

Assessing Labour Market Impacts of Trade Opening in Uruguay

Adriana Peluffo[♦]

Preliminary Draft

Abstract

The analysis of the links between trade policy and labour market outcomes has developed in recent decades, prompt up by the concerns about the effects of the increasing globalisation process in which trade plays a major role.

In this work we propose to analyse the impact of the increase in trade liberalisation, as a consequence of Mercosur's creation on employment, income and wage dispersion at the household level.

To this aim we use data from the Encuesta Continua de Hogares (ECH) for the period 1988 and 1996 and apply impact evaluation techniques in order to isolate the effect of trade reforms from other policies at work during the period.

One of the most robust findings that emerge using difference-in-difference regressions as well as double robust estimators and inverse probability weighting is that in the period following Mercosur's creation there was an increase in monthly earnings and hourly labour earnings as well as a significant increase in the probability of unemployment and increased wage dispersion.

Keywords: trade, labour markets, employment, wages, trade and labour market interactions.

JEL: F02, F16, J23, J31.

[♦] Instituto de Economía, Facultad de Ciencias Económicas y Administración, UdelaR; e-mail: adriana.peluffo@gmail.com

Acknowledgements

We wish to thank to Ariel Barraud for his help and to Maira Colacce and Marco Colafranceschi for their assistance with the databases.

1. Introduction

The analysis of the impact of increasing globalisation on labour markets has been a focus of research in the last decades. Initially studies focused on developed countries and analysed how opening to trade would affect workers with different skills (Freeman 1995; Feenstra y Hanson 1999). As developing countries start to open up their economies and data become available these countries also turn out to be a focus of analysis. Nevertheless, so far, the results are not clear cut and there are mixed evidence on the effects of trade liberalisation on labour markets. One of the most puzzling findings is that there is evidence of a skill-bias in labour demand and increased wage inequality as a result of increasing trade liberalisation, both for developed and developing countries (Attanasio, Goldberg, y Pavcnik 2004; Feenstra y Hanson 1997; Robbins 1996; Perry y Olarreaga 2007).

In this work we propose to analyse the impact of the increase in trade liberalisation in Uruguay, as a consequence of Mercosur's creation on wages, unemployment and wage dispersion at the household level. To this aim we apply impact evaluation techniques using data from the Encuesta Continua de Hogares (ECH) for the period 1988-1996.

A contribution of this paper is the use of the difference-in-difference approach, which is not common in trade empirical works, to analyse the impact of trade liberalization at the household level for a small developing country. In particular, the matching and double difference (MDID) approach has the advantage of removing the effects of common shocks. This make possible to isolate the effect of trade reforms from other policies during the period, providing in this manner a more accurate analysis of the impact of trade openness.

This work structures as follows: after the introduction, in section 2 we present some features of the trade liberalisation process in Uruguay. In section 3 we present briefly some theoretical issues and empirical evidence on the links between trade liberalization and its impact on labour markets. In the fourth section we present the empirical implementation. In the fifth section we present the results and finally some concluding remarks.

2. Trade openness in Uruguay and MERCOSUR's creation

As most countries in the region, Uruguay has pursued an import substitution policy from the early 1930s to mid-70s (Bértola 1991). Since 1974 trade policy has been characterized by a continuous reduction in tariff barriers, both in the number of tariffs levels and in average rates. Also non-tariff barriers have been eliminated, remaining mainly Reference Prices and Minimum Export Prices. Nevertheless, the number of goods subject to Reference Prices and Minimum Export Prices experienced a dramatic reduction.

In 1991 Uruguay signed the Asuncion Treaty aimed to the creation of the Southern Common Market (MERCOSUR) with Argentina, Brazil and Paraguay, which implied a deepening in the liberalization process.¹ In 1995 the custom union was functioning for the 85 per cent of the tariff lines, though the four countries have kept a list of exemptions for some goods, and it was still an imperfect custom union.

Trade openness in Uruguay was a deepening of a continuous process of tariff reduction that started up to mid seventies with the first wave of opening and liberalization policies. Uruguay belongs to the called “early reformers”, that is to say the countries who first apply the first-generation reforms in Latin America, including an important financial liberalization.

Thus by the creation of the Common Market Uruguay already had an important proportion of its trade with the big partners, namely through bilateral trade agreements with Argentina (CAUCE) and Brazil (PEC). These agreements provided tariff preferences from Uruguay with its neighbours against third countries for manufacturing goods.²

The integration process was verified in a context of the return to growth in the region, along with policies of trade and financial liberalization and stabilization. The creation of the MERCOSUR decreases the cost of access to partners' markets and implies an enlargement of the market. Nevertheless, the degree of development and economic size between

¹ The Asuncion Treaty, signed on the 26th March of 1991 is a regional integration agreement to create the Southern Common Market. It was signed by Argentina, Brazil, Paraguay and Uruguay.

² The agreement with Argentina (CAUCE) was signed on August 20, 1974, the trade agreement with Brazil (PEC), on June 12, 1975. Bilateral agreements play a decisive role, particularly in trade with Argentina. From 1982 to 1984, 65.2% of all Uruguayan exports to Argentina were developed under the terms of CAUCE and only 12.6% under the conditions of "normal" trade with Argentina. 90% of industrial exports to Argentina were verified through the CAUCE. Trade agreements with Brazil play a role rather less significant. Between 1982 and 1984, only 16.8% of Uruguayan exports to Brazil were performed according to the PEC conditions, while 28.3% were classified under the category of "general regime" (Marmora y Messner 1991).

countries and regions is very uneven which may act as an impediment to deeper integration.

After MERCOSUR creation there has been an important rise of Uruguayan trade with the big partners: Argentina and Brazil, for both imported and exported goods. The average values for the period 1975-1978 show that exports to Argentina and Brazil were 22 per cent of total Uruguayan exports while this figure raise to 46 per cent in the period 1994-1996.³

In 1995 the tariff structure of the bloc was adopted. Thus, the protection levels in Uruguay, regarding extra-regional trade are defined basically through two key instruments: tariffs and the exchange rate.

On the other hand, the exchange rate was used as an instrument to reduce inflation, and domestic currency was strongly appreciated during most of the period analyzed. In the 90s the policy designed to reduce inflation was to tie the peso to the dollar (crawling peg or “ancla cambiaria”). The Stabilization Plan was triggered by an inflation that reached the three digits, in January 1991. The monetary aspect of the plan was the use of the domestic currency pegged to the dollar. This was instrumented by the Central Bank through a band regime with pre-announced ex-change rates. This policy was successful in reducing inflation which fell steadily since 1991 up to the year 2002. The cost of this policy was to make exports less competitive, mainly outside the region, since Brazil and Argentina also implemented similar stabilization policies.⁴

During the 90s there was a significant growth of exports to MERCOSUR partners, especially to Argentina. On the other hand there was a decrease in the exports to countries others than those of MERCOSUR (to third countries). In 1994 the main destiny of exports was MERCOSUR countries: 51.4 % of total exports were made to MERCOSUR partners. Also there was an important increase in imports as we have already noted in the previous section.

In Table 1 and Chart 1 we present the evolution of manufacturing gross product, imports and exports for the period 1988 up to 2001.

³ Source: Banco Central del Uruguay

⁴ The exchange rate policy has consequences on the domestic currency appreciation and through this channel to trade specialization.

In Table 2 and Chart 2 we present the evolution of the Openness Index and the Import Penetration and Export ratio. We can observe the increase in openness in the three indicators considered. They increase steadily up to 2000 and contract in 2001.

By the end of the 90s the share of manufacturing product in GDP as well as the number of manufacturing firms has decreased substantially and the unemployment rise. In Table 3 and Chart 3 we present the share of manufacturing product in GDP, while in Table 4 and Chart 4 we present the employment rate, the number of persons employed and the unemployment rate and the number of persons unemployed. We observe the increase in unemployment in the Uruguayan economy during the period.

3. Links between trade policy and labour market

3.1. Theoretical issues

It is worth devoting some words to the links between trade policy and labour market outcomes. Trade policies can have a significant impact on the level and structure of employment, on wages and wage differentials, and on labour market institutions and policies. Nevertheless labour and social policies also influence the outcomes of trade policies in terms of growth of output, employment and the distribution of income.⁵

Trade liberalization is associated with both job destruction and job creation. The net employment effect in the short run depends mainly on country specific factors such as the functioning of the labour market. In the long run, the efficiency gains due to trade liberalization are expected to generate positive employment effects, either in terms of quantity or quality of jobs or a combination of both.

The theoretical literature provides insights into the process of job destruction and job creation following trade liberalization and illustrates how different country characteristics can affect temporary and permanent employment at the sectoral or country level (Lee, Vivarelli and Office 2006).

