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ABSTRACT

The Gender Wage Gap in Chile 1992-2003 from a Matching Comparisons Perspective*

This paper analyzes the evolution of the gender wage gap in Chile during the period 1992 to 2003 using the decomposition approach developed in Nopo (2004). This approach, which decomposes the wage gap into four additive elements, stresses the need for comparisons inside the common support for the distributions of observable characteristics of individuals. Also, it allows an analysis of the distribution of unexplained differences in wages (not only the averages). The results suggest that, besides the high educational attainment of females, there are noticeable gender wage gaps in Chile favoring males. These unexplained differences in wages, which move around 25 percent of average female wages, show no clear tendency during the period of analysis. The wage gaps are higher at the highest percentiles of the wage distribution, among those with higher educational attainment, among directors and among part-time workers. The technique also detects some evidence of a glass-ceiling effect in Chilean labor markets, such that for some occupations and particular combinations of observable characteristics, there are highly paid males but not females.

JEL Classification: C14, D31, J16, O54

Keywords: matching, non-parametric, gender wage gap, Latin America

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1. Introduction

Despite major advances in the education of the female labor force in Chile relative to males, gender differences in wages remain noticeable. Apparently, there are other human capital characteristics of individuals that the labor markets reward differently by gender, favoring males. This paper is an attempt to explore the role of some of these individual characteristics.

The literature on the Chilean gender wage gap is not new, and the first studies on the topic include the works of Paredes (1982) and Paredes and Riveros (1993). Performing Blinder-Oaxaca decompositions for the period 1958-1990 in the metropolitan area of Santiago, they provide evidence on unexplained wage differences against females during the whole period examined. Interestingly, they found that these unexplained differences in wages are correlated with the business cycle. Along similar lines, both methodologically and with respect to the data set utilized, Contreras and Puentes (2000) studied the evolution of gender gap for the period 1958-1996 in Greater Santiago, arriving at similar conclusions. Also, they document evidence that suggests that the unexplained differences in wages decreased from the 1960s to the 1980s, but this trend was reversed in the 1990s. Additionally, they found that these unexplained gender differences in pay are mostly a result of the underpayment of females rather than the overpayment of males.

The work of Montenegro and Paredes (1999) introduced the quantile regressions approach to the analysis, complementing the Blinder-Oaxaca decompositions. Using the same data set as the previous studies for the period 1960-1998, the authors found systematic differences in returns to education and to experience by gender along the conditional wage distribution. Returns to education are larger for women than for men in lower quantiles, while they are lower in the upper quantiles. The authors did not find a systematic pattern in the level of unexplained differences in pay over time except for the last decade, where, despite a tighter labor market, they observed an increase in the gender wage differential. They show that the gender wage gap is much greater in the upper quantiles. Interestingly, they reported that although the gender wage gap has been falling in Chile, the unexplained component of it has been increasing at the same time. This results is consistent with the one presented by García, Hernández and López (1997)

Along the same line of using quantile regressions with Blinder-Oaxaca decompositions, Montenegro (2001) analyzes gender differentials in returns to education, returns to experience,

and gender wage differentials. Montenegro used micro data sets from the CASEN Survey, which are nationally and regionally representative for the period 1990-1998. He found systematic differences in returns to education and to experience by gender along the conditional wage distribution. The results show that returns to education are significantly different for women and men by quantiles, although returns to education at the median produce very similar results for men and women, implying that an OLS mean estimate will not be able to detect gender differences. The results for returns to years of experience show that in the lower quantiles men and women have similar rates of return, whereas in the upper quantiles men tend to have higher rates of return. Montenegro also found evidence that the unexplained wage differential is higher in the upper quantiles of the conditional wage distribution. In particular, we show that the unexplained wage gap steadily increases from 10 percent to 40 percent as we move from the lower part to the upper part along the conditional wage distribution.

Using the CASEN Survey, García studies the labor market participation of females and the gender wage gap for the period 1990-1998. Among the findings, the author observed that the participation of females in the labor market increases across income quintiles. While only 24 percent of the females in the first income quintile work, the corresponding percentage for the top quintile is 42 percent. The gender wage gap also varies across income quintiles, from 43 percent at the first quintiles to 59 percent at the top quintile. The author found similar results when analyzing the gender wage gap for different sectors and types of job. As the difference in wages for men and women remain stable over the period, she concludes that this constitutes a persistent phenomenon in Chile.

This paper introduces a recently developed approach for the analysis of wage differentials, namely the use of matching comparisons. In such a way, according to Ñopo (2004), the gender wage gap is decomposed into four additive elements that take into account not only differences in observable characteristics of individuals, but also differences in supports for the distributions of those characteristics. This implies a more precise measurement of the explained and unexplained components of the wage gap. On top of that gain on precision, the matching approach allows for a deeper exploration of the unexplained component of the gap and its distribution. Next, Section 2 of this paper introduces data for the analysis of gender wage gaps, emphasizing gender differences in individuals' observable characteristics that the labor market rewards. Section 3 presents gender wage gap decompositions for different specifications of the

matching technique developed in Ñopo (2004), emphasizing the analysis of the distribution of the unexplained differences. Section 4 concludes.

2. The Data: Human Capital Characteristics of the Working Population by Gender in Chile 1992-2003

All the statistics and estimations presented in this study are based on the CASEN, the official household survey of Chile that has been undertaken by MIDEPLAN since 1987. The survey covers the entire population in both urban and rural areas, and the period under analysis runs from 1992 to 2003. Since the main objective of this study is to estimate and explain gender wage gaps in Chile, the population under consideration is all employed females and males between 16 and 75 years old; we abstract from selection issues.

When trying to explain the differences in earnings between women and men, one can attribute them to some observable characteristics of the individuals that are determinants of wages. This would be a valid argument in cases where differences in age, education, occupational experience and occupation, among other characteristics, exist. However, these differences only partially explain the wage gap. The purpose of this paper is to measure precisely the extent to which differences in characteristics explain differences in pay.

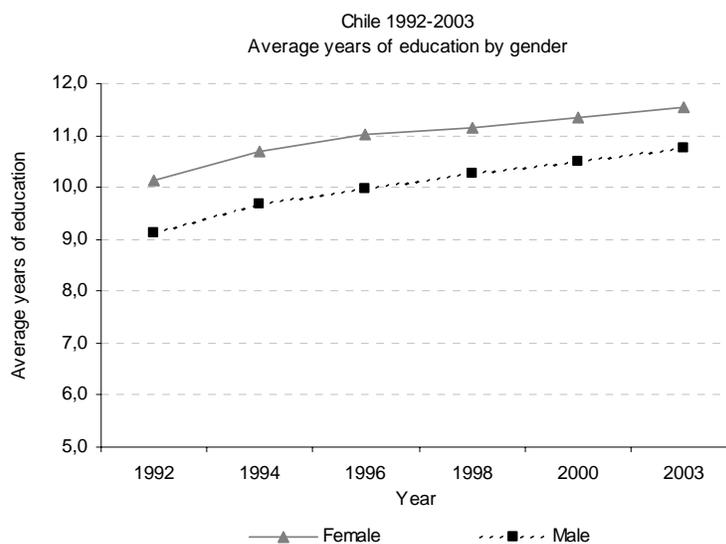
Exploring some descriptive statistics by gender will elucidate this notion. In this section we present the main characteristics of females and males workers, such as education, labor market participation, unemployment rates, average hours of works and hourly wages. The analysis of these characteristics supports the decompositions of wage gaps by introducing a matching comparisons approach.

2.1 Education

In Chile, female workers systematically show higher levels of education than males. In Figure 1 we present the average years of schooling by gender in the last decade. As can be seen from the figure, females have on average one more year of schooling than males. In 1992, women had on average 10 years of education, while for men the average was 9 years. In 2003, the average was 11.5 years of schooling for women and 10.7 years for men. However, the observed rise in the average years of schooling during the decade was more intense for men than for women. In the whole decade, the average years of education for women increased by 14 percent, while for men

the average increased by 17 percent. As a result, the schooling gender gap slightly narrowed in Chile during the 1990s, although it is still favoring females.

Figure 1.



Source: Author's calculations based on the CASEN, Mideplan.

The educational gender gap in Chile is observed in both rural and urban areas. Figures 2 and 3 show the average years of schooling by gender and area. The average years of schooling for female and male workers in rural areas is 7.1 years, while in urban areas it is 10.6 years. In the 1992-2003 period the average increased in both areas. Large differences are observed in the years of schooling of working females and males in rural areas. In rural areas, women have on average 1.6 years of education more than men, while in urban areas this difference falls to 0.5 years.

Figure 2.

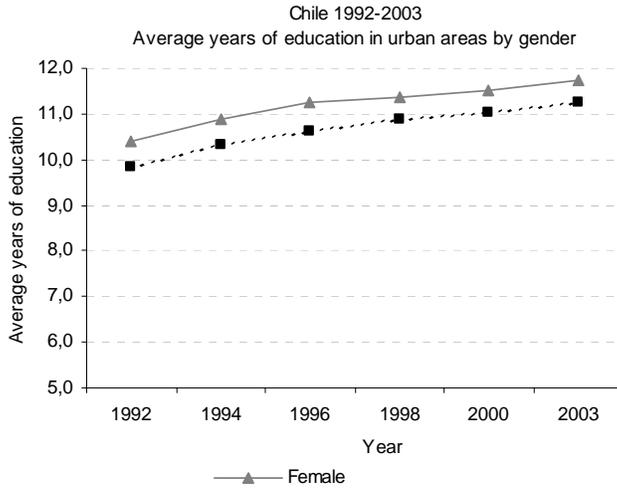
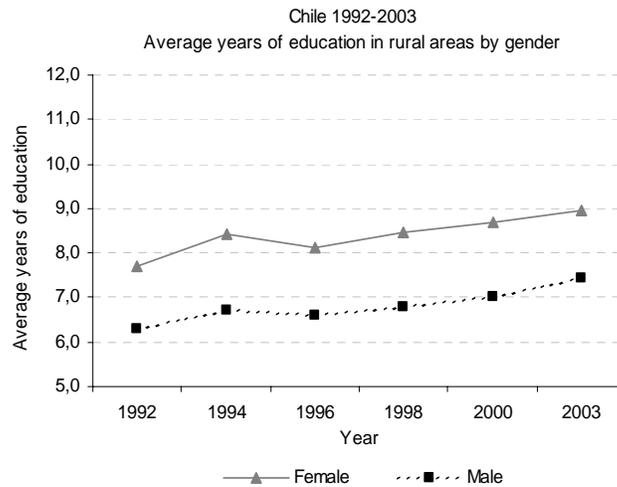


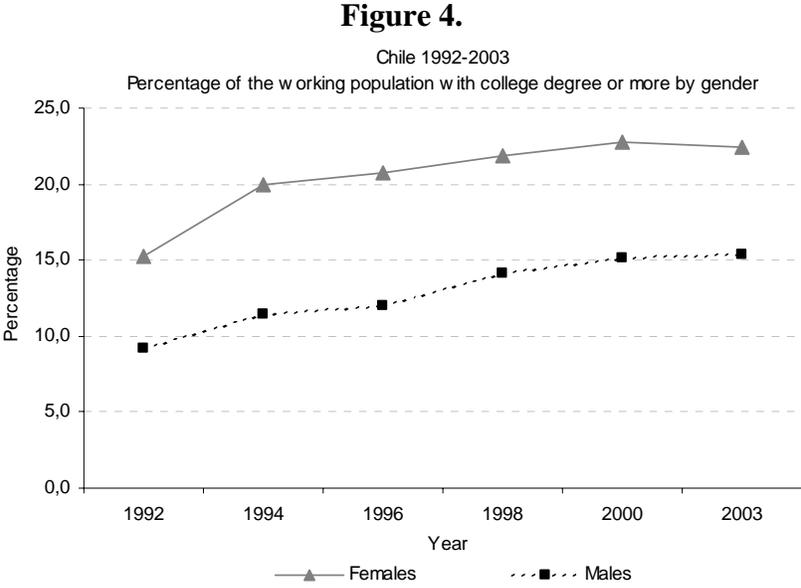
Figure 3.



Source: Author's calculations based on the CASEN, Mideplan.

The share of workers with no education has sharply decreased. At the same, the share of workers with higher education has risen. In 2003, only 1.2 percent of working females and males had no education (decreasing from 2.6 percent in 1992), while 18 percent had completed college (increasing from 11.1 percent in 1992). Figure 4 shows this increase in the share of highly educated workers by gender. Both females and males show important improvements for

the last decade. Again, the difference in favor of female workers has remained almost constant during the period.



