger than across countries. The coefficient of correlation between the two series is -0.615 and significant at the 5 percent level. Since sample sizes by region are reasonable but small (see Table 6) in figure 3 we replicate figure 2 by using all available information. That is, we pool together all the ECHPS waves and compute gender gaps in log hourly wages and employment on this sample (these can be interpreted as medium-run statistics). In this case the negative correlation becomes stronger, -0.824, and significant at the 1 percent level. The regional 'rankings' by gender employment and wage gaps are identical across the two figures.

This evidence supports the view that, if women who are employed in Southern Italy tend to have relatively high-wage characteristics, low female employment rates in these regions may become consistent with low gender wage gaps simply because low-wage women do not work and thus they do not feature in the observed wage distribution. We explore this conjecture by replicating the analysis in the previous section across Italian regions.

The results are reported in Table 5 which follows the same structure as Table 4. Column 1 reports the actual median wage gap (for reference), column 2 the results using imputation from the nearest available wave, columns 3 and 4 refer to imputation on observables using unemployment status and education and experience, respectively.

Column 1 shows that while gender wage gaps are negative, relatively large and statistically significant in all the northern regions and Lazio for all remaining regions women's and men's wages are not significantly different from each other (although they tend to be negative for most regions except for Sud and Sicilia where women seem to earn more than men do).

Moving from column 1 to column 2, one can see that the median wage gap remains substan-

tially unaffected or marginally affected in all the northern regions and Sardinia and increases substantially in the remaining regions. Interestingly, the gender gap on the imputed distribution actually declines (by 5 and 10 percent, respectively) in Lombardia and Emilia-Romagna - thus implying a negative selection in the labor force for these regions.[10] That is, in this case it is women with high-wage characteristics who seem to have a more intermittent participation to the labor market. The gap increases by around 20 percent in Lazio and Campania, becoming (more) statistically significant; by 35 percent in Abruzzo-Molise; and by more than 80 percent in Centro regions. The gap also increases in the Sud and in Sicilia - where it becomes negative, although it remains not statistically different from zero. Once again, gender wage gaps tend to respond more strongly to selection correction in regions with higher employment gaps and this is reflected in the cross-regional correlation between employment and wage gaps which falls from -0.750 in column 1 to -0.674 in column 3 (a 10 percent decline) and looses significance. The fact that under this imputation rule we obtain a small effect of non-random employment selection is not surprising. In columns 1-4 of Table 6 we report the proportion of the adult population that is either working or has an imputed wage. When moving from column 1 to 2, the fraction of women included increases in most regions, including some regions where the estimated wage gap is not greatly affected by the sample inclusion rules. However, although female employment rates in the southern regions increase their level remain quite low (38 percent in Sicilia and around 45 percent in Sud, Campania and Sardegna). That is, we can recover relatively fewer less-attached women in these regions than elsewhere because they are characterized by more persistent employment patterns. Entries in Table 6 also show that the fraction of men included in the sample increases, albeit less than for women. It is thus not simply the lower female employment rate in several regions that drives our findings, it is also the fact that in some regions selection into work seems to be less correlated to wage characteristics than in others.

This is clear when we compare column 1 to columns 3 and 4. In both columns we use observable characteristics to impute wages for the non-employed. Median wage gaps are only marginally affected in the Nord Ovest down to Emilia-Romagna. However, in the remaining regions the gender wage gap increases enormously with respect to the actual wage gap of column 1, especially so in Campania, Sud and Sicilia. As a consequence the correlation with employment gaps turns positive (and insignificant). Under this imputation rule, selection explains virtually all the negative cross-regional correlation between wage and employment gaps.

[10] This is an interesting feature of the OP methodology. Imputation based on unobservable does not requite any assumption on the 'sign' of selection into employment ex-ante. Thus, we can potentially obtain lower estimate of the gender wage gap on the imputed than on the actual wage distribution.