The classical link between trade and income inequality is based on the Stolper-Samuelson Theorem developed in a model that assumed full employment. According to this theorem

⁵ For a survey on the theoretical links of globalisation and inequality see Goldberg and Pavcnik (2007) .

inequality is most likely to increase in industrialized countries as a consequence of trade with developing countries because the former are well endowed with skilled labour. While in developing countries is expected to observe a decline in inequality. This would happen because developing countries are typically well endowed with low skill labour relative to developed countries. With a move to free trade, developing countries will be more competitive in low skill intensive sectors which will expand. The increased demand for low skilled workers, who typically belong to the poorer segments of the population, will lead to an increase in their wages relative to the wages of skilled workers. Thus, the theoretical literature predicts that trade liberalization raises average income levels, and some contributions to the theoretical growth literature suggest that trade also stimulates growth.⁶

It is worth to note that the majority of trade in industrialized countries is intra-industry trade, i.e. trade with other industrial countries. Thus, the changes in relative demand for different factors of productions predicted by Stolper-Samuelson are not likely to hold. In this regard Manasse and Turrini (2001) analysed whether intra-industry trade has an impact on the demand for high-skilled and low-skilled labour and conclude that intra-industry trade can raise wage inequality within countries and within sectors. Duranton (1999) comes to a similar conclusion in a model that combines intra-industry trade with technological change. In his model trade and technological progress lead to increase wage inequality.

As we have mentioned above, traditional trade models assume full employment, though some workers may be better or worse off in the long run due to changes in wages. It is assumed that on average, individuals would be better off as a result of overall efficiency gains triggered by trade liberalization. However, many economies are not characterized by full employment.⁷ In this case trade liberalization would reduce demand for workers mainly in import competing sectors and unemployment would increase.

Recent trade models point out that adjustment processes may not only be observed between sectors but also within sectors. The “new-new trade models” that introduce firm heterogeneity and fixed-market entry costs predict that trade reform will trigger job

⁶ A large number of multi-country case studies and econometric studies using cross-country datasets have tested the empirical validity of the trade-growth relationship but there is no full agreement among economists concerning the precise nature of this relationship .

⁷ For a recent theoretical model with unemployment see Helpman, Itskhoki and Redding (2010).

creation and job destruction in all sectors, as both net-exporting and net-importing sectors will be characterized by expanding high-productivity firms and low-productivity firms that will shrink or close down. This implies that an important reshuffling of jobs takes place within sectors.

3.2. Evidence of the effect of trade liberalization on employment and wages

Even though the economic literature has produced a large number of empirical studies analysing the effects of trade on labour market outcomes, so far no clear message emerges from the literature. The only general conclusion that may be justified is that employment effects depend on a large number of country-specific factors, aside differences in the quality of the data and econometric issues of the studies.

One shortcoming of the studies is that they fail to distinguish the different possible causes of employment changes. Labour market policies, macroeconomic policies, technological changes or movements along the business cycle are only a few examples of factors that may affect an economy's employment level. In this regard, the work by Gaston and Trefler (1997) on the Canada-US Free Trade Agreement, make a distinction between the employment effects of the trade agreement and those of a general recession affecting both trading partners in the same period. Gaston and Trefler (1997) find that tariffs cuts contributed to reduce employment during the years following the agreement but that they also contributed to important productivity increases leading to long run efficiency gains. However, after controlling for recession, it appears that the FTA accounted for only 9-14 per cent of the jobs lost over the period. Trefler (2001) analysing the Canada-US free trade agreement finds instead a bigger role for the tariff cuts in the employment declines. According to his estimates nearly 30 per cent of the observed employment losses in manufacturing were a result of the FTA tariff cuts. His work shows that the adjustment process took seven years and during this process many workers moved to high-end manufacturing jobs along with dramatic productivity growth. Both, aspects reflect important long run efficiency gains from trade. Trefler also finds increases in workers annual earnings and these increases are significantly higher in those industries that cut tariff rates most.

Milner and Wright (1998) analyzed labour market responses to trade liberalization in Mauritius. They show that manufacturing employment increased significantly in the period following the 1983 trade liberalization. Though employment increases in the long run exceeded those that occurred immediately after the reform, the short-run impacts on employment were significant and positive. Rama (1994), in contrast, finds a negative effect of trade liberalization on employment in his analysis of trade policy reform in Uruguay in the late 1970s and early 1980s. Further evidence on developing countries is given by Harrison and Revenga (1995). They find evidence of increases in manufacturing employment following trade liberalization periods in Costa Rica, Peru and Uruguay. Instead, in a number of transitional economies (Czechoslovakia, Poland and Romania), employment fell during the transition period. As the authors note, however, those countries were undergoing significant other reforms that went well beyond trade liberalization.

There are some cross-country studies that provide insights into the income effects of trade reform for subgroups in the population. The study by Rama (2003) explicitly looks at the effects of trade reform on wages and finds that wages grow faster in economies that integrate with the rest of the world. The author finds that trade can have a negative impact on wages in the short run, but finds that it only takes a few years for this effect to change sign. Lopez (2004) distinguishes between the short and long run effect of trade policies. He finds that trade openness raises inequality and stimulates growth at the same time and refers to trade liberalization as a win-lose policy. Improvements in infrastructure and in education on the other hand reduce inequality and increase growth at the same time, so does inflation reduction.

Most empirical works for Latin America suggest that trade liberalization has led to an increase in both income and wage inequality and a skill bias of labour demand (Robbins 1996; Attanasio, Goldberg, y Pavcnik 2004; Feenstra y Hanson 1997; Perry y Olarreaga 2007; A. Barraud 2008; Wood 1997; Slaughter 2000). Dollar and Kraay (2004) find that trade openness affects income distribution positively. A similar result is obtained by Behrman, Birdsall and Székely (2000) for a set of Latin American countries. However, Sanchez-Paramo and Schady (2003) find the opposite result in six Latin American countries, where trade volumes would negatively affect inequality. Spilimbergo et al. (1999) also find that trade openness would be associated with higher inequality, whereas Edwards

(1998) does not find any significant effect of trade on income distribution. Galiani and Porto (2006) find a negative effect of tariff reforms on the wage levels in Argentina.⁸ More recently Barraud (2009) analysing the effect of trade liberalization on wages for Argentina using difference in differences and matching techniques, finds that labour market and poverty indicators deteriorated in the 1988-1998 liberalization period in Argentina.

The whole picture that emerges is that this literature does not appear to allow for any general conclusion as to the link between trade liberalization and income distribution and the impression arises that this link is country and situation specific.

For the Uruguayan case Casacuberta and Vaillant (2002) find that the higher the tariff reduction the higher was the reduction in employment and wages at the industry level. Galiani and Sanguinetti (2003) find that Mercosur trade flows have negatively affected the level of industry employment in Uruguay. However these results are obtained through correlations so they are not controlling for other forces that may have induced different manufacturing activities to change their employment levels.

The tariff schedule in place before trade liberalization may also affect the impact of trade on wage inequality. If protection was higher in the low-skill intensive sectors, then trade liberalization may actually lead to shrinkage of these sectors. As a consequence, wage inequality would increase. It has been suggested in the literature that this phenomenon has been observed in Mexico and Morocco.

Hence, so far empirical research into the link between trade liberalization and market labour outcomes has produced mixed results. While the evidence for Asia seems to confirm a reduction in inequality following trade liberalization in Latin America inequality shows an increase.

As we have already mentioned we should keep in mind the difficulty of isolating the effects of trade from other policies implemented simultaneously with trade reform. In most studies, the identification of trade effects relies on the comparison before and after a policy change. As a consequence, this approach attributes changes originating from other sources to trade policy. Most studies use data covering only a short time period after the reform which implies that the results can be heavily affected by the cyclical behaviour of the economy. The difference-in-difference methodology should eliminate the effects of common shocks providing so a more precise description of the impact of trade policy as

⁸Winters et al. (2004) and Hertel and Reimer (2005) surveyed the effects of trade on income levels.

we explain in Section 5. We try to improve over Barraud’s study by using a double-robust estimator which allows obtaining unbiased estimated when there are confounding factors (e.g. changes in technology, in labour supply, in institutional settings and other policies that may affect the outcome as well as the probability of treatment).

4. Empirical implementation

4.1. Methodology

This paper use a difference-in-differences methodology which allows to study the impact of increased trade exposure due to the creation of the Mercosur (the treatment) relative to individuals in industries that did not increase their exposure to foreign competition (the control group). We estimate regressions equations in double differences without matching as well as matching and double-differences.

4.1.1 Regression Equations (DID)

In the case of regression equations our baseline equation to estimate is the following:

$$Y_{it} = \beta_o + \beta_L TT_{it} + \beta_x X_{it} + \varepsilon_{it} \quad (1)$$

where Y_{it} is the outcome for household i at time t . As outcome variables we consider monthly earnings, total hourly labour earnings, hourly wages, hourly labour earnings in monetary terms and in-kind, unemployment probability and wage dispersion. TT_{it} is the trade liberalization variable. It is constructed by interacting individuals belonging to the manufacturing industries (Lib_{it} , where manufacturing=1 and service or control group=0) with a time dummy that takes the value of one for 1996 (five years after the creation of the MERCOSUR).⁹

As treatment group we consider those individuals working in the manufacturing sector while as non-tradable we consider the public employees as explained below.