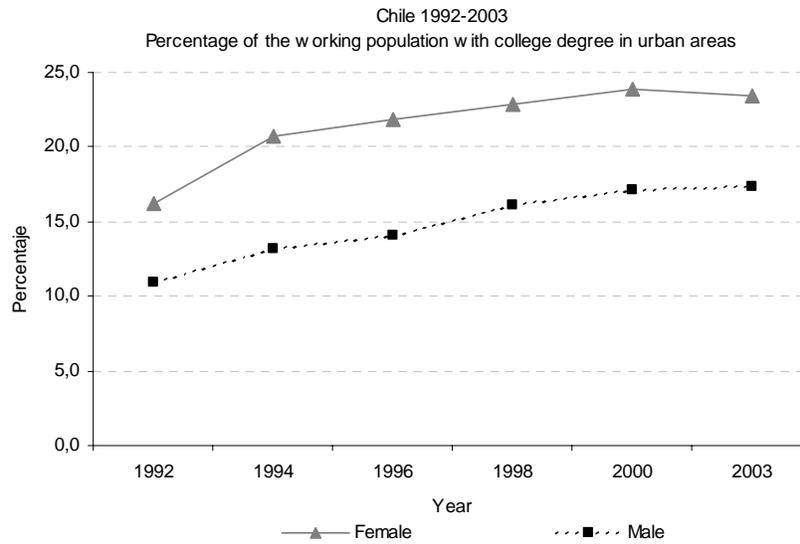
Source: Author’s calculations based on the CASEN, Mideplan.

When considering educational structure by geographic area, several important differences are observed. In rural areas the percentage of the working population with higher education is lower than in urban areas. While only 3.8 percent of the working population in rural areas has a college degree or higher, in urban areas that percentage reaches 17 percent. Figures 5 and 6 show the percentage of the working population with college degree or higher by area and gender. The gender differences persist over the whole period; in the last two years, however, this educational gender gap has been widening in rural areas and narrowing in urban areas.

Figure 5.



Figure 6.

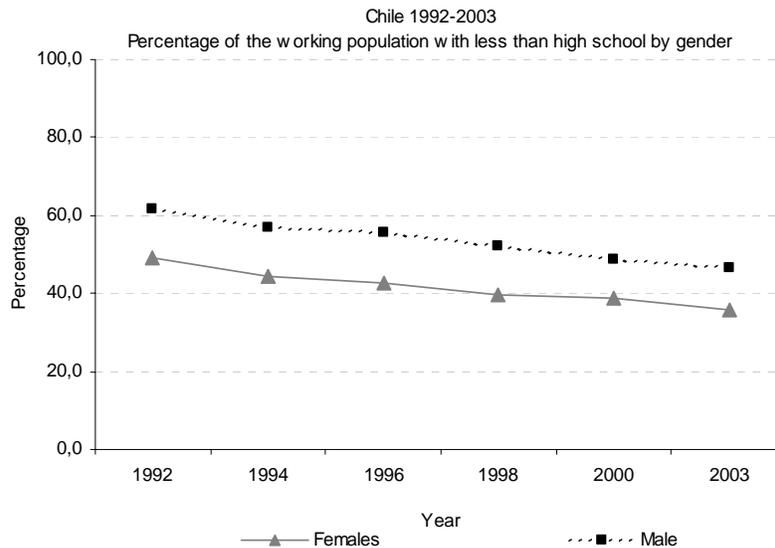


Source: Author's calculations based on the CASEN, Mideplan.

Exploring the educational characteristics at the other extreme of the distribution, Figure 7 presents the percentage of employed women and men with less than high school education in Chile. Although the figure shows evidence of a general improvement in education (as the

percentage of workers with less than high school has been decreasing in a sustained way), it also shows the evidence in favor of females that the previous figures presented.

Figure 7.



Source: Author's calculations based on the CASEN, Mideplan.

When looking at the same differences in the lower extreme of educational attainment by gender, large differences arise between rural and urban areas. Around 80 percent of employed males and females in rural areas have not completed high school, while in urban areas this percentage falls to 40 percent. It is important to note that the educational gender gap is greater in rural areas (see Figures 8 and 9). In this case, is higher the percentage of males in the labor force that had not completed their secondary school than females.

Figure 8.

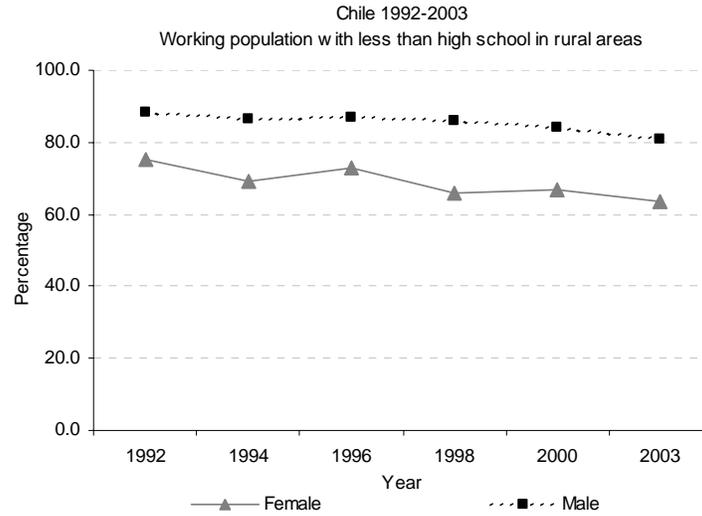
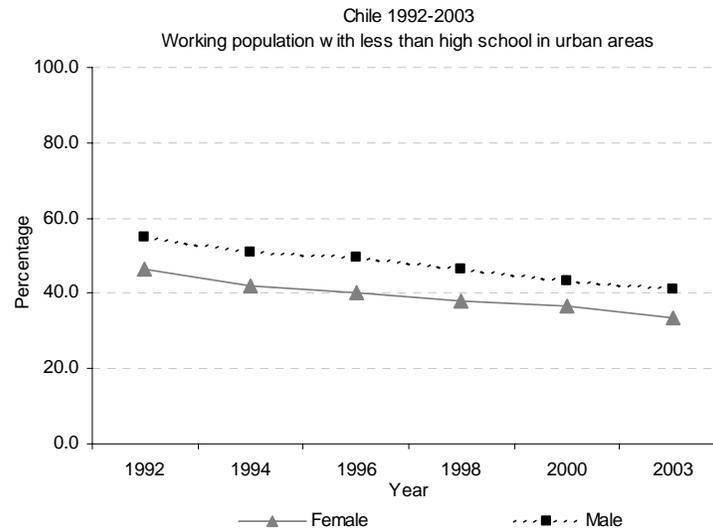


Figure 9.



Source: Author's calculations based on the CASEN, Mideplan.

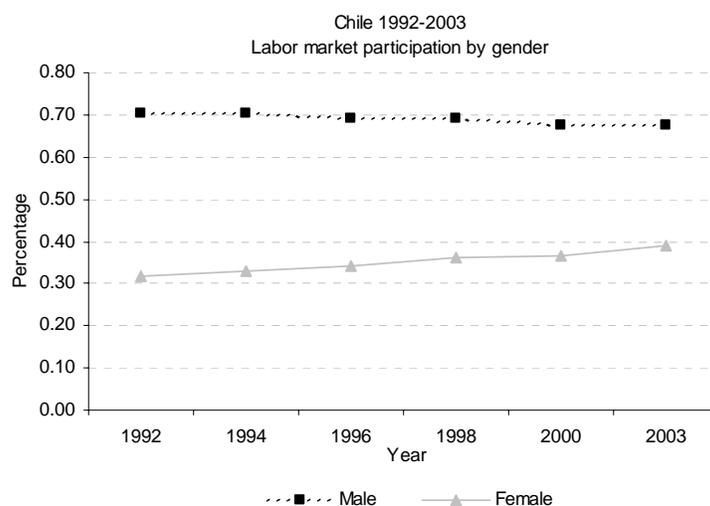
All the data presented above confirm that working females in Chile have more schooling than males, both in rural and urban areas. As education is an important determinant of earnings, it would be expected for women to have higher wages than men. However, the statistics show the opposite result. As will be shown later, the hourly wages of men are higher than the hourly

wages received by women. The next sub-section is devoted to the analysis of gender differences in labor force participation.

2.2 Labor Force Participation

The Chilean labor market has its particularities when compared to the labor markets of other countries in the region. Two of the most striking stylized facts that make Chile an interesting case are low female labor force participation and a high number of hours of work, especially among males. Regarding the former, Figure 10 shows the evolution of participation rates for both males and females. The evidence suggests that the gender gap in participation has been decreasing during the last decade. This comes as a result of both a decrease in male participation and an increase in female participation. While in 1992 only 31 percent of women were participating in the labor market, in 2003 this proportion reached 39 percent. The combined effect points towards an increase in the Chilean participation rate for the period under consideration.

Figure 10.

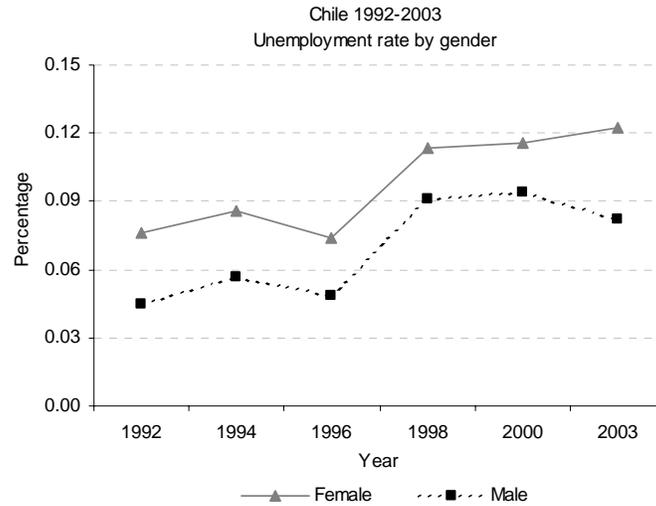


Source: Author's calculations based on the CASEN, Mideplan.

Accompanying this increase in participation, Chile also experienced an increase in unemployment. This increase happened most significantly in 1998 when the unemployment rate jumped from 6 percent to 10 percent, equally affecting males and females. Overall, gender

differences in unemployment did not change much during the decade, and they show only a slight increase for 2003. Figure 11 reports the evolution of unemployment rates by gender.

Figure 11.



Source: Author's calculations based on the CASEN, Mideplan.

Gender differences in unemployment rates at the national level prevail among different educational attainment groups as well. Less-educated individuals in Chile tend to display higher unemployment rates, especially among females. Also, the big jump in unemployment rates reported at the national level for 1998 shows an interesting educationally differentiated pattern. Among less-educated individuals, the jumps in unemployment for that year (with respect to 1996) have similar magnitudes for males and females, but for those with a college degree or higher most of the change in unemployment happened among the females. The unemployment rate for more-educated females more than doubled from 1996 to 1998.

Figure 12.

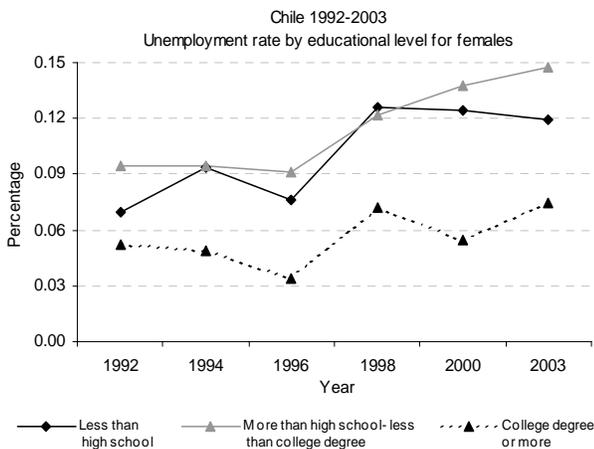
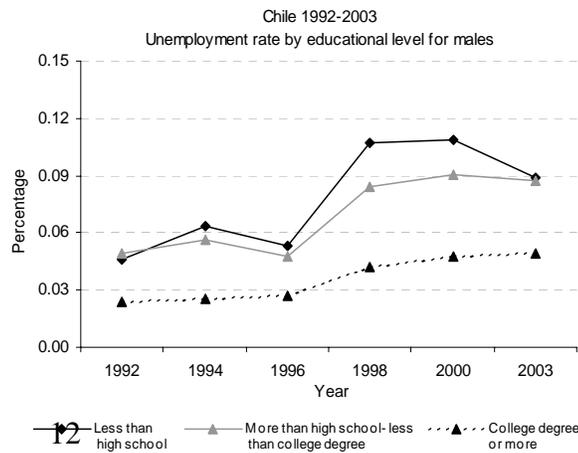