A similar pattern emerges in column 4. In Campania and Sardegna we obtain median gender wage gaps of approximately 80 percentage points on the imputed distribution. Moreover, we cannot report estimates for Sud and Sicilia since the inference in this case is not valid. This is because the female median wage on the imputed sample falls in the imputed set. That is, more than half of the female sample not in work in 1999 has low-wage characteristics (lower than upper-secondary education and less than 10 years of labor market experience). Very few observations are imputed above the median because in these regions most if not all of the women with high education (a college degree or higher) and experience on the labor market (10 years or higher) actually are at work in 1999. These findings are revealing. They suggest that, especially for this group of regions, the most salient characteristics of 'missing' women in the labor market are (low) education and (low) labor market experience.

As in the cross-country analysis, the results reported in this section consistently indicate the importance of sample selection (on a small set of observable characteristics) in regions with high employment gaps.

6 Concluding Remarks

The study of international or regional differences might have important implications for Equal Opportunity policies. In areas where selection dominates, stricter implementation of equal pay policies would have a limited impact, as the problem is rather rooted in low female employment rates. In this case equal employment policies would be best suited, and these range from anti-discrimination hiring regulations to family policies aimed at raising participation of mothers such as the rights to flexible working times and subsidized child-care. With this in mind, we conclude with a brief discussion of potential determinants of the regional variation in the level and composition of female employment.

One important factor is identified in a recent paper by Del Boca and Vuri (2007). Their analysis shows that while the quality of public child care is quite high in general, and fairly homogeneous across regions, both the availability and the flexibility in the hours of child care services are limited and heterogenous with respect to household characteristics such as income and area of residence. They also show that these factors are important determinants of female employment and child-care decisions. Given these premises their argument that differences in the characteristics of the child care system across regions might have a significant role in explaining the observed cross-regional variation in female employment seems quite convincing.

Differences in cultural beliefs about gender roles and family values (see Fernández and Fogli, 2009, Fernández, 2007 and Fortin, 2005) might also play a role. Besides affecting women's incentives to work, these "fuzzy" variables may also shape employers' beliefs about women's labor force attachment, and thus the demand for female labor. In addition, labor market conditions as well as the sectorial composition of the (local) economy may also be significant determinants of gender employment gaps. Disentangling supply and demand factors that drive the observed variation in female employment rates is interesting and important but rather complicated. In ongoing work Olivetti and Petrongolo (2009) exploit employment and wage differences across countries, genders and skills to address this issue. Similarly to the analysis discussed in this paper, their findings might have interesting implications for understanding the variation in women's labor market outcomes across Italian regions.

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Table 1: Gender Earnings Ratios and Female Employment Rates, 2000 (%)

	Female/Male Ratio Mean Hourly Earnings	*Female Employment Rate*
Anglo-Saxon		
Canada	83.4	70.4
UK	78.9	68.9
USA	77.6	70.7
Scandinavia		
Denmark	87.5	75.9
Finland	85.4	72.1
Norway	92.5	76.5
Sweden	91.9	76.4
Mediterranean		
Greece	87.5	49.7
Italy	95.2	46.3
Spain	85.9	52.9
Rest of Europe		
Austria	79.4	61.8
Belgium	88.0	56.6
France	88.5	61.7
Germany	79.5	63.3
Ireland	86.5	55.7
Netherlands	80.4	65.3
Portugal	90.5	63.8

Notes: Statistics for 16-64 years old age group. Data sources. Gender Earnings Ratios: ECHPS, US and Canadian Census of Population, Statistics Norway and Statistics Sweden web pages. The gap is computed as the female/male ratio of mean hourly earnings for all wage and salaried workers. The samples exclude the self-employed, the military and those in full-time education. Female Employment Rates: OECD Stat web page.

Table 2: Gender Earnings Ratios by Age, 2000

	25-34	35-44	45-54
Anglo-Saxon			
Canada	88.6	80.3	74.8
UK	87.1	73.2	71.0
USA	82.9	72.7	67.4
Scandinavia			
Denmark	91.6	93.1	88.3
Finland	91.9	82.1	80.4
Mediterranean			
Greece	96.0	93.0	81.0
Italy	98.2	97.7	98.0
Spain	88.6	86.3	85.2
Rest of Europe			
Austria	79.9	80.5	77.6
Belgium	93.5	97.1	86.8
France	94.1	88.9	81.7
Germany	84.6	78.1	79.9
Ireland	98.1	86.0	68.6
Netherlands	99.3	81.6	75.6
Portugal	80.3	83.4	82.0

Notes: Author's calculations based on ECHPS data for European countries, CPS, Demographic Files for the US and Census data for Canada. The gap is computed as the female/male ratio of median hourly earnings for all wage and salaried workers. The sample excludes the self-employed, the military and those in full-time education.