⁹ The Asuncion Treaty, signed on the 26th March of 1991 is a regional integration agreement to create the Southern Common Market. It was signed by Argentina, Brazil, Paraguay and Uruguay.

X_{it} is a set of control variables or covariates which includes age, civil status, chief of the household, sex, hours worked the week before to the survey, number of jobs and schooling years.

To construct the liberalization variable (TT_{it}), we define the treated group as those individuals working in the tradable industries (Lib_{it}) after MERCOSUR's creation. Our control group is integrated by individuals working in the public sector, which are likely to be less affected by trade openness. We should note that this definition of the tradable and non-tradable groups is not free of criticism: on one hand it may be sensitive to the level of aggregation used. Besides, Barraud and Calfat (2008) analyzing the effect of trade liberalization on wages for Argentina find evidence of significant impacts of trade liberalization on several non-tradable sectors as well as an important shift of manufacturing workers to services, which would indicate that the service sector is also likely to be affected by liberalization.

Nevertheless, using public employees as control group has the advantage that they have different characteristics relative to the private sector employees that allow us to assume that they were much less affected than other private workers by the trade policies that were in place in the 1990s. These characteristics are linked with the conditions of entry, the possibilities of lay-offs, and the setting of their wages. Further, from the data we observed that unemployment rates for the service sector are significantly lower than for the manufacturing one. In this regard, we analyze the proportion of unemployment by industry finding that 74 % comes from manufacturing and 26 % from the service sector, corroborating the assumption that manufacturing is by large more affected due to trade liberalisation than the control group (see Appendix 1).¹⁰

Another reason for choosing public employees as control group, related to the above, is that there is a low inter-sectoral mobility between both groups since there are institutional and traditional barriers to entry in the public sector, preventing workers from the industrial sector to move to government jobs. Furthermore labour skills are usually specific to each sector, and this would also be a factor affecting mobility. Besides, we can assume that public employees share a similar set of characteristics with those working in the manufacturing sector, that's to say, the individuals in the treatment group.

¹⁰ Furthermore, the percentage of unemployment in manufacturing for 1996 is of 12.52 % while in the control group is 7.5 %.

Finally, in a similar work for the Argentinean case Barraud (2009) uses services as control group.

We also tried different definitions of control groups based on different aggregations of public workers according to the industry in which they work as shown in Table 5.

We work with civil servants in Public Administration and Defence and “Social and other community and related services” (emp_pub4) as control group, since it has enough number of observations to conduct the analysis and excludes public workers that belong to industries that were affected by increased trade openness such as some public enterprises as refineries (ANCAP).

Variables were deflated by the price deflator so they are expressed in real terms with base in December 2006.

4.1.2 Matching and Double Differences

The effect of Mercosur’s creation is the estimated difference-in-difference of the outcome variable (earnings, hourly wage, probability of unemployment and wage dispersion) between the treated and the control groups. The difference-in-difference methodology is implemented matching households with similar propensity scores as well as inverse probability weighting and Difference-in-Differences estimation.

We use a matching and difference-in-differences methodology which allows studying the causal effect of increasing trade liberalisation (the treatment) on individuals which belong to the tradable group(the treated) relative to individuals that were not –or at least into a lower extent- affected by the opening of the economy (the control group). Thus, our aim is to evaluate the causal effect the creation of the Mercosur on \mathbf{Y} , where \mathbf{Y} represent monthly earnings, total hourly labour earnings, hourly wages, unemployment probability and wage dispersion. Y is referred to as the “outcome” in the evaluation literature.¹¹

The effect of trade openness is the estimated difference-in-difference of the outcome variable (Y_{it}) between the treated and the control groups.

¹¹ Blundell and Costa Dias (2000) present a review of the microeconomic evaluation literature.

Let increased trade openness due to Mercosur's creation (TT^*) where $TT_{it}^* \in \{0,1\}$ denotes an indicator (dummy variable) of whether household i has been exposed to increased trade openness- and $Y_{i,t+s}^1$ is the outcome at $t+s$, after Mercosur's creation, i.e. after 1991. Also denote by $Y_{i,t+s}^0$ the outcome of household i had it not been exposed to increased trade openness. The causal effect of the TT^* for household i at period $(t+s)$ is defined as: $Y_{i,t+s}^1 - Y_{i,t+s}^0$.

The fundamental problem of causal inference is that the quantity $Y_{i,t+s}^0$, referred as the counterfactual, is unobservable. Causal inference relies on the construction of the counterfactual, which is the outcome the individuals would have experienced on average had they not been exposed to increased trade openness. The counterfactual is estimated by the corresponding average value of household that do not have experienced an increased in trade exposure. An important issue in the construction of the counterfactual is the selection of a valid control group and to this end we make use of matching techniques.

The basic idea of matching is to select from the group of individuals belonging to the control group those in which the distribution of the variables \mathbf{X}_{it} affecting the outcome is as similar as possible to the distribution of the individuals belonging to the treated group. The matching procedure consists on linking each treated individual with the same values of the \mathbf{X}_{it} . We adopt the “propensity score matching” method. To this end, we first identify the probability of being exposed to increased trade openness (the “propensity score”) for all individuals, irrespective if they belong to treated or control group by means of a logit model. A household k belonging to the control industries, which is “closest” in terms of its “propensity score” to a firm belonging to the tradable industries, is then selected as a match for the former. There are several matching techniques, and in this work we use the “kernel” matching method that penalises distant observations, and bootstrapped standard errors and inverse probability weighting. Inverse probability weighting derives weights from the propensity score, where these are defined by the inverse of the propensity score if the individual receives treatment and the inverse of 1 minus the propensity score if the subject is in the control group.

A matching procedure is preferable to randomly or arbitrarily choosing the comparison group because it is less likely to suffer from selection bias by picking individuals with markedly different characteristics.

As Blundell and Costa Dias (2002) point out, a combination of matching and difference-in-difference is likely to improve the quality of non-experimental evaluation studies. The difference-in-difference approach is a two step procedure. Firstly, the difference between the average output variable before and after the treatment is estimated for firms belonging to the treated group, conditional on a set of covariates (\mathbf{X}_{it}). However, this difference can not be attributed only to increased trade openness since the output variables might be affected by other macroeconomic factors, such as policies aimed to stabilization of the economy. To deal with this the difference obtained at the first stage is further differenced with respect to the before and after difference for the control group. The difference-in-difference estimator therefore removes effects of common shocks and provides a more accurate description of the impact of the trade liberalisation on labour markets. Furthermore, the double-robust estimator offers increased protection against model misspecification and also gives unbiased estimates of the treatment effect when the models are correctly specified, allowing so to obtain accurate results.

4.2. Data Sources and Variables

Data come from the Continuous Household Survey for the years 1988 and 1996, recorded by the Instituto Nacional de Estadística (INE). These surveys are representative of urban areas with more than 900 inhabitants in the whole country.

Due to data availability we work with the main occupation. Also, for the sake of simplicity we consider only the employees and dropping from the sample owners, independents workers and cooperative members. Thus, the treated group is defined as those individuals whose main occupation is as workers in Manufactures while the control group is composed by public workers in "Public Management and Defence" and "Social and other community and related services" as main occupation¹². In Table 6 we present the number of observation in each group and year.

¹² According to the definition of the outcome variables in this work, both groups exclude those who declare to have worked 0 hours in the week previous to the survey and to those who do not declare income in the month previous to the survey.

As can be observed from Table 6, the control group represents a slightly higher number of observations of the total sample for the two years considered in this work. This implies that the distribution of both groups do not change substantially over the period.

The outcome variables considered regarding earnings and wages are monthly earnings, total hourly labour earnings –including leave pays and bonuses-, hourly wages and hourly earnings (monetary and in kind and excluding leave pays and bonuses). As we have mentioned before all the income variables are in real terms with base December 2006. Furthermore we analyse the probability of unemployment, estimated with a logit model¹³ and wage dispersion.

Monthly earnings are composed by all the net incomes from the main occupation, i.e. monetary wages and wages in-kind, commissions, bonuses, leave pays, tips and others compensations. To estimate the total hourly labour earnings we divide monthly earnings by the hours worked in the week in the main occupation, i.e. the one that represents the main earnings.¹⁴ Hourly wages considers exclusively the monetary earnings (wage and commissions) per hour in the main occupation in monetary terms, while hourly labour earnings takes into account wages and earnings in-kind and exclude bonuses and holiday pays. In appendix 3 we present the evolution of these four variables for the treatment and control group.

In order to analyse wage inequality we defined the 80th percentile of total hourly wages and monthly labour earnings and compute the ratio of these values over hourly labour earnings and monthly labour earnings generating the variables named gap2 and gap3 respectively at the 2 digit ISIC level.¹⁵ Further, we tested also earning dispersion as the value of total earnings in the 80th percentile with respect to its median value, naming this variable gap4.