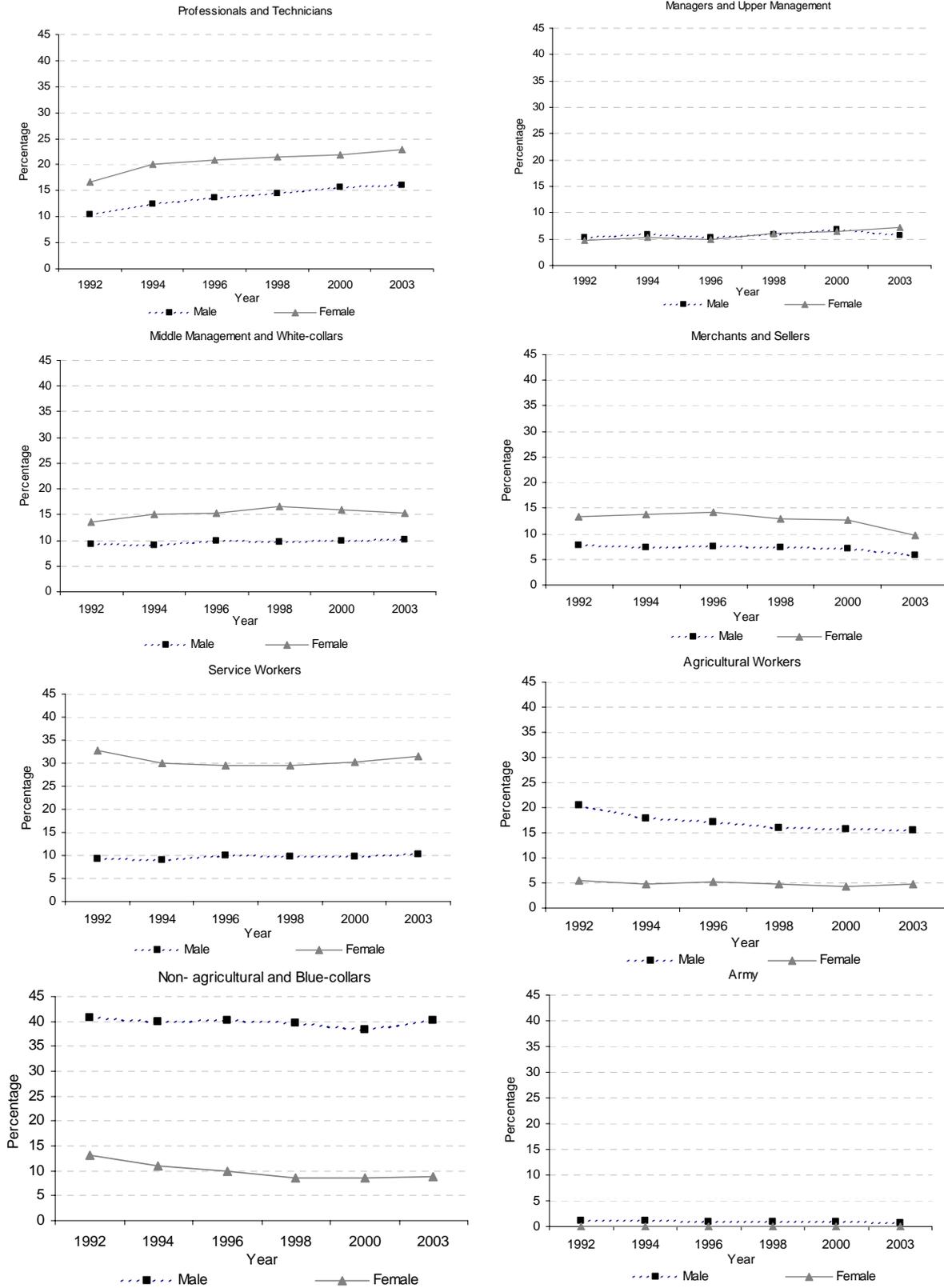
Figure 13.



Source: Author's calculations based on the CASEN, Mideplan.

The eight graphs of Figure 14 report the evolution of the gender composition of the labor force by occupations. It is interesting to note the slight reduction in gender gaps among merchants and workers in the service and agricultural sectors. Another stylized fact to highlight from the figure is the apparent non-gap among managers. Women participation in the labor force is mainly concentrated in the service sector (around 45 percent of working females are employed as service workers and merchants and sellers). On the other hand, around 60 percent of males are blue-collar and agricultural workers.

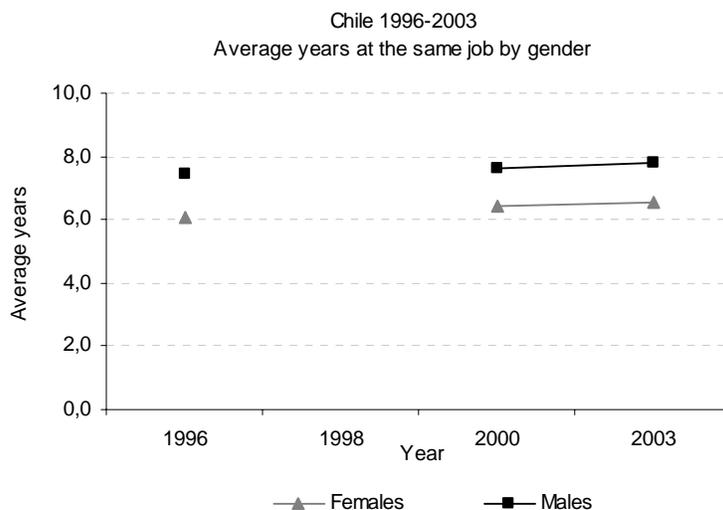
Figure 14. Distribution of the Labor Force by Occupations and Gender



Source: Author's calculations based on the CASEN, Mideplan.

An important variable to take into account when analyzing wage gaps is occupational experience. Traditionally the studies in this area have used a proxy, potential experience, computed as a linear combination of age and schooling. The evidence suggests that this approach tends to produce biased estimates of the gender gaps (see Weichselbaumer and Winter-Ebmer, 2003). With the Chilean CASEN we have the uncommon opportunity to use such occupational experience, at least for three of the years under analysis. The evolution of this variable is reported in Figure 15. As can be seen, average years at the same occupation slightly increased in Chile from 1996 to 2003, but gender differences remained almost constant (favoring males).

Figure 15.



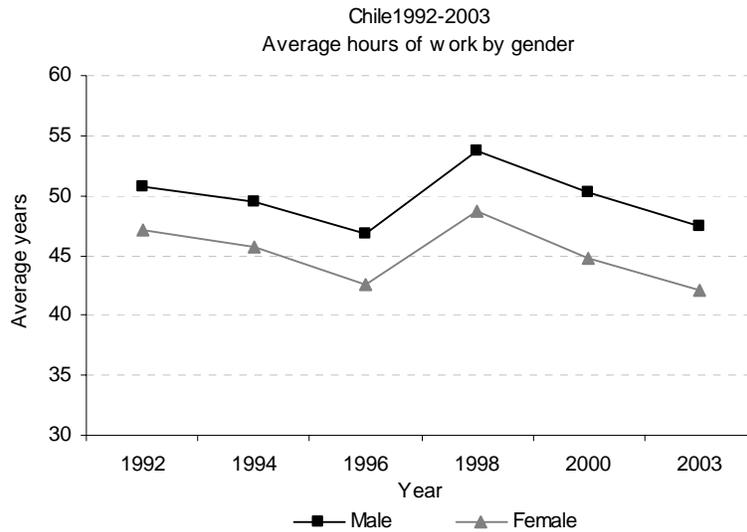
Source: Author's calculations based on the CASEN, Mideplan.

2.3 Hours of Work

Figure 16 presents the average number of hours of work per week by gender. Working hours increased from 49.5 hours per week in 1992 to 51.9 in 1998, decreasing after that to 45.4 in 2003. The peak observed in 1998, where males worked an average of 54 hours per week, can be linked to the recession (with the corresponding increase in unemployment) that the country experienced that year. The gender gap in hours of work was around 3.5 hours at the beginning of

the 1990s, and it increased during the period of analysis. In 2003, it reached 5.3 hours. This is one of the few individual characteristics for which the gender gap has been widening during the decade.

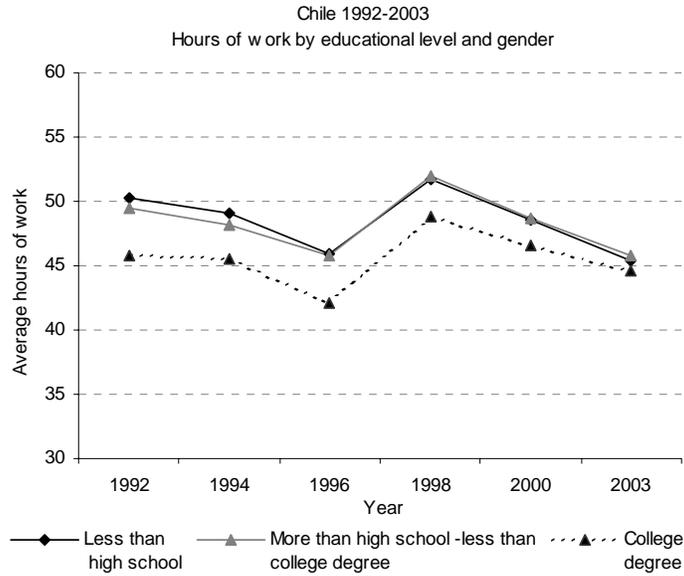
Figure 16.



Source: Author's calculations based on the CASEN, Mideplan.

Workers with less education used to devote more hours to the labor market than skilled workers (Figure 17). However, this gap, which was prevalent in the early 1990s has narrowed as hours worked have fallen 10 percent for the unskilled and 3 percent for skilled workers. While in 2003 a typical highly educated Chilean worked one hour less than in 1990, a typical unskilled worker worked nearly 5 hours less than in the early 1990s. It is important to notice that the differences in the hours of work between high-educated and low-educated workers started to narrow since 1998 and almost disappeared by 2003.

Figure 17.



Source: Author's calculations based on the CASEN, Mideplan.

At the beginning of the decade the difference in the hours of work by educational level was higher for women than for men. In 2003 the average hours of work of employed females and males seems to be independent of educational level (see Figures 18 and 19).

Figure 18.

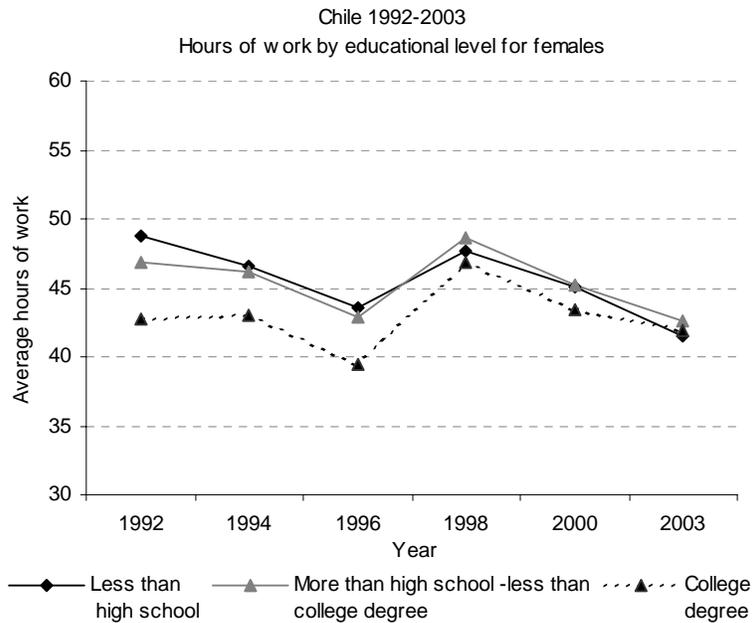
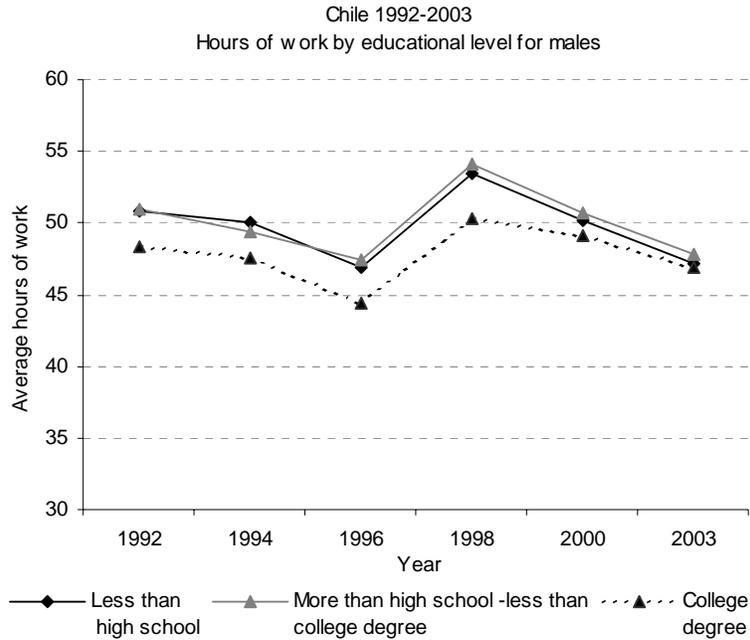


Figure 19.