Table 3: Evolution of Gender Earnings Ratios

	1986	2000	Average Yearly Growth 1986-2000 (%)
Anglo-Saxon			
Canada	65.2	85.4	1.95
UK	66.5	76.4	1.00
USA	67.8	76.0	0.82
Scandinavia			
Sweden	83.2	84.5	0.11
Finland	77.5	79.6	0.19
Mediterranean			
Italy*	70.1	83.3	1.74
Rest of Europe			
France	83.6	87.6	0.33
Germany	71.0	77.0	0.58
Netherlands	67.0	78.6	1.15

Notes: Female/Male Median Earnings Ratio for Full-time, Year-round workers. Data source: OECD Earnings Database.
*For Italy the latest year available is 1996.

Table 4: Gender Wage Gaps Across Imputation Rules, OECD Countries

	1 Base sample	2 Imputation on unobservables Wages imputed from other waves (-5,+2 window)	3 Imputation on observables Educated guess: low wage imputed if unemployed	4 Imputation on observables Educated guess: low (high) wage imputed if education<upper sec. (>= higher educ.) & experience<10 (>=10) yrs
US	0.339	0.361	0.335	0.348
UK	0.256	0.284	0.238	0.253
Finland	0.160	0.197	0.179	0.16
Denmark	0.086	0.100	0.1	0.092
Germany	0.191	0.214	0.214	0.196
Netherlands	0.178	0.199	0.246	0.189
Belgium	0.078	0.112	0.113	0.084
Austria	0.192	0.234	0.21	0.208
Ireland	0.232	0.284	0.213	0.241
France	0.095	0.152	0.134	0.102
Italy	0.059	0.075	0.092	0.088
Spain	0.097	0.168	0.182	0.109
Portugal	0.150	0.186	0.188	0.162
Greece	0.111	0.184	0.175	0.16
Correlation	*-.329**	*-0.181*	*0.435*	*-0.200*

Notes: Columns 1-2 (3-4) reproduce the same columns from Table 2 (Table 3) in Olivetti and Petrongolo (2008)**. All median wage gaps are significant at the 1% level**. Figures in the last row display the cross-country correlation between the reported gender wage gap and the gender employment gap (* significant at the 10% level). Sample: aged 25-54, excluding the self-employed, the military and those in full-time education, 1999. Source: PSID and ECHPS.

Table 5: Gender Wage gaps Across Imputation rules, Italian Regions

	1 Base sample	2 Imputation on unobservables Wages imputed from other waves (-5,+2 window)	3 Imputation on observables Educated guess: low wage imputed if unemployed	4 Imputation on observables Educated guess: low (high) wage imputed if education<upper sec. (>= higher educ.) & experience<10 (>=10) yrs
Nord Ovest	-0.100***	-0.109***	-0.089**	-0.125***
Lombardia	-0.102***	-0.097***	-0.113***	-0.117***
Nord Est	-0.094***	-0.097***	-0.101***	-0.104***
Emilia-Romagna	-0.172***	-0.155***	-0.170***	-0.181***
Centro (I)	-0.049	-0.091**	-0.102***	-0.122***
Lazio	-0.082**	-0.099***	-0.085*	-0.269***
Abruzzo-Molise	-0.087	-0.118**	-0.191***	-0.223***
Campania	-0.006	-0.114**	-0.142*	-0.884***
Sud	0.008	0.01	-0.179***	.
Sicilia	0.022	-0.009	-0.176	.
Sardegna	-0.107	-0.102*	-0.333***	-0.788***
Correlation	*-0.750****	*-0.674***	*0.103*	*0.353*

Notes: Figures in the last row display the cross-country correlation between the reported gender wage gap and the gender employment gap. *** Significant at the 1% level, ** significant at the 5% level, * significant at the 10% level. Sample: aged 25-54, excluding the self-employed, the military and those in full-time education, 1999. Source: ECHPS.