In Table 7.1 we summarise the main features of the variables considered in this work for the years 1988 and 1996 while in Table 7.2 we present total hourly and income wage gaps.

¹³ See Appendix 3 for details on the estimation of the probability of unemployment.

¹⁴ Since earnings are expressed in a monthly basis we divide the total monthly earnings by 4.3 to obtain the weekly income. Monthly earnings and hourly labour earnings include leave pays and bonuses.

¹⁵ Lack of data prevents us from analysing wage dispersion at the 3-digit ISIC level.

We can observe an increase in income and wage gaps in the period with and important decreased in the standard deviation, pointing out and increased dispersion of these variables.

4. Results

4.1. Difference-in-difference regressions

The most relevant results obtained in this paper are presented in this section. Following the methodology presented in Section 3, we estimate regression equations in double differences in order to estimate the impact of the increased trade openness due to Mercosur's creation, on a selected group of impact variables regarding earnings and wages, unemployment probability and wage dispersion.

Firstly we analyse the results obtained for earnings and wages: monthly earnings, total hourly labour earnings, hourly wages, and hourly earnings monetary and in-kind earnings. From the t-test analysis (see Appendix 2) we can observe that monthly earnings are significantly higher for the treated than for the control group in both years, while hourly wages are significantly higher in both years for the control group and the unemployment rate is significantly higher in the treated for both years. In Table 8.1 we present the results for the difference-in-differences regressions without matching.

Mercosur's creation shows a positive effect on the monthly earnings and hourly labour earnings of the workers affected by increased trade openness, i.e. those workers in the Manufacturing industry. Nevertheless, the treatment is not significant for hourly labour earnings and hourly monetary wages. This would point out not significant effect for monetary earnings but a positive effect when we consider also labour earnings in-kind.

The control variables behave as expected and are significant in all the cases. In line with previous studies incomes are higher in Montevideo in relation with the rest of the urban areas, higher for men and head of the household. Furthermore, earnings increase with the schooling years and age. With regard to age it could be observed that the coefficient associated to squared age is negative, which would imply that the effect of age is not linear but quadratic, i.e. as age increases income increases at a decreasing rate.

Regarding to the probability of unemployment the impact of Mercosur's creation is positive and significant, which implies that increasing trade openness increases unemployment probability. In Table 8.2 we present the results. Once again the control variables have the expected signs and are significant except for the variable hours worked,

indicating that the probability of unemployment is not associated with the amount of hours worked previously to dismissal.

The results point out that increased trade openness has a positive impact on monthly earnings of the treated groups –i.e. the workers affected by the treatment- but that it also increases the probability of unemployment. Nevertheless, it has no impact on total hourly labour earnings when we control for hours worked. This could imply that the increase in labour income is accompanied by a proportional increase in hours worked which compensates the effect on total earnings of workers as well as in in-kind earnings.

Further, when we analyse hourly wages we do not observe significant effects arising from Mercosur's creation corroborating our previous findings, but there is a positive and significant effect when we take monetary wages and in kind. This could be explained by the labour deregulation that took place in this period, mainly in the private sector, which implied that a substantial amount of the wages were paid in-kind (for instance through food tickets).

Finally, the results for wage dispersion point out an increase in dispersion, both for monthly earnings and hourly earnings after Mercosur's creation as can be observed from Table 8.3

4.2. Matching and difference-in-difference

We tried two alternative approaches for estimating the matching and double difference effects on the outcome variables for our repeated cross-sectional data. In first place we estimate the effects of belonging to the tradable sector after and before and take the difference between the estimated average treatment on the treated. To this end we use kernel weighting method that penalizes distant observations.

Another approach is to use double robust estimators and inverse probability weighting using the distribution of the treated after the treatment. A double-robust estimator allows obtaining unbiased inference when adjusting for selection effects such as confounding¹⁶ by allowing for different forms of model misspecification. Furthermore, it can also offer increased efficiency when the model is correctly specified (Emsley et al., 2008).

¹⁶ Confounding occurs when there are variables that can affect the outcome of interest, which are correlated to the treatment under analysis. Confounding as well as not common trends can be controlled for using inverse probability weighting.

For MDID and kernel weighting –reported in Table 9- we find again a positive and significant impact of Mercosur’s creation on monthly earnings, hourly labour earnings (monetary and in-kind) and the probability of unemployment as before. Nevertheless, we also find a positive effect on hourly wages and a negative effect on monetary income per hour, which were not significant when we perform the DID regressions.

Finally for the double robust estimators and inverse probability weighting (Table 10) we find a positive effect of Mercosur’s creation on earnings and wages for all the definitions tried and a rise in the probability of unemployment and increases in wage dispersion.

5. Consistency checks

Since there were important changes in the methodology used by the INE in 1991, such as changes in the sampling and the questionnaires applied we try also 1991 as the baseline year and 1996 as the year after the intervention.

For the DID regressions we find a positive significant impact of Mercosur’s creation for monthly labour earnings, hourly labour earnings, hourly wages (monetary), and hourly labour earnings in money and in kind, though the estimated coefficient differs from previous results. Further, increased trade openness seems to increase the probability of unemployment. The only difference is that monetary hourly wages turns out to be positively significant taking 1991 as baseline year, while it is was not significant when we take 1988 as baseline.

Also income and wage dispersion shows a similar behaviour taking 1991 as baseline instead of 1988.

As we commented above Barraud (2009) implemented a difference-in-difference approach using household surveys for the years 1988 and 1998, for the Argentinean case. Barraud define as treated workers in manufacturing industries and as control the public employees. The main findings were a reduction in monthly and hourly earnings and increases in the probability of unemployment. Nevertheless for the Uruguayan case we find increases in wages and also in the probability of unemployment and a rise in wage dispersion.

6. Concluding remarks

The results for the difference-in-difference regressions seems to show that increased trade openness due to Mercosur's creation has had a positive impact on total earnings of the treated group, i.e. manufacturing workers, but when controlling for hours worked it is not significant which could be pointing out a countervailing effect due to the hours worked, i.e. the higher income is due to more hours worked and not a higher hourly wage. Furthermore, we observe that increased trade openness impact positively and significantly on the probability of unemployment of the treated group. Finally, we observe a positive effect on monthly earnings (in monetary terms plus in kind) and increases for our three measures of wage dispersion tried.

Since these results could be affected by differences in the characteristics of individuals in the treated and control group we apply double robust estimators finding significant increases in income and hourly wages as well in the probability of unemployment and increased wage dispersion. Thus, our results confirms the findings by Casacuberta and Vaillant (2002) and Galiani and Sanguinetti (2003) who working at the industry level find that Mercosur trade flows have negatively affected the level of industry employment in Uruguay. However their results are obtain trough correlations so they do not have a causal interpretation. In this regard we contribute to the literature providing a causal nexus between Mercosur's creation and labour market outcome. In our research agenda is to dig deeper into the relations between trade and labour market outcomes, and if possible to work with matched employees and firm level data, including as well into the analysis institutional factors and technological change.

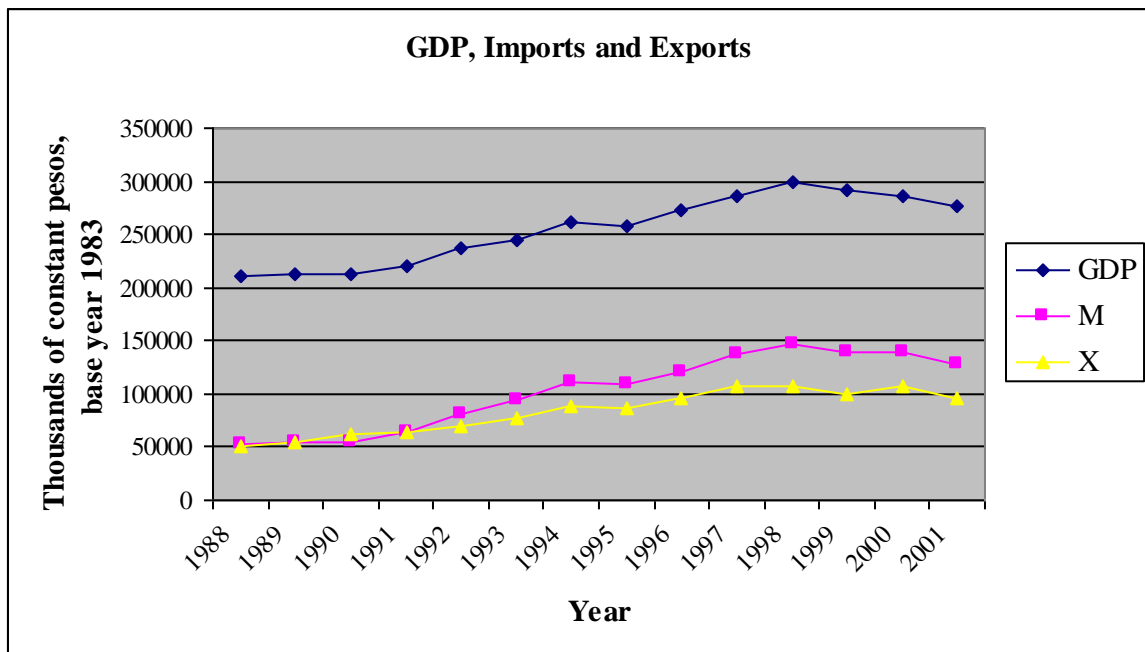
Table 1: Evolution of GDP, Imports and Exports (thousands of constant pesos base year 1983)

Year	GDP	Imports	Exports
1988	209,892	52,321	51,373
1989	212,209	54,909	55,228
1990	212,840	54,548	62,795
1991	220,372	64,409	64,504
1992	237,851	80,591	70,387
1993	244,142	94,473	76,459
1994	261,951	111,734	88,038
1995	258,159	108,341	86,403
1996	272,559	120,617	95,287
1997	286,317	136,593	107,695
1998	299,311	147,013	108,055
1999	290,791	138,503	100,099
2000	286,600	138,600	106,467
2001	276,898	128,785	96,748

GDP: gross domestic product, M: imports, X: exports.