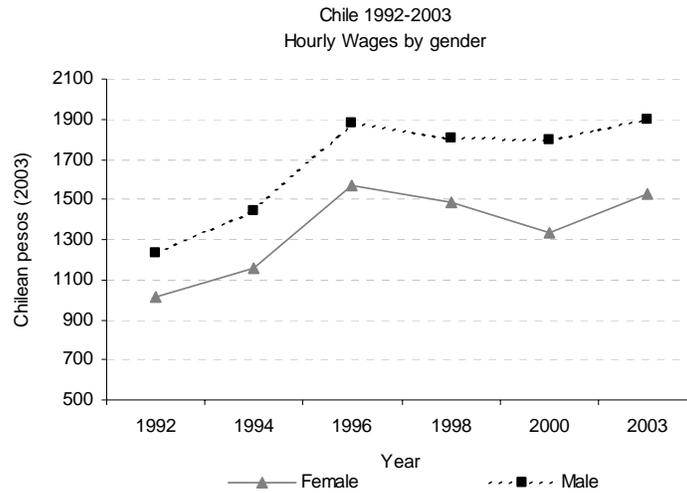


Source: Author's calculations based on the CASEN, Mideplan.

2.4 Hourly Wages

During the last decade the Chilean economy had a performance with no equal in the region. The average annual growth of the GDP was 6.3 percent, and the rate of inflation the lowest in the last four decades. As a result of the economic progress wages considerable increased, even in 1998 when the economy suffered a slowdown. Since 1996, hourly wages substantially increased. Since 1990, mean hourly wages (deflated by the CPI) increased 51 percent. For men, the increase in hourly wages was 54 percent, while for women it was 51 percent. Figure 20 shows the hourly wages for the main occupations by gender. The gap between men and women in hourly wages is noteworthy. It reached the highest levels of the decade in 2000, when men earned on average 35 percent more than women. In 2003 the average hourly wage for men was \$1,902, while for women the average hourly wage was \$1,525 (Chilean pesos).

Figure 20.



Source: Author's calculations based on the CASEN, Mideplan.

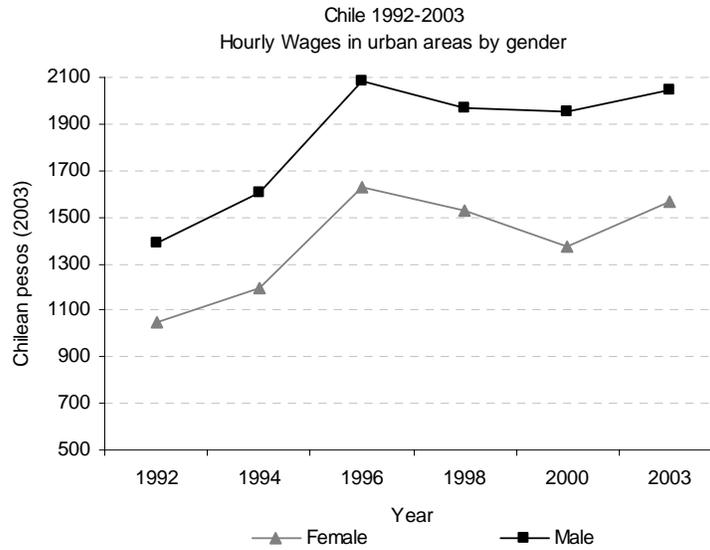
The following figures (Figures 21 and 22) show hourly wages by area and gender. On average, not only are urban wages higher than rural wages, but they also experienced a higher increase over the decade. In fact, while mean hourly wages in urban areas rose 58 percent, in rural areas they rose only 38 percent. In 2003 hourly wages in urban areas were on average 63 percent higher than in rural areas.

As can be seen from the graphs, the gender gap in the hourly wages is substantially higher in urban areas, while in rural areas the gap disappears. Since as shown in Figure 21 the gender wage gap is close to zero in rural areas, the gender wage gap decomposition of the next section will focus on the working females and males of rural areas in Chile.

Figure 21.



Figure 22.

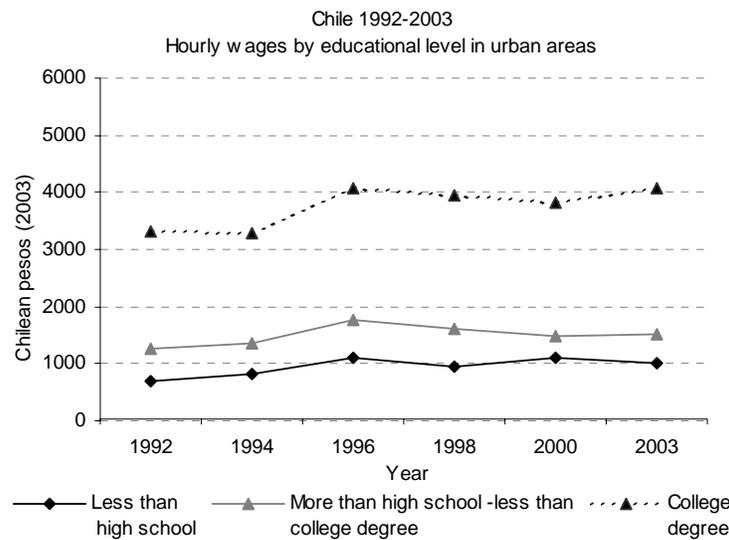


Source: Author's calculations based on the CASEN, Mideplan.

When comparing the hourly wages by educational levels, we can observe that all groups experienced an increase in wages from 1992 to 2003. This growth, however, was higher for those who have less education. For instance, while in the period 1992-2003 the hourly wage increased 22 percent in the skilled group, the increase was 42 percent for people with low education. As shown in Figure 23, the hourly wages of workers with college degree are around four times more

than those with less than high school during the decade. An important gap exists between the hourly wages of workers with a college degree and those who did not complete their college studies and have only a high school degree. In that case, the former group of workers earns 2.5 more than the latter. The gap diminishes for people with less than high school and people with high school and incomplete college.

Figure 23.



Source: Author's calculations based on the CASEN, Mideplan.

The gender wage gap is larger for highly educated workers. Men with a college degree earn 50 percent more than women with the same educational level. The differences in earning between males and females are less important among workers with less than a college degree (less than high school or more than high school but less than a college degree).

Figure 24

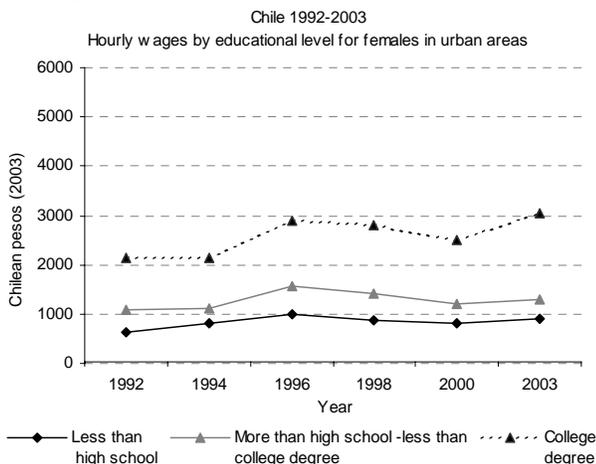
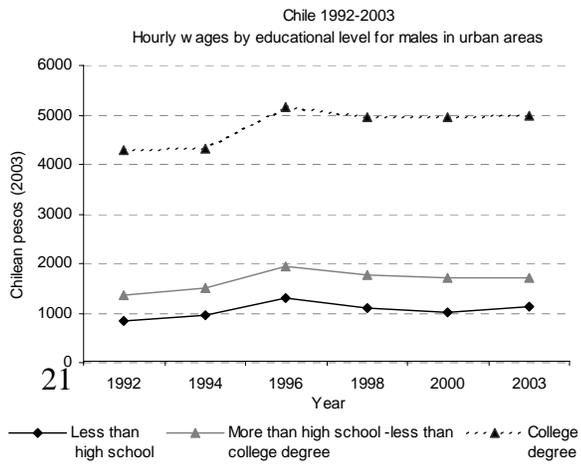


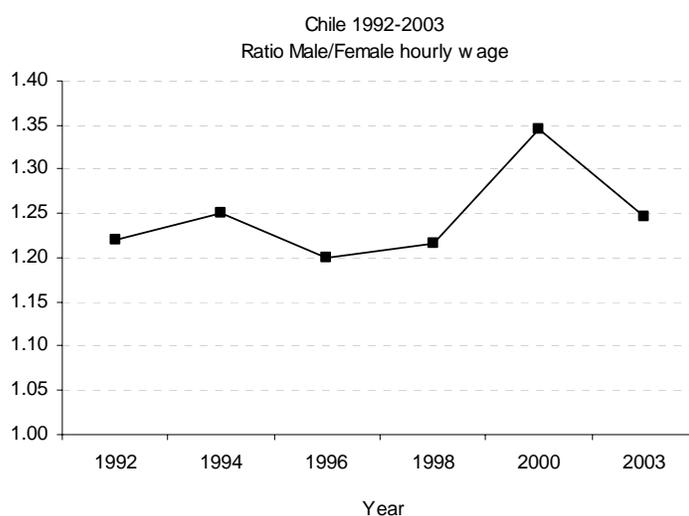
Figure 25



Source: Author's calculations based on the CASEN, Mideplan.

Figure 26 shows the average hourly wage gap as a multiple of average hourly female earnings. The gender wage gap ranges from 22 percent at the beginning of the decade to 35 percent in the year 2000. Although the gender wage gap decreased in 2003, men still earn 25 percent more than women.

Figure 26.



Source: Author's calculations based on the CASEN, Mideplan.

The gender wage gap reported in the previous figure does not take into account that males and females differ in observable characteristics that the labor market rewards. It becomes important to measure, then, to what extent the gender differences in observable human capital characteristics allow us to explain the gender wage gap and what remains unexplained. The approach in this case involves gender wage gap decompositions. In the next section we present the results obtained from a decomposition based on matching comparisons.

3. Wage Gap Decompositions

The technique applied for the wage gap decompositions follows the one developed in Ñopo (2004). According to that technique, males and females are matched on the basis of their

observable human capital characteristics. The resulting matched females and males make up a set that reflects a synthetic situation in which there is a labor market where both genders have exactly the same observable characteristics. Thus, the gender differences in pay that prevail in such a set of matched individuals can be regarded as unexplained by observable characteristics. On the basis of that set of matched individuals, and comparing it to the set of unmatched females and males, the gender wage gap is decomposed into four additive terms.

One of them, Delta-M, reflects the fact that some males have combinations of observable characteristics that no female has achieved. Analogously, Delta-F captures the role on the gender wage gap of the fact that some females have combinations of observable characteristics that no male has. The third component, Delta-X, accounts for the differences in the distributions of observable characteristics among those females and males with the same observable characteristics. Last but not least, Delta-0 is the component of the gender wage gap that cannot be explained by differences in observable characteristics between genders. Although some authors have traditionally referred to this component as a measure of gender-based discrimination in pay in labor markets, we prefer to refer to it as a measure of *unexplained* differences (either because of the existence of discrimination or the existence of unobserved individual characteristics that the labor market rewards).

The matching of females and males on the basis of observable characteristics is implemented for five combinations of characteristics. The first one considers only age, marital status and years of schooling. The second set adds the condition of full-time/part-time worker to the previous set of matching characteristics. The third set replaces this last matching variable for occupational category (which aggregates occupations at the 1-digit level). The fourth set of matching characteristics considers simultaneously all the variables considered in the three previous sets. The fifth set adds years of occupational experience to the set of variables considered in the fourth set. It is important to note that the likelihood of finding matches between females and males decreases with the number of matching characteristics as well as with the number of possible values that each characteristic may take. For that reason the percentage of matched individuals (and hence, the extent of the uncommon support), varies with the set of matching characteristics. Table 1 shows the percentage of females and males matched for each combination of matching variables.

Table 1. Percentage of Women and Men Matched by Different Control Sets

Year	Controlling by				
	(i) Age, education and marital status	(ii) Age, education, marital status and occupation	(iii) Age, education, marital status and full time job	(iv) Age, education, marital status, full time job and occupation	(v) Age, education, marital status and years at the same job
1992					
Women	92.5	74.5	84.7	61.5	
Men	93.6	66.4	86.7	54.4	
1994					
Women	94.4	78.2	88.1	65.5	
Men	95.7	73.6	90.5	61.4	
1996					
Women	94.4	75.7	86.5	61.4	49.2
Men	95.1	69.3	87.7	55.0	32.8
1998					
Women	95.5	79.9	89.1	66.3	
Men	97.0	76.0	91.7	63.4	
2000					
Women	96.5	81.2	90.2	49.5	60.7
Men	97.2	77.8	93.1	45.0	50.7
2003					
Women	96.5	82.9	90.8	68.4	51.8
Men	97.6	82.6	92.7	67.4	37.6

Source: Author's calculations based on the CASEN, Mideplan.