Table 6: Percentage of adult population in samples for Tables 5

	No. obs. 1999		1		2		3		4	
	M	F	M	F	M	F	M	F	M	F
Nord Ovest	265	288	87.9	64.9	93.6	75.0	95.8	70.5	88.7	71.2
Lombardia	292	372	93.2	65.3	97.6	74.7	96.2	68.0	94.2	68.3
Nord Est	317	390	92.1	59.2	96.2	72.3	94.6	64.1	92.7	63.6
Emilia-Romagna	144	173	87.5	72.3	96.5	86.1	93.8	79.8	87.5	75.7
Centro (I)	342	386	90.9	55.4	97.7	66.8	95.6	62.4	92.1	67.1
Lazio	197	242	82.2	41.7	93.9	55.0	91.9	47.1	87.3	60.3
Abruzzo-Molise	196	213	68.9	36.2	87.8	50.2	83.7	54.0	70.9	52.1
Campania	354	401	66.4	31.4	82.8	46.9	91.8	45.9	75.7	60.1
Sud	473	580	74.4	32.1	88.6	45.3	89.9	48.1	79.1	61.2
Sicilia	286	391	63.3	26.1	83.6	37.9	85.7	44.5	69.9	64.7
Sardegna	223	280	66.8	31.8	89.7	45.4	90.1	49.3	76.7	65.0

Notes: Figures in columns 1-4 represent the proportions of males and females included in the sample for columns 1-4 in Tables 5. Sample: aged 25-54, excluding the self-employed, the military and those in full-time education. Source: ECHPS.

Sample inclusion rules by column:

1. Employed at time of survey in 1999.
2. Wage imputed from other waves when non-employed (-5, +2 window).
3. Impute wage<median when unemployed.
4. Impute wage<median when non-employed & education<upper secondary & experience<10 years.
   Impute wage>median when non-employed & education>=higher educ. & experience>=10.

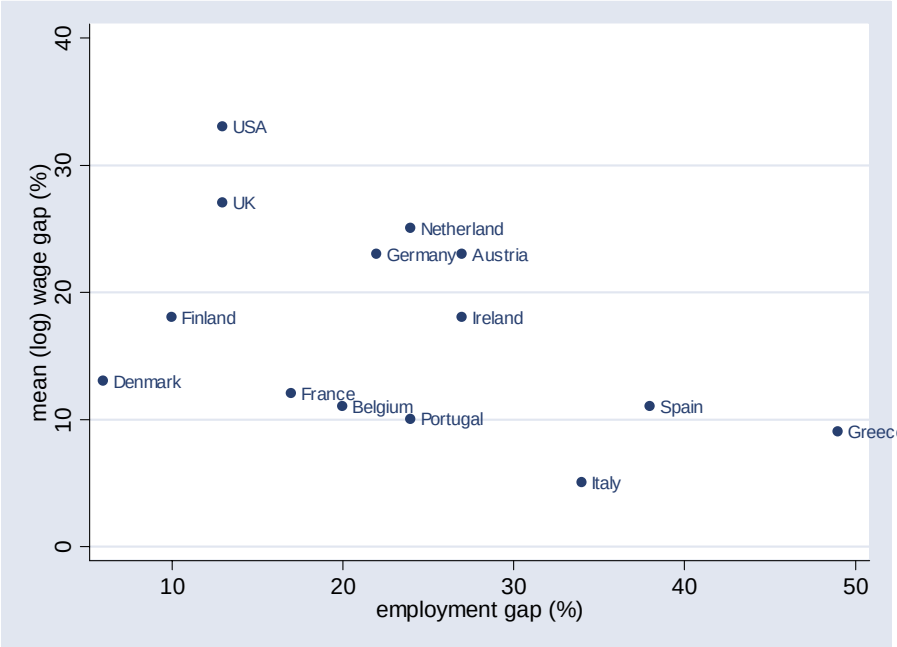

Figure 1: Gender gaps across OECD countries, 1999
(Coefficient of correlation: -0.474*)