Source: Own elaboration based on data from the Uruguayan Central Bank (Banco Central del Uruguay)

Chart 1: Evolution of GDP, Imports and Exports (thousands of constant pesos base year 1983)



Source: Own elaboration based on data from the Uruguayan Central Bank (Banco Central del Uruguay)

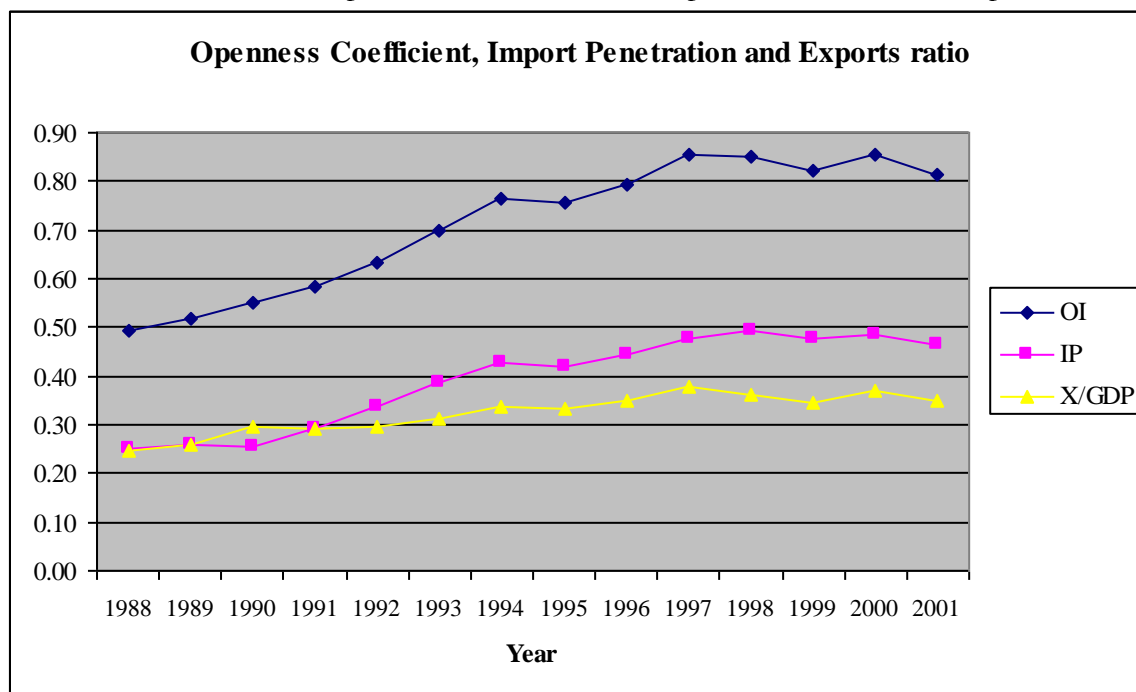
Table 2: Evolution of the Openness Coefficient (OI) and Import Penetration (IP) and Exports Ratio

Year	OI	IP	X/GDP
1988	0.49	0.25	0.24
1989	0.52	0.26	0.26
1990	0.55	0.26	0.30
1991	0.58	0.29	0.29
1992	0.63	0.34	0.30
1993	0.70	0.39	0.31
1994	0.76	0.43	0.34
1995	0.75	0.42	0.33
1996	0.79	0.44	0.35
1997	0.85	0.48	0.38
1998	0.85	0.49	0.36
1999	0.82	0.48	0.34
2000	0.86	0.48	0.37
2001	0.81	0.47	0.35

OI: openness coefficient defined as $(\text{Exports} + \text{Imports}) / \text{GDP}$ and IP: import penetration ratio defined as M / GDP and the export ratio is defined as $\text{Exports} / \text{GDP}$

Source: own elaboration based on data from the Uruguayan Central Bank (Banco Central del Uruguay)

Chart 2: Evolution of the Openness Coefficient and Import Penetration and Export Ratio



Source: own elaboration based on data from the Uruguayan Central Bank (Banco Central del Uruguay)

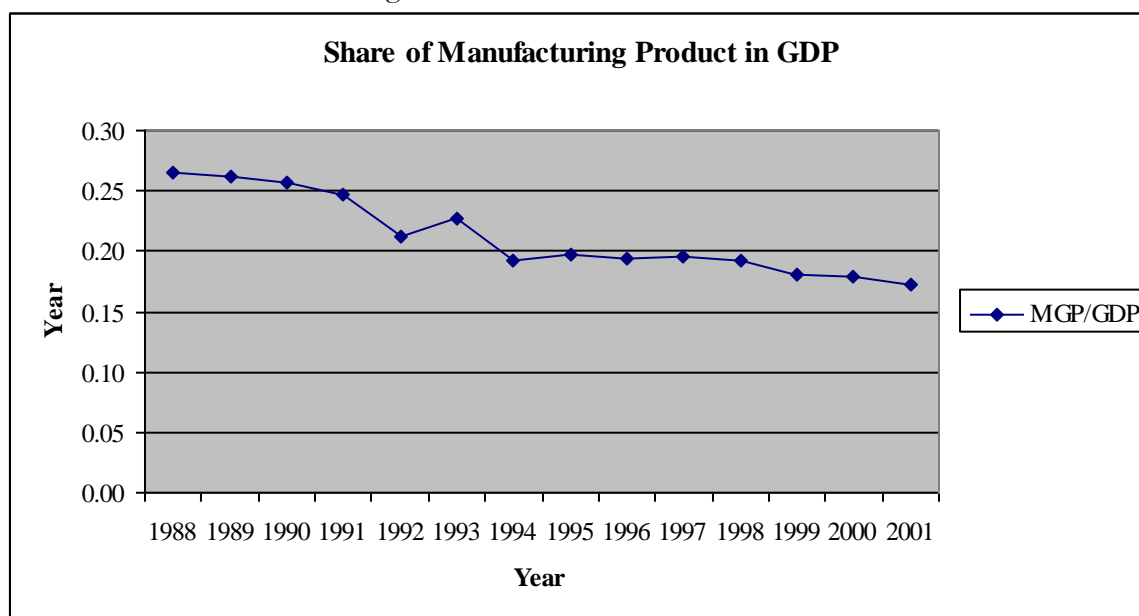
Table 3: Share of Manufacturing Product in GDP

Year	GDP	MGP*	MGP/GDP
1988	209,892	55,667	0.27
1989	212,209	55,560	0.26
1990	212,840	54,750	0.26
1991	220,372	54,464	0.25
1992	237,851	50,328	0.21
1993	244,142	55,296	0.23
1994	261,951	50,361	0.19
1995	258,159	50,877	0.20
1996	272,559	52,918	0.19
1997	286,317	56,023	0.20
1998	299,311	57,330	0.19
1999	290,791	52,514	0.18
2000	286,600	51,424	0.18
2001	276,898	47,537	0.17

*MGP: Manufacturing gross product in thousands of constant pesos, base year 1983.

Source: Own elaboration based on data from the Uruguayan Central Bank (Banco Central del Uruguay)

Chart 3: Share of Manufacturing Product in GDP



MGP/GDP: Manufacturing gross product over GDP.