Provided that the methodology emphasizes the comparison of wages for males and females, in and out of the common support of the distributions of observable characteristics, it becomes important to identify the main differences along those lines. Next, Table 2 reports the average statistics for males and females in and out of the common support for each set of matching characteristics. In general, the average ages of unmatched females and males are higher than their matched counterparts. On the other hand, the average years of education for females and males in matched groups are higher than in unmatched ones (with the exception of the set of controls that includes occupational experience). In regard to marital status, most of the females and males in the common support are (formally or informally) married. This is also the case of male workers outside the common support, but most unmatched females are separated or widows. Most of the matched females and males (around 30 percent) are service workers. Notice that a small percentage of females and males in the common support work as directors or managers, compared to females and males outside the common support.

The average number of hours of work for the matched females and males is higher than that of corresponding unmatched workers, and the difference is greater for females. When using the average years at the same job as a control for the matching (control V), we observed that

females and males in the common support remain on average 13 years at the same job, while females out of the common support stay on average 6.8 years and men 8.4 years.

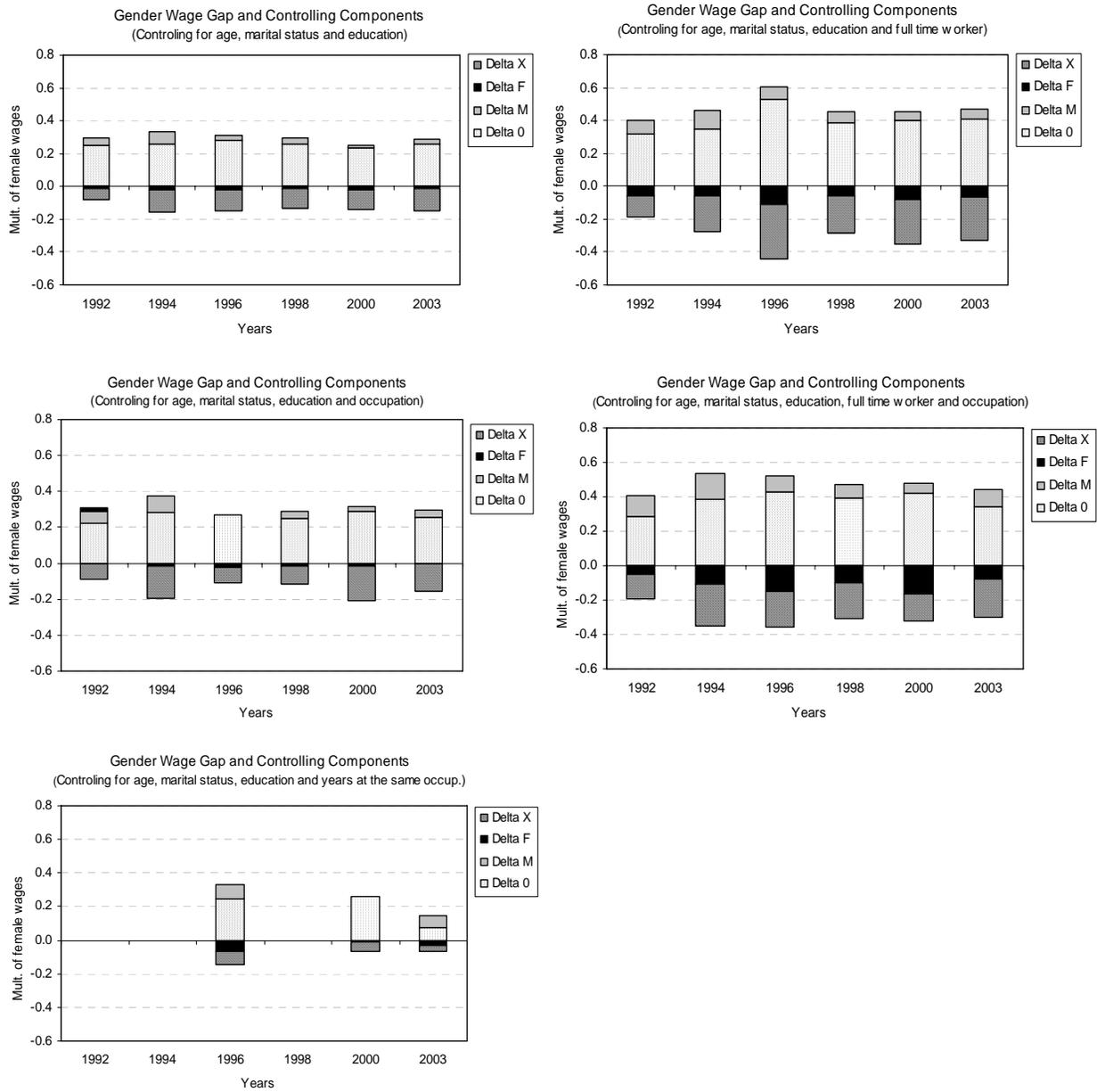
Table 2. Average Statistics for Males and Females in and out of the Common Support for Each Set of Matching Characteristics

	Controlling by								
	(ii)			(iv)			(v)		
	Age, education, marital status and occupation			Age, education, marital status, full time job and occupation			Age, education, marital status and years at the same job		
	Matched females and males	Unmatched females	Unmatched males	Matched females and males	Unmatched females	Unmatched males	Matched females and males	Unmatched females	Unmatched males
Average age	35.6	43.8	44.8	34.9	41.5	43.0	35.7	37.7	39.2
Average years of Schooling	10.6	8.9	7.6	10.8	9.3	7.9	9.8	10.5	9.0
Marital Status (percentage)									
<i>Married</i>	47.2	14.5	53.9	48.0	26.6	55.3	43.7	36.7	44.1
<i>Union</i>	10.3	4.0	10.4	10.2	7.0	11.5	26.9	27.4	36.3
<i>Separated</i>	5.3	37.5	8.7	3.9	27.1	7.0	3.2	14.4	4.6
<i>Widow</i>	14.9	25.8	13.2	17.8	22.1	13.2	14.0	8.9	5.6
<i>Single</i>	22.3	18.2	13.8	20.2	17.2	13.1	12.2	12.6	9.4
Occupation (percentage)									
<i>Professionals</i>	18.1	11.7	5.3	19.0	12.8	5.9			
<i>Directors</i>	5.7	11.2	7.4	5.3	9.0	6.4			
<i>Administratives</i>	13.0	12.9	3.4	13.2	12.5	3.0			
<i>Sellers and merchants</i>	10.8	14.8	5.1	10.5	13.6	5.1			
<i>Service workers</i>	30.1	40.0	3.8	27.0	40.7	4.4			
<i>Agricultural workers</i>	12.0	4.5	32.5	14.1	5.3	32.0			
<i>Non-agricultural workers</i>	10.2	4.8	39.9	10.9	6.1	41.6			
Average hours of work				48.7	39.6	46.9			
Average years at the same job							13.0	6.8	8.4

Source: Author's calculations based on the CASEN, Mideplan.

Next, in Figure 27 we report the resulting wage gap decompositions for which some empirical regularities arise. First, the Delta-X component, and to some extent the Delta-F component as well, are negative. This reflects the fact that human capital characteristics, especially education, display better statistics for females than for males in Chile. Second, the Delta-M component is generally positive, suggesting the existence of a glass-ceiling effect. That is to say that there are males with combinations of observable characteristics for which there are no comparables females, and these males have wages that are, on average, higher than those in the rest of the economy. As a result of the previous facts, the Delta-0 component (the one that remains unexplained by observable characteristics) is regularly slightly higher than the original measure of gender wage gaps (the one measured before matching). This is equivalent to saying that the measure of the gender wage gap that remains unexplained after a Blinder-Oaxaca decomposition is higher than the original measure of wage gap, as has been reported in the literature about gender gaps in Chile summarized in the first section of this paper.

Figure 27. Wage Gap Decomposition for Different Sets of Controls

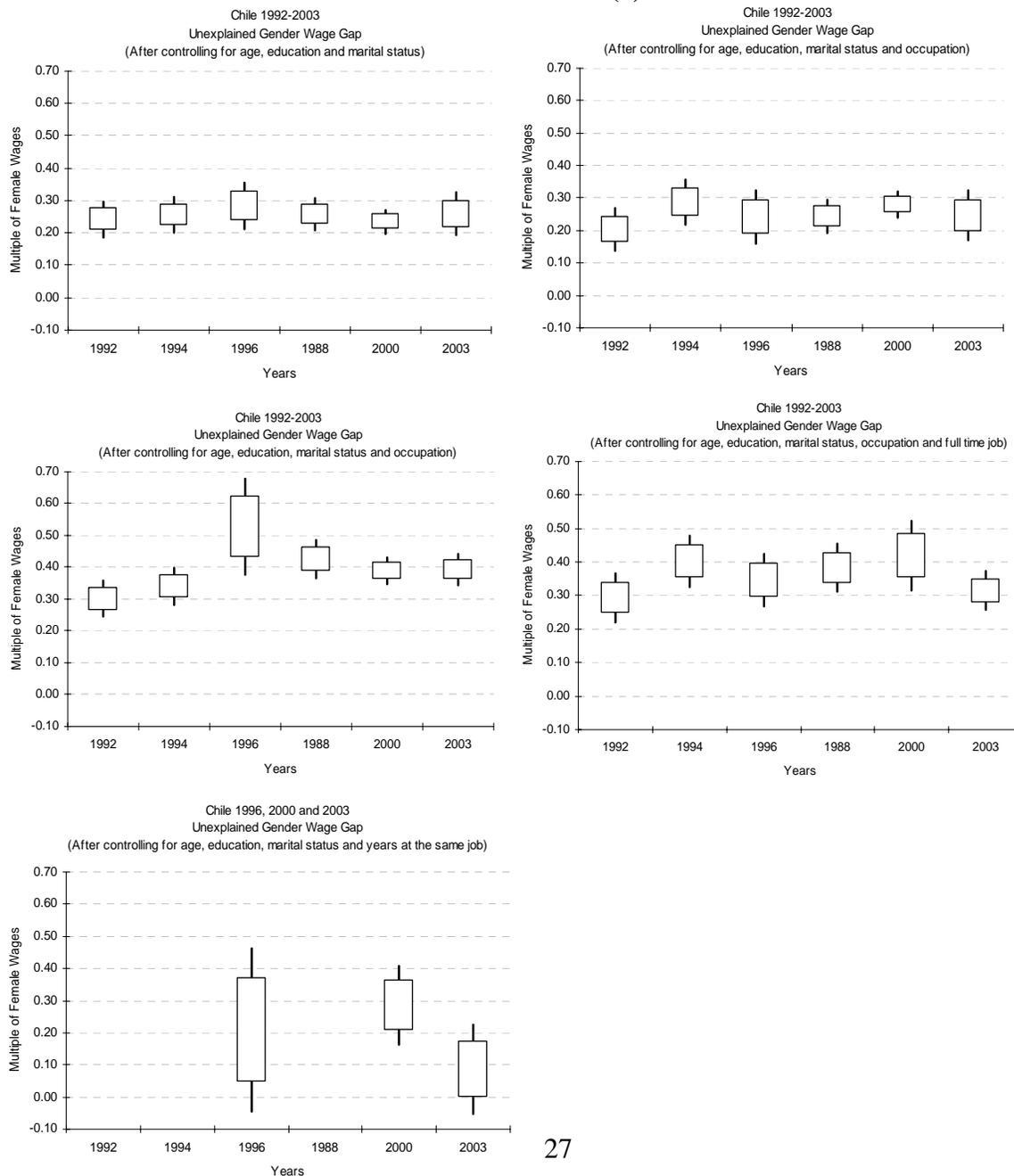


Source: Author's estimations based on the CASEN.