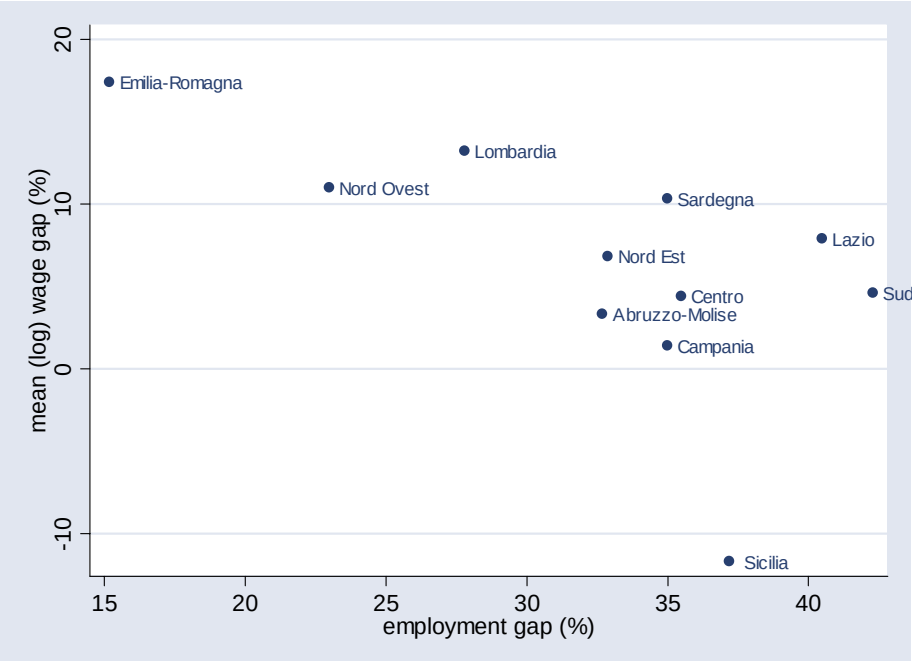

Figure 2: Gender gaps across Italian regions, 1999
(Coefficient of correlation: -0.615**)

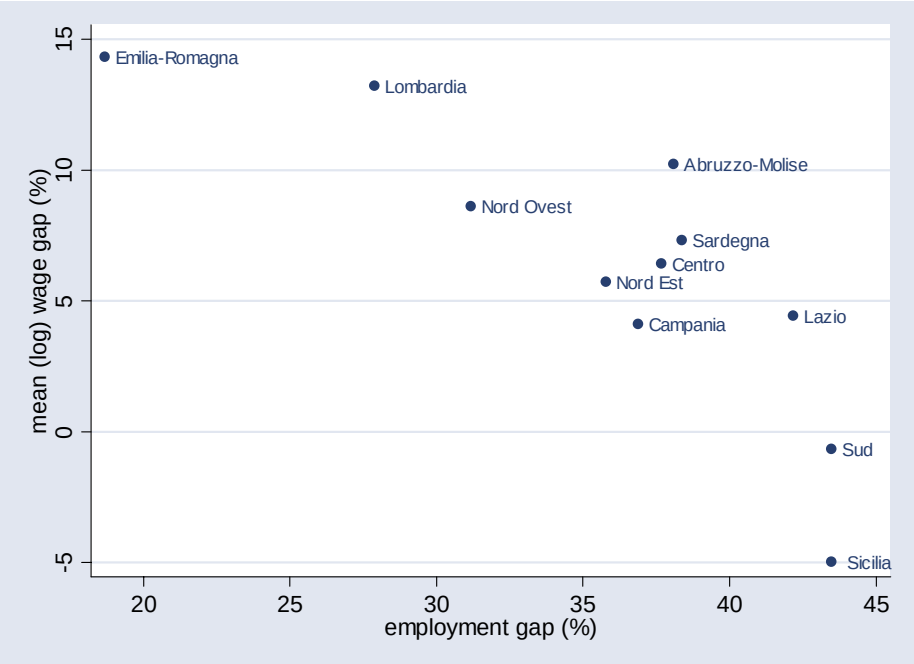

Figure 3: Gender gaps across Italian regions, all waves
(Coefficient of correlation: -0.824***)