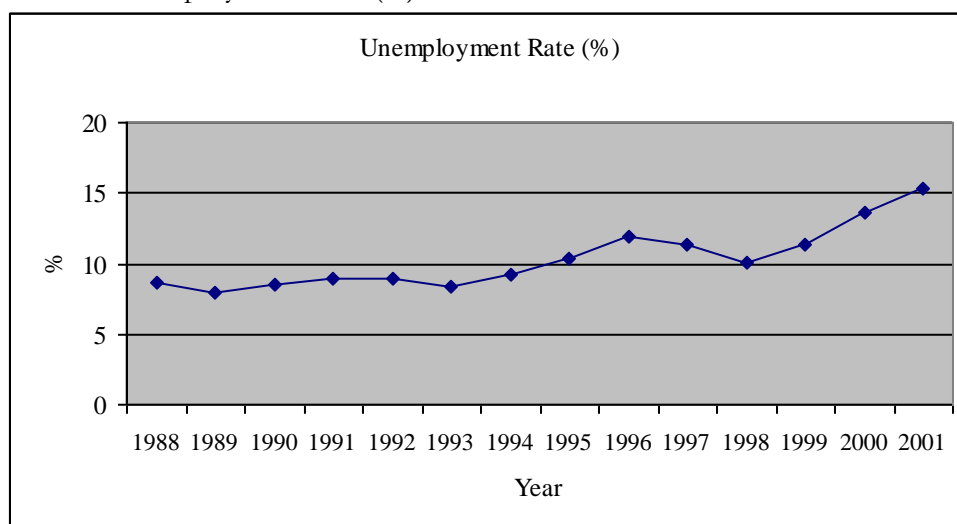
Source: Own elaboration based on data from the Uruguayan Central Bank (Banco Central del Uruguay)

Table 4: Employment and unemployment in Uruguay, 1988-2001

Year	Employment Rate (%)	No. of persons employed (thousands)	Unemployment Rate (%)	No. of persons unemployed (thousands)
1988	52.2	1,077.30	8.6	101.9
1989	53.1	1,108.40	8	95.2
1990	53.5	1,110.60	8.5	102.1
1991	52.3	1,125.40	8.9	109.9
1992	52.2	1,142.90	9	113.2
1993	52	1,156.00	8.3	105.4
1994	52.8	1,186.90	9.2	121.1
1995	53	1,206.00	10.3	137.5
1996	51.3	1,174.80	11.9	159.1
1997	51	1,172.40	11.4	151.5
1998	54.3	1,103.70	10.1	123.8
1999	52.6	1,082.10	11.3	137.7
2000	51.5	1,067.60	13.6	167.7
2001	51.4	1,076.20	15.3	193.2

Source: Instituto Nacional de Estadísticas (INE)

Chart 4: Unemployment Rate (%)



Source: Instituto Nacional de Estadísticas (INE)

Table 5: Definitions of control groups

Variable	Definition
emp_pub1	Public Workers
emp_pub2	Public workers in the division “Community Social and Personal Services”– excludes public enterprises
emp_pub3	Public workers in the division “Community Social and Personal Services – excludes public enterprises – and “Personal and Household Services” as well as “International Organizations”
emp_pub4	Public workers “Public Administration and Defence " and "Social and other community and related services”
emp_pub5	Public workers in "Social and other community and related services”

Source: Own elaboration

Table 6: Number and percentage of observations in the control and treated groups– 1988 and 1996, urban areas with more than 900 inhabitants

	<i>1988</i>		<i>1996</i>	
	Observations	%	Observations	%
Control group	3863	51.3	3054	53.7
Treated group	3667	48.7	2631	46.3
Total	7530	100	5685	100

Source: Own elaboration based on ECH 1988 and 1996

Table 7.1: Descriptive statistics– 1988 and 1996, urban areas with more than 900 inhabitants

		1988								
		Total			Treated			Non-Treated		
		No. Obs.	Average	S.E.	No. Obs.	Average	S.E.	No. Obs.	Average	S.E.
Outcome Variables	Monthly earnings	7530	10741.35	9024.929	3667	11043.48	10811.73	3863	10454.55	6903.341
	Total hourly labour earnings*	7530	60.9388	58.64012	3667	56.18011	65.61545	3863	65.45604	50.74353
	Hourly wages (hourly monetary wage)	7530	51.93759	49.93657	3667	48.62609	57.96903	3863	55.08107	40.63559
	Hourly labour earnings (monetary and in-kind)**	7530	54.37341	50.49756	3667	49.80618	58.25184	3863	58.70891	41.37124
	Unemployment probability	7530	0.0692962	0.0619908	3667	0.0811074	0.073021	3863	0.0580843	0.0466049
Control Variables	Montevideo	7530	0.4742364	0.499369	3667	0.5396782	0.4984911	3863	0.4121149	0.4922793
	Sex (man=1)	7530	0.6258964	0.4839227	3667	0.6817562	0.4658582	3863	0.5728708	0.4947254
	Age	7530	37.39867	11.66889	3667	36.18871	12.28136	3863	38.54724	10.93454
	Squared Age	7530	1534.806	928.4611	3667	1460.413	959.5702	3863	1605.423	892.3375
	Head of household	7530	0.5017264	0.5000302	3667	0.4935915	0.5000271	3863	0.5094486	0.4999754
	Schooling years	7530	9.2	4.156597	3667	7.862285	3.148509	3863	10.46984	4.57823
	Hours worked	7530	44.49588	15.3459	3667	47.36215	12.90632	3863	41.77505	16.90496
	Number of jobs	7530	1.133599	0.3818153	3667	1.065176	0.2566215	3863	1.19855	0.4615489

*Include leave pays and bonuses; **Excludes leave pays and bonuses

S.E.: standard errors

Source: Own elaboration based on ECH 1988 and 1996

		1996								
		Total			Treated			Non-Treated		
		No. Obs.	Average	S.E.	No. Obs.	Average	S.E.	No. Obs.	Average	S.E.
Outcome Variables	Monthly earnings	5685	11577.71	10108.74	2631	12139.73	12448.73	3054	11093.54	7499.512
	Total hourly labour earnings	5685	68.16526	59.86078	2631	62.94509	63.4181	3054	72.66239	56.24047
	Hourly monetary wages (hourly monetary wage)	5685	57.16029	52.29815	2631	53.01425	54.94132	3054	60.73208	49.64109
	Hourly labour earnings (monetary and in-kind)	5685	62.68532	53.21773	2631	57.97227	55.72992	3054	66.74558	50.61269
	Unemployment probability	5666	0.0938942	0.072972	2625	0.1156789	0.0840809	3041	0.0750897	0.0552922
Control Variables	Montevideo	5685	0.517854	0.4997251	2631	0.5549221	0.4970689	3054	0.4859201	0.4998836
	Sex (man=1)	5685	0.5825858	0.4931758	2631	0.6913721	0.462015	3054	0.4888671	0.4999579
	Age	5685	38.24468	11.72058	2631	35.75067	12.20706	3054	40.39325	10.83565
	Squared Age	5685	1600.003	932.6359	2631	1427.066	945.2063	3054	1748.988	895.4232
	Head of household	5685	0.4666667	0.4989315	2631	0.4583808	0.4983596	3054	0.4738048	0.4993951
	Schooling years	5666	9.965055	3.963805	2625	8.590476	3.123522	3041	11.15159	4.221075
	Hours worked	5685	42.26684	14.08965	2631	45.75675	10.95456	3054	39.26031	15.70613
	Number of jobs	5683	1.146402	0.3967028	2631	1.066515	0.2625988	3052	1.215269	0.4726435

S.E.: standard errors

Source: Own elaboration based on ECH 1988 and 1996

7.2 Hourly and Income wage gaps

Hourly wage gap		
(gap2)	1988	1996
Average	2.965	3.781
Standard Dev.	2.668	29.71
No. Observations	7530	5681
Monthly labour earnings gap (gap3)		
Average	2.88	3.625
Standard Dev.	3.722	22.46
No. Observations	7530	5681

Table 8.1: Results of the estimation of regression equations in double differences on the income impact variables

VARIABLES	Monthly earnings	Total hourly earnings	Hourly monetary wage	Hourly labour earnings (monetary and in-kind)
Treatment	0.0375*** (0.0129)	0.00622 (0.0129)	0.00586 (0.0130)	0.0415*** (0.0125)
Montevideo	0.200*** (0.00890)	0.182*** (0.00932)	0.178*** (0.00927)	0.174*** (0.00899)
Sex	0.225*** (0.0126)	0.119*** (0.0126)	0.119*** (0.0121)	0.129*** (0.0117)
Age	0.0482*** (0.00288)	0.0440*** (0.00296)	0.0372*** (0.00287)	0.0398*** (0.00280)
Age ²	-0.000465*** (3.62e-05)	-0.000392*** (3.71e-05)	-0.000282*** (3.61e-05)	-0.000336*** (3.53e-05)
Head of household	0.190*** (0.0124)	0.147*** (0.0127)	0.0806*** (0.0124)	0.106*** (0.0120)
Schooling years	0.0533*** (0.00136)	0.0669*** (0.00135)	0.0736*** (0.00131)	0.0687*** (0.00130)
Marital status	0.123*** (0.0108)	0.121*** (0.0112)	0.0859*** (0.0108)	0.104*** (0.0106)
Hours worked	0.00981*** (0.000384)			
Number of works	-0.0377*** (0.0118)	0.0306** (0.0129)	0.0448*** (0.0125)	0.0488*** (0.0122)
Constant	6.716*** (0.0597)	1.910*** (0.0569)	1.802*** (0.0543)	1.875*** (0.0531)
Observations	13,194	13,194	13,142	13,162
R-squared	0.342	0.319	0.334	0.327