For the component that measures to what extent the gender wage gap cannot be explained by observable individuals characteristics, Delta-0, we provide confidence intervals for the average in Figure 28. There, the extremes of the boxes represent confidence intervals at the 90-

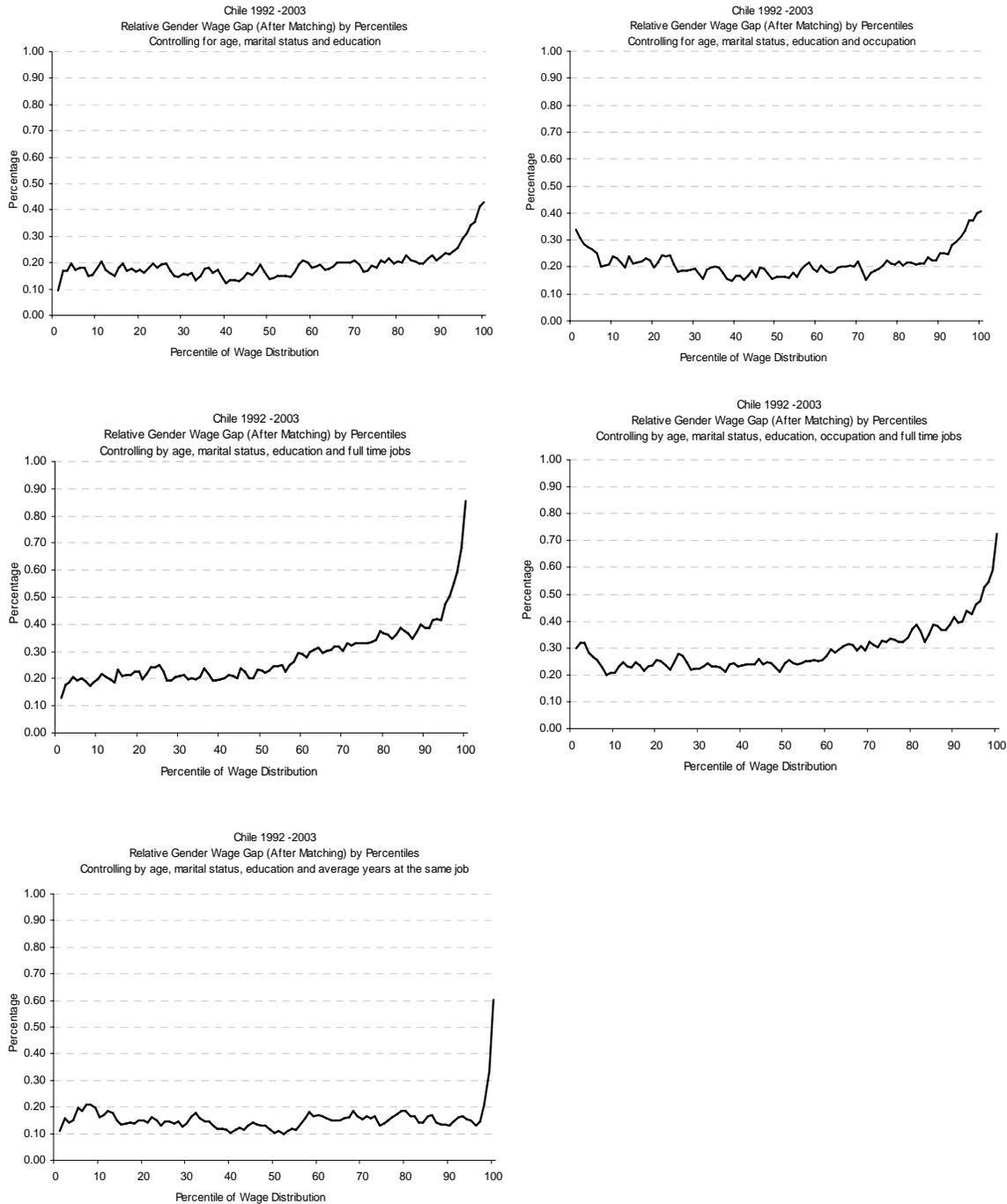
percent level and the extremes of the bars represents confidence intervals at the 99-percent level. The confidence intervals obtained from the last set of matching characteristics are wider than all others. This arises as a result of the smaller number of matched females and males that corresponds to this higher number of matching variables. On the one hand, this is the combination of individual characteristics that controls the most for gender differences (and hence, as a result, the unexplained component is the smallest of all combinations); but on the other hand it is so restrictive that it imposes a cost in terms of standard errors.

Figure 28. Confidence Intervals for the Unexplained Gender Wage Gap for Different sets of controls (1)



Also, the matching technique introduced to disentangle the four components of \tilde{N} opo (2004) allows the exploration not only of the average measure of unexplained differences but also its empirical distribution. This analysis is reported in the next series of figures. First, Figure 29 shows the distribution, for the whole period 1992-2003 and using the five different sets of matching characteristics, of the unexplained differences in wages by percentiles of the wage distribution. The results suggest that the unexplained component of the gender wage gap is greater among those in the highest percentiles of the wage distribution than at lower percentiles. While for the lowest percentiles of the wage distribution, males tend to earn an unexplained premium of 10 percent to 20 percent over comparable females, at the top of the distribution this premium increases to 40 percent to 80 percent, depending on the set of matching characteristics.

Figure 29. Relative Gender Wage Gap by Percentiles for Different Sets of Controls for the Period 1992-2003



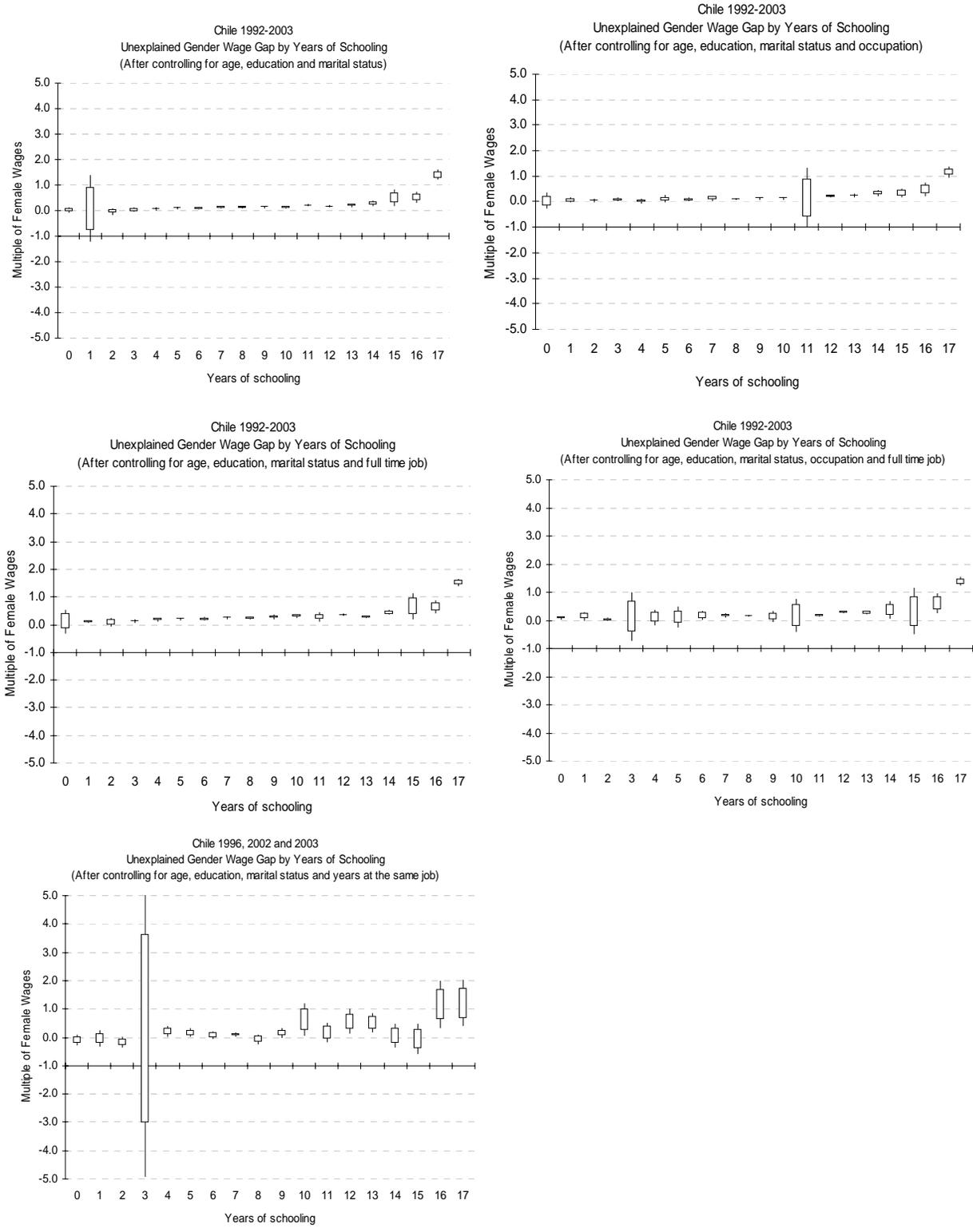
Along the same lines of exploring the distribution of the unexplained component of gender wage gaps, it is possible to analyze that distribution for different segments of the labor force. Figure 30 below shows confidence intervals for such an unexplained component by years

of schooling. The higher and more dispersed measures of unexplained wage gaps are found among those with more education. Figure 31 reports information about the unexplained gaps by occupation. The highest and most dispersed gap is found among managers and, to a lesser extent, among professionals.

When looking at the distribution of the unexplained wages by age groups (Figure 32) we find some evidence of higher and more dispersed gaps among older individuals for almost all combinations of control characteristics, except for the one that includes on-the-job experience. In this case, higher and more dispersed gaps are found among middle-age individuals. By marital status, the highest gaps are found among the married individuals (Figure 33), but when experience (measured as years working at the same job) is introduced all groups seem to have similar unexplained gaps, although more dispersed among separated individuals.

The unexplained wage gap is substantially higher and more dispersed among those who work less than 20 hours per week than among the rest of the labor market (Figure 34). The evidence on unexplained gaps in geographic terms is mixed. When experience is not taken into account it seems that the unexplained gap is higher in Santiago than in the rest of the country. But when experience is considered as one of the matching variables, the unexplained gap in the provinces gets higher (although more dispersed) than the one in Santiago (Figure 35).

Figure 30. Confidence Intervals for the Unexplained Gender Wage Gap for Different Sets of Controls by years of schooling



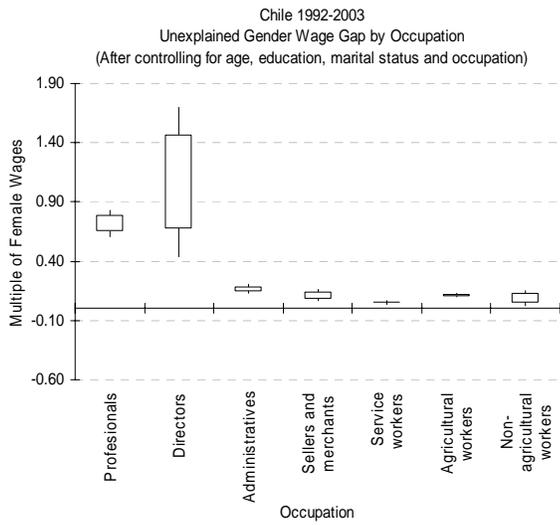
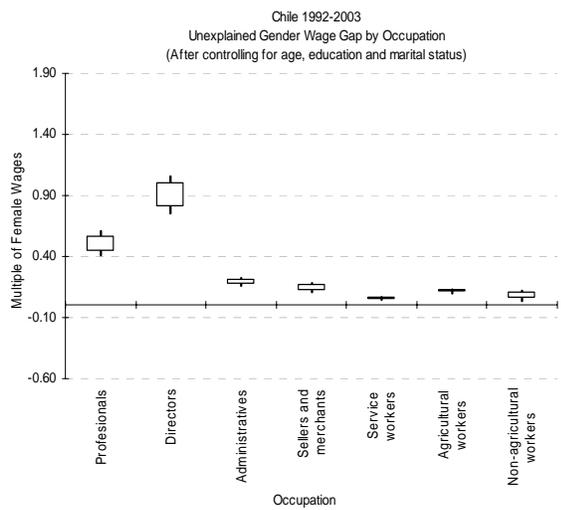
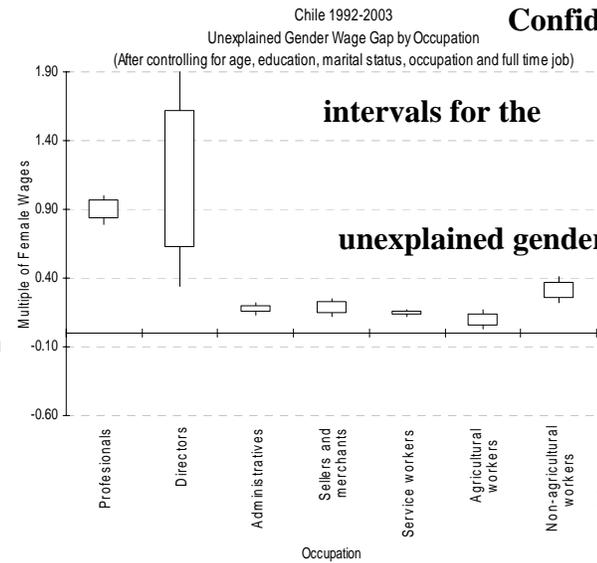
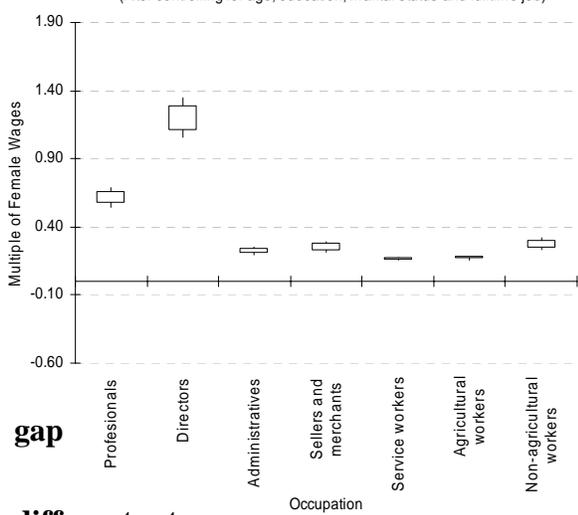