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Source: Own elaboration based on ECH 1988 and 1996

Table 8.2: Results of the estimation of regression equations in double differences on unemployment probability

VARIABLES	Unemployment probability
Treatment	0.0282*** (0.000591)
Montevideo	0.0113*** (0.000441)
Sex	-0.0360*** (0.000712)
Age	-0.0174*** (0.000184)
Age^2	0.000181*** (2.13e-06)
Head of household	-0.0302*** (0.000607)
Schooling years	-0.00355*** (6.70e-05)
Marital status	-0.0219*** (0.000479)
Hours worked	-1.07e-05 (1.71e-05)
Number of works	0.00357*** (0.000534)
Constant	0.523*** (0.00407)
Observations	13,194
R-squared	0.870

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Own elaboration base on ECH 1988 and 1996

Table 8.3: Wage dispersion

VARIABLES	(1) lngap2	(2) lngap3	(3) lngap4
Treatment	0.0811*** (0.0128)	0.195*** (0.0131)	0.0749*** (0.00115)
Montevideo	-0.171*** (0.00898)	-0.144*** (0.00911)	0.0133*** (0.000929)
Sex	-0.184*** (0.0125)	-0.154*** (0.0127)	0.00455*** (0.00118)
Age	-0.0413*** (0.00288)	-0.0507*** (0.00296)	-0.00117*** (0.000279)
Age^2	0.000395*** (3.61e-05)	0.000481*** (3.71e-05)	1.08e-05*** (3.42e-06)
Head of household	-0.179*** (0.0125)	-0.168*** (0.0127)	0.00240* (0.00123)
Schooling years	-0.0498*** (0.00134)	-0.0605*** (0.00136)	-0.00277*** (0.000128)
Marital Status	-0.125*** (0.0108)	-0.120*** (0.0111)	-0.00243** (0.00108)
Hours worked	0.0119*** (0.000356)	-0.00800*** (0.000379)	0.000383*** (3.42e-05)
Number of jobs	0.0256** (0.0123)	0.00885 (0.0119)	-0.00744*** (0.00119)
Constant	2.161*** (0.0589)	3.247*** (0.0608)	0.372*** (0.00562)
Observations	13,190	13,190	13,190
R-squared	0.340	0.337	0.338

Lngap2: average of the upper 80th hourly wage over the wage of the individual; lngap3: average of the upper 80th total income over total income of the individual; lngap4: average of the upper 80th total income over the median total income. Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Own elaboration base on ECH 1988 and 1996

Table 9: Results of the estimation of matching and difference-in-differences with the kernel weighting method

VARIABLES	ATT96	ATT88	MDID	t-test
Monthly labour earnings	-0.0053 (0.0193)	-0.0517 (0.014)	0.0464	180.93
Total hourly labour earnings	-0.0989 (0.0192)	-0.1054 (0.0147)	0.0065	25.35
Hourly wages (monetary)	-0.01631 (0.0198)	-0.00579 (0.0148)	-0.01052	-40.95
Hourly wages (monetary and in-kind)	-0.0621 (0.0186)	-0.0792 (0.0144)	0.0171	66.63
Unemployment probability	0.03146 (0.00205)	0.02565 (0.0021)	0.00581	22.66
Number of observations	5664	5666		

Source: Own elaboration base on ECH 1988 and 1996

Table 10: Results of the estimation of matching and difference-in-differences with double-robust estimates and inverse probability weighting

Outcome variable	Coefficient	Standard Error	z
Monthly earnings	0.047	0.014	3.47***
Hourly labour earnings (monetary)	0.025	0.013	1.9*
Hourly wages	0.038	0.013	2.91***
Hourly labour earnings (monetary and in kind)	0.07	0.013	5.48***
Unemployment Probability	0.023	0.001	43.54***
Dispersion in hourly wages (GAP2)	0.071	0.014	5.03***
Dispersion in total income (GAP3)	0.221	0.014	15.51***
Dispersion in total income (GAP4)	0.084	0.001	72.35***

All variables are in natural logarithms.

*** p<0.01, ** p<0.05, * p<0.1

Source: Own elaboration base on ECH 1988 and 1996

Table 11: Results of the estimation of regression equations in double differences

VARIABLES	(1) Total Labour Income	(2) Hourly labour earnings (monetary)	(3) Hourly wages	(4) Hourly labour earnings (monetary and in-kind)	(5) Unemployment Probability
Treatment	1.489*** (0.0161)	0.0123 (0.0131)	0.0498*** (0.0131)	0.0417*** (0.0127)	0.0245*** (0.000569)
Montevideo	0.118*** (0.0178)	0.230*** (0.00996)	0.207*** (0.0100)	0.205*** (0.00971)	0.00693*** (0.000450)
Sex	0.235*** (0.0228)	0.180*** (0.0134)	0.179*** (0.0130)	0.186*** (0.0126)	-0.0289*** (0.000701)
Age	0.0775*** (0.0055)	0.0467*** (0.00314)	0.0434*** (0.00309)	0.0443*** (0.00302)	-0.0179*** (0.000185)
Age2	-0.00070*** (6.95e-05)	-0.000432*** (3.93e-05)	-0.000356*** (3.87e-05)	-0.000398*** (3.79e-05)	0.000186*** (2.14e-06)
Head	0.174*** (0.0235)	0.143*** (0.0132)	0.0846*** (0.0132)	0.107*** (0.0126)	-0.0397*** (0.000595)
Education	0.0919*** (0.00261)	0.0655*** (0.00144)	0.0762*** (0.00141)	0.0677*** (0.00138)	-0.00442*** (7.11e-05)
Marital status	0.0919*** (0.0212)	0.103*** (0.0117)	0.0728*** (0.0115)	0.0883*** (0.0112)	-0.0188*** (0.000481)
Hours worked	0.007*** (0.00073)				-2.02e-05 (1.87e-05)
Number of works	-0.059** (0.0054)	0.0152*** (0.00570)	0.0165** (0.00771)	0.0162** (0.00769)	0.000363 (0.000348)
Constant	3.464*** (0.110)	1.835*** (0.0602)	1.598*** (0.0589)	1.799*** (0.0580)	0.550*** (0.00412)
Observations	12,182	12,182	12,133	12,164	12,182
R-squared	0.360	0.307	0.326	0.305	0.882

Robust standard errors in parenthesis

*** p<0.01, ** p<0.05, * p<0.10

Source: Own elaboration base on ECH 1988 and 1996

Table 12: Results of the estimation of matching and difference-in-differences with double-robust estimates and inverse probability weighting

	Coefficient	Standard Error	z
Monthly labour earnings	1.428	0.017	85.41***
Total hourly labour earnings	0.045	0.014	3.23***
Hourly wages (monetary)	0.087	0.013	6.48***
Hourly labour (monetary and in-kind)	0.081	0.013	6.23***
Unemployment Probability	0.022	0.001	40.42***
Dispersion in hourly wages (GAP2)	0.065	0.065	4.53***
Dispersion in total earnings (GAP3)	0.209	0.015	14.28***