Figure 31. Chile 1992-2003
Unexplained Gender Wage Gap by Occupation
(After controlling for age, education, marital status and fulltime job)



gap

Confidence intervals for the unexplained gender wage for different sets of controls by occupation

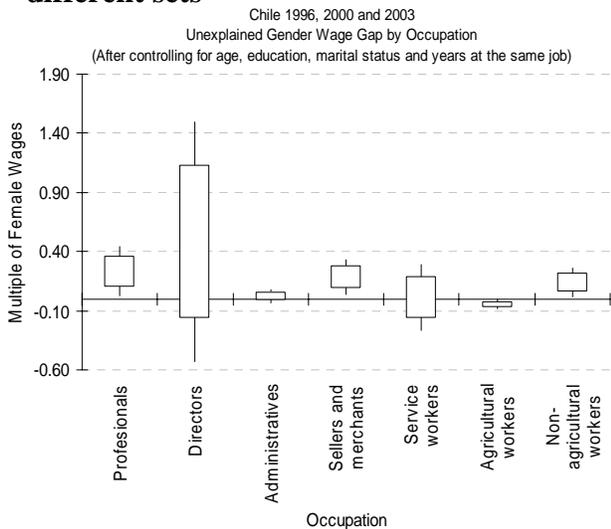


Figure 32. Confidence Intervals for the Unexplained Gender Wage Gap for Different Sets of Controls by Age Groups

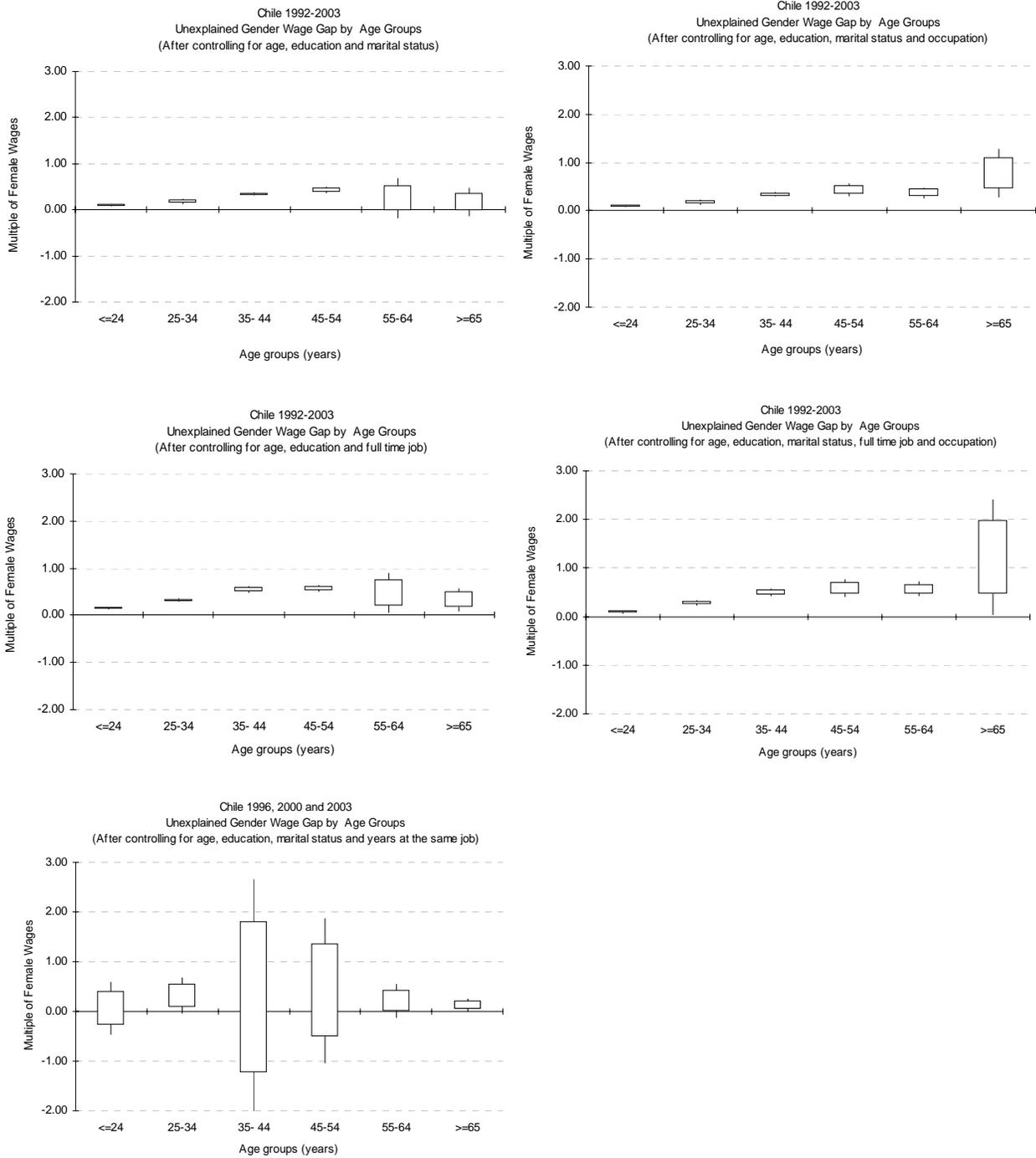


Figure 33. Confidence Intervals for the Unexplained Gender Wage Gap for Different Sets of Controls by Marital Status

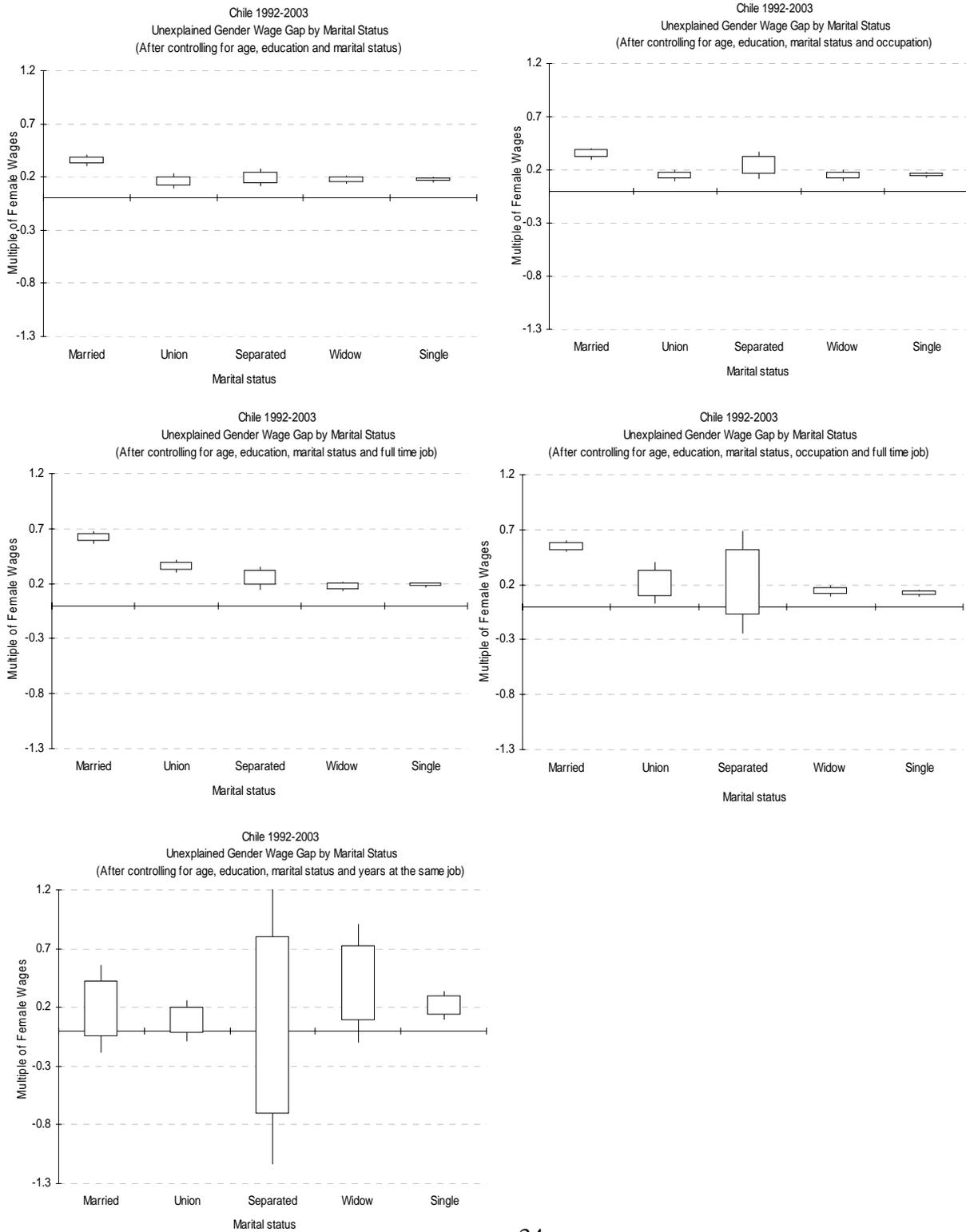


Figure 34. Confidence Intervals for the Unexplained Gender Wage Gap for Different Sets of Controls by Hours of Work

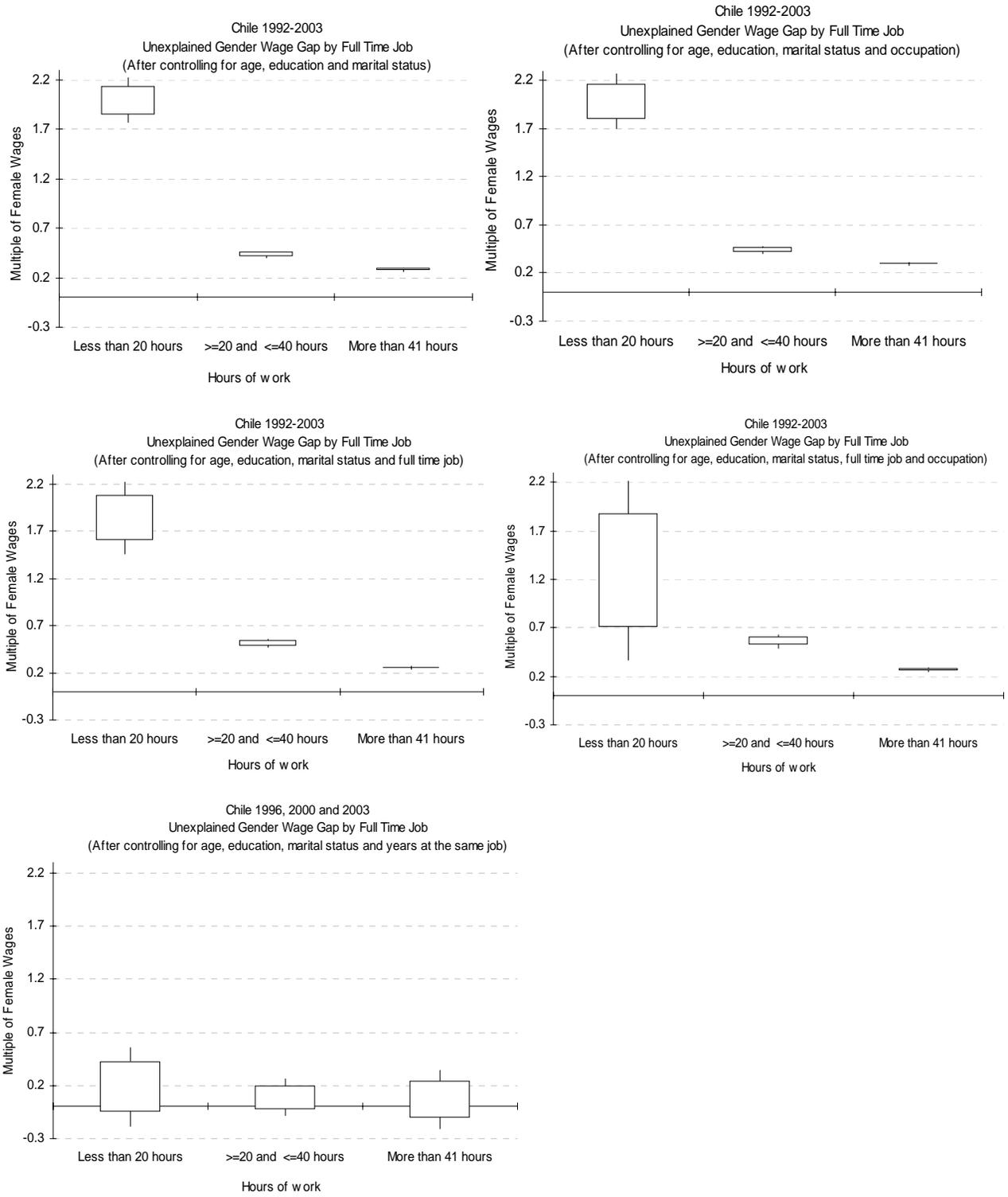


Figure 35. Confidence Intervals for the Unexplained Gender Wage Gap for Different Sets of Controls by Geographic Area

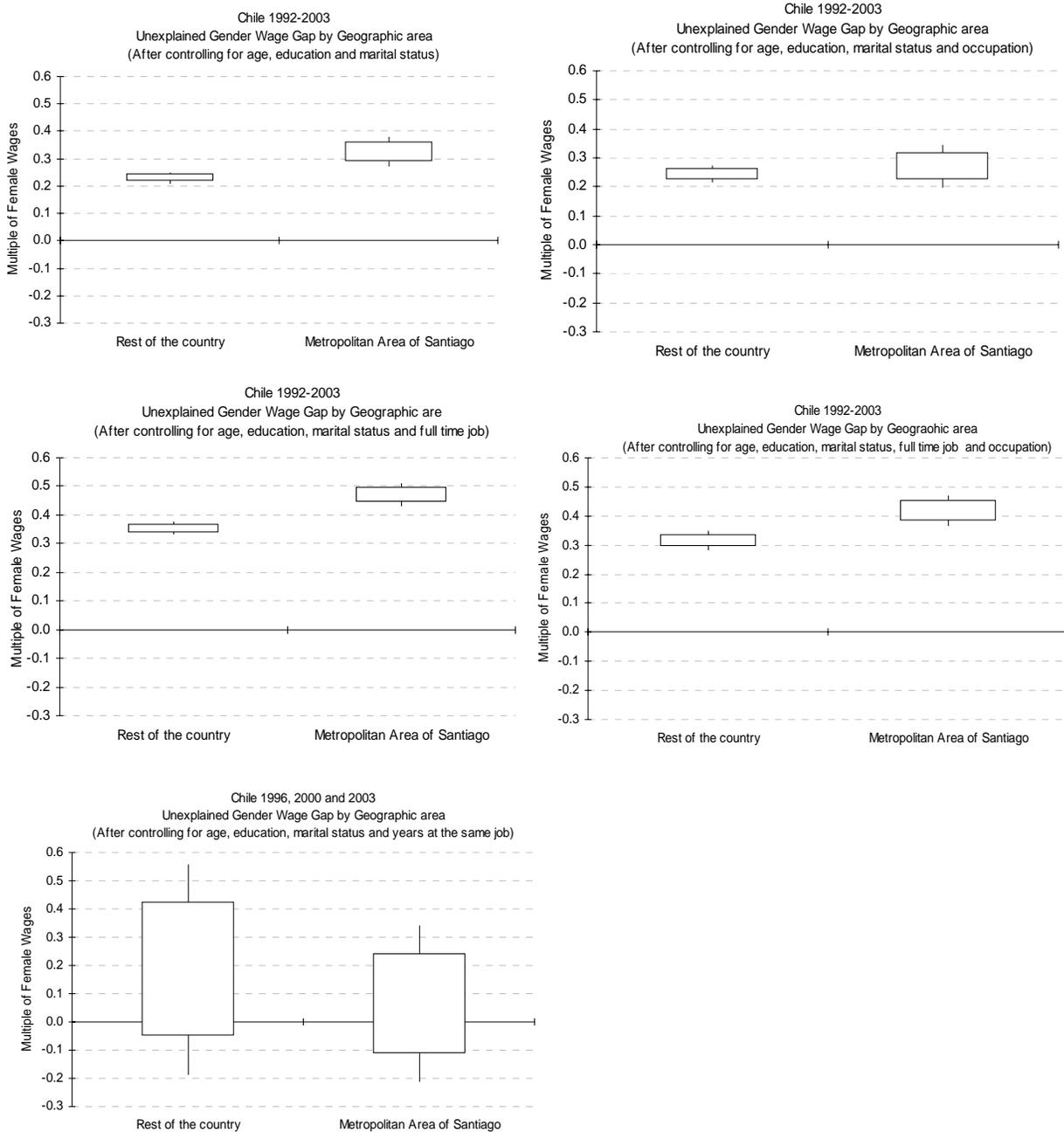
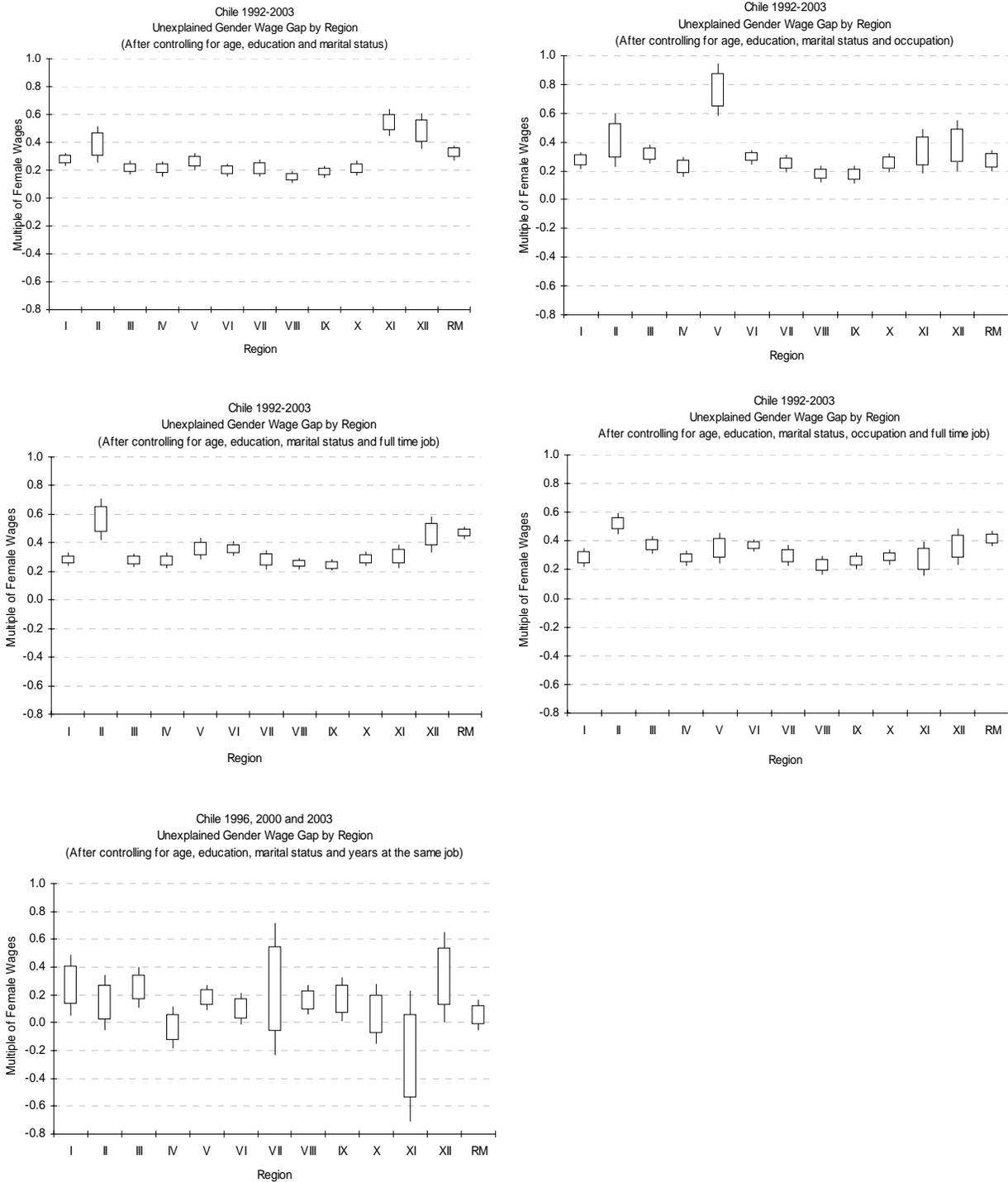


Figure 36. Confidence Intervals for the Unexplained Gender Wage Gap for Different Sets of Controls by Region



4. Conclusions

Chile is one of the Latin American nations where the labor force has experienced a reversal in the educational gender gap. Females currently exhibit, on average, more years of schooling than males. Nonetheless, there are still noticeable gender differences, favoring males, in labor market participation and outcomes. For the period under consideration (1992-2003), the male labor force participation rate is almost twice that of females (70 percent vs. 36 percent) and the male unemployment rate is two percentage points below the female unemployment rate (10 percent vs. 8 percent). Regarding hourly wages, males have earned between 22 percent and 35 percent more than females during the same period. Part of these differences in wages can be attributed to gender differences in observable characteristics that the labor market rewards, and some other part remains unexplained (and can be attributed to the existence of gender differences in unobservable characteristics or discrimination).

This paper analyzes the evolution of the gender wage gap in Chile with a non-traditional tool, matching comparisons. The use of matching highlights the need to restrict the comparison of wages to those observable characteristics for which both males and females are found in the data sets. Such an approach permits three gains: a more accurate measurement of the unexplained gender wage gap, an estimator that approximates the measure of the role of glass-ceiling effects on the overall wage gap, and the possibility of exploring the distribution of unexplained gaps.

The results suggest the existence of a noticeable glass-ceiling effect in Chile. There are particular combinations of experience, age, marital status and education for which it is not possible to make gender comparisons. Married, older males (beyond their forties) with more than 10 years of occupational experience are more likely to have no female counterparts actively working in the Chilean labor market. And these males are more likely to work in managerial occupations and earn hourly wages that are substantially above the national average. This can account for between 5 and 8 percentage points of the gender wage gap in Chile.

Regarding the distribution of the unexplained gender differences in hourly wages, the paper finds that it is proportionately higher among highly paid individuals, those with higher education, directors, older segments of the labor market, those who are married and part-time workers. There is no clear evidence that the unexplained gender wage gap is higher in Santiago than in the rest of the nation.

According to the results, occupational experience seems to be an important characteristic to explain the prevalent gender wage gaps in Chile. Unfortunately, this variable is not available for all the years of the period under consideration. For the years in which it is available, there are important differences in favor of males (8 vs. 6 years of average occupational experience), and these differences account for an important share of the wage gap. If Chilean public policies were to point towards an improvement of occupational experiences for females, there are good reasons to think that the gender wage gap can show interesting reductions.

Bibliography

- Blau, F., and L. Kahn 1992. "The Gender Earnings Gap: Learning from International Comparison." *American Economic Review* 82: 533-538.
- Blinder, A. 1973. "Wage Discrimination: Reduced Form and Structural Estimates." *Journal of Human Resources* 7(4): 436-55.
- Contreras, D., E. Puentes and D. Bravo. 1999. "Female Labor Force Participation 1957-1997: A Synthetic Cohort Analysis." Santiago, Chile: Universidad de Chile. Mimeographed document.
- García Durán, B. 2000. "Diagnóstico de la discriminación salarial de la mujer en el mercado laboral chileno." Santiago, Chile: Universidad de Chile. Dissertation.
- Montenegro, C. 1999. "Wage Distribution in Chile: Does Gender Matter? A Quantile Regression Approach." Washington, DC, United States: World Bank. Mimeographed document.
- Montenegro, C., and R. Paredes. 1999. "Gender Wage Gap and Discrimination: A Long Term View Using Quantile Regression." Washington, DC, United States and Santiago, Chile: World Bank and University of Chile. Mimeographed document.
- http://www.ricardoparedes.cl/paperweb/Montenegro_Paredes.PDF
- Ñopo, H. 2004. "Matching as a Tool to Decompose Wage Gaps." IZA Discussion Papers 981. Bonn, Germany: Institute for the Study of Labor (IZA).
- Oaxaca, R. 1973. "Male-Female Wage Differentials in the Urban Labor Market." *International Economic Review* 14(3): 693-709.
- Paredes, R., and L. Riveros. 1994. "Gender Wage Gaps in Chile. A Long Term View: 1958-1990." *Estudios de Economía* 21(Número especial): 211-230.
- Weichselbaumer, D., and R. Winter-Ebmer. 2003. "A Meta-Analysis of the International Gender Wage Gap." IZA Discussion Papers 906. Bonn, Germany: Institute for the Study of Labor (IZA).