*** p<0.01, ** p<0.05, * p<0.10

Source: Own elaboration base on ECH 1988 and 1996

8. References

- Attanasio, O., P. K Goldberg, and N. Pavcnik. 2004. «Trade reforms and wage inequality in Colombia». *Journal of Development Economics* 74 (2): 331–366.
- Baldwin, R. E. 2004. *Openness and Growth: What's the Empirical Relationship?* University of Chicago Press.
- Barraud, A. 2008. «Labor income impacts of trade opening in Argentina. A difference-in-differences estimator approach». University of Antwerp, mimeo.
- Barraud, A. A. 2009. «Labor income impacts of trade opening in Argentina. A difference-in-differences estimator approach».
- Barraud, A. A, and G. Calfat. 2008. «Poverty effects from trade liberalisation in Argentina». *Journal of Development Studies* 44 (3): 365–383.
- Behrman, J. R, N. Birdsall, M. Székely, and Inter-American Development Bank. Research Dept. 2000. *Economic reform and wage differentials in Latin America*. Inter-American Development Bank.
- Blundell, R., and M. Costa Dias. 2000. «Evaluation methods for non-experimental data». *Fiscal studies* 21 (4): 427–468.
- Blundell, R., and M. Costa-Dias. 2002. «Alternative approaches to evaluation in empirical microeconomics». *University College London e Institute for Fiscal Studies, Centre for microdata methods and practice, CEMMAP Working Paper CWP10/02*.
- Bértola, L. 1991. *La Industria manufacturera uruguaya, 1913-1961: un enfoque sectorial de su crecimiento, fluctuaciones y crisis*. Montevideo, Uruguay: CIEDUR.
- Casacuberta, C., and M. Vaillant. 2002. *Trade and wages in Uruguay in the 1990's*. Departamento de Economía, Facultad de Ciencias Sociales, Documento de trabajo N° 09/02.
- Dollar, D., and A. Kraay. 2004. «Trade, Growth, and Poverty». *The Economic Journal* 114 (493): F22–F49.
- Duranton, G. 1999. «Trade, wage inequalities and disparities between countries: The technology connection». *Growth and change* 30 (4): 455–478.
- Edwards, S. 1998. «Openness, productivity and growth: What do we really know». *The Economic Journal* 108: 383–398.
- Emsley, R., M. Lunt, A. Pickles, and G.H. Dunn. 2008. «Implementing double-robust estimators of causal effects». *Stata Journal* 8 (3): 334–353.
- Feenstra, R. C, and G. H Hanson. 1997. «Foreign direct investment and relative wages: Evidence from Mexico's maquiladoras». *Journal of international economics* 42 (3-4): 371–393.
- . 1999. «The Impact of Outsourcing and High-Technology Capital on Wages: Estimates For The United States, 1979-1990». *Quarterly Journal of Economics* 114 (3): 907–940.
- Freeman, R. B. 1995. «Are your wages set in Beijing?» *The Journal of Economic Perspectives* 9 (3): 15–32.
- Galiani, S., and G. G Porto. 2006. *Trends in tariff reforms and trends in wage inequality*. Policy Research Working Paper Series N° 3905, The World Bank.
- Galiani, S., and P. Sanguinetti. 2003. «Mercosur and the Behaviour of Labor Markets in Argentina and Uruguay». *Universidad Torcuato Di Tella, WP* 18.
- Gaston, N., y D. Trefler. 1997. «The labour market consequences of the Canada-US Free Trade Agreement». *The Canadian Journal of Economics/Revue canadienne d'Economie* 30 (1): 18–41.
- Goldberg, P. K, and N. Pavcnik. 2007. *Distributional effects of globalization in developing countries*. National Bureau of Economic Research Cambridge, Mass., USA.
- Harrison, A., and A. Revenga. 1995. *The effects of trade policy reform: what do we really know?* NBER Working Paper N° 5225, National Bureau of Economic Research.
- Helpman, E., and O. Itskhoki. 2010. «Labour market rigidities, trade and unemployment». *Review of Economic Studies* 77 (3): 1100–1137.
- Hertel, T. W, and J. J Reimer. 2005. «Predicting the poverty impacts of trade reform». *The Journal of International Trade & Economic Development* 14 (4): 377–405.
- Lee, E., M. Vivarelli, and International Labour Office. 2006. *Globalization, employment and income distribution in developing countries*. ILO.
- Loayza, N., P. Fajnzylber, and C. Calderón. 2004. *Economic growth in Latin America and the Caribbean: stylized facts, explanations, and forecasts*. World Bank.

- Lopez, H. 2004. *Pro-Poor-Pro-Growth: Is There a Trade Off?* Policy Research Working Paper Series N° 3378, The World Bank.
- Manasse, P., and A. Turrini. 2001. «Trade, wages, and superstars». *Journal of International Economics* 54 (1): 97–117.
- Marmora, Leopoldo, and Dirk Messner. 1991. «La integración de Argentina, Brasil y Uruguay». *Nueva Sociedad* Nro. 113: 130–145.
- Milner, C., and P. Wright. 1998. «Modelling labour market adjustment to trade liberalisation in an industrialising economy». *The Economic Journal* 108 (447): 509–528.
- Perry, G., and M. Olarreaga. 2007. «Trade liberalization, inequality and poverty reduction in Latin America». En *Annual World Bank Conference on Development Economics, Regional: Beyond Transition*.
- Rama, M. 1994. «Trade reform and manufacturing». En *The effects of protectionism in a small country. The case of Uruguay*, Conolly y De Melo, eds., FMI.
- . 2003. «Globalization and the labor market». *The World Bank Research Observer* 18 (2): 159.
- Robbins, D. J. 1996. *Evidence on trade and wages in the developing world*. Technical Paper N° 119, OECD.
- Rodriguez, F., and D. Rodrik. 2000. «Trade policy and economic growth: a skeptic's guide to the cross-national evidence». En *NBER Macro Annual 2000*, B. Bernake y K. Rogoff, eds. MIT Press.
- Slaughter, M. J. 2000. «Production transfer within multinational enterprises and American wages». *Journal of International Economics* 50 (2): 449–472.
- Spilimbergo, A., J. L. Londoño, and M. Székely. 1999. «Income distribution, factor endowments, and trade openness». *Journal of Development Economics* 59 (1): 77–101.
- Sánchez-Páramo, C., and N. R. Schady. 2003. *Off and running?: technology, trade, and the rising demand for skilled workers in Latin America*. Policy Research Working Papers N° 2015, The World Bank.
- Trefler, D. 2001. *The long and short of the Canada-US Free Trade Agreement*. National Bureau of Economic Research Cambridge, Mass., USA.
- Wacziarg, R., and K. Welch. 2003. *Trade liberalization and growth: New evidence*. National Bureau of Economic Research Cambridge, Mass., USA.
- Winters, L. A, N. McCulloch, and A. McKay. 2004. «Trade liberalization and poverty: the evidence so far». *Journal of Economic Literature* 42 (1): 72–115.
- Wood, A. 1997. «Openness and wage inequality in developing countries: the Latin American challenge to East Asian conventional wisdom». *The World Bank Economic Review* 11 (1): 33.

9. Appendices

Appendix 1: Unemployment rate in the treatment and control group for 1988 and 1996.

Industry, ISIC revision 2																
	Treated Group								Control Group							
Industry	31	32	33	34	35	36	37	38	39	91	92	93	94	95	96	Total
Employees	1,562	1,988	383	266	533	234	14	639	98	2,734	100	3,096	640	3,6	19	26,745
Unemployees	110	137	14	17	25	6	0	29	11	45	2	99	24	352	1	1,503
Unemployees in unemployment insurance	45	39	2	2	5	1	0	6	0	0	0	4	2	5	0	172
Total	1,717	2,164	399	285	563	241	14	674	109	2,779	102	3,199	666	4	20	28,42

Appendix 2: Probability of Unemployment

To estimate the probability of unemployment we first use a logit model
 Where $\Pr(y=1|X)=F(X)$, where y is the probability of unemployment and X are the covariates: Montevideo, Sex, age, squared age, head of household, education and marital status. After estimating the $\hat{\beta}$ we predict the probability of unemployment for each individual.

For both years, 1988 and 1996, we analyse if the probability of unemployment were similar between the treatment and the control group by means of a t-test finding that in fact the probability of unemployment is higher in the manufacturing sector than in the control group. We present the results for 1988 in Table 2.1, in which the difference between both groups is of 0.03. The same feature is observed for 1996 but with a slight raise in unemployment for the treated group (Table 2.2), and the difference between both groups is of 0.04.

Table 2.1: Probability of unemployment, Two-sample t test with equal variances by group (treatment group=1 and control group=0 year1988)

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3526	.0551943	.000808	.047978	.0536101	.0567784
1	3648	.0874021	.0013138	.079354	.0848262	.089978
combined	7174	.0715721	.0008001	.0677654	.0700037	.0731404
diff		-.0322079	.0015546		-.0352554	-.0291603
diff = mean(0) - mean(1)				t = -20.7173		
Ho: diff = 0				degrees of freedom = 7172		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.0000		Pr(T > t) = 0.0000		Pr(T > t) = 1.0000		

Table 2.2: Probability of unemployment, Two-sample t test with equal variances for treatment=1 and control group=0, 1996

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3041	.0748768	.001002	.0552579	.072912	.0768415
1	2625	.115858	.001657	.0848971	.1126088	.1191072
combined	5666	.093863	.0009758	.0734488	.0919501	.0957758
diff		-.0409813	.0018797		-.0446662	-.0372963
diff = mean(0) - mean(1)				t = -21.8020		
Ho: diff = 0				degrees of freedom = 5664		
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.0000		Pr(T > t) = 0.0000		Pr(T > t) = 1.0000		

In 1996 for both groups there is a higher probability of unemployment than in 1988, before Mercosur's creation as can be seen in the Table 2.3.

Table 2.3: Probability of unemployment, Two-sample t test with equal variances by treatment (intervencion)

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	7530	.0692962	.0007144	.0619908	.0678958	.0706966
1	5666	.0938942	.0009694	.072972	.0919938	.0957947
combined	13196	.0798579	.0005922	.0680229	.0786972	.0810186
diff		-.024598	.001177		-.0269052	-.0222909

diff = mean(0) - mean(1) t = -20.8985
 Ho: diff = 0 degrees of freedom = 13194

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 0.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 1.0000

Even after controlling for schooling years in the logit regression we can observe that those workers with more than 12 schooling years, i.e. those who have completed high-school, have a lower probability of unemployment than those with less than 12 years of education.

```
. g dedu=0
```

```
. replace dedu=1 if edu>=12
(3757 real changes made)
```

```
. ttest pr_des, by(dedu)
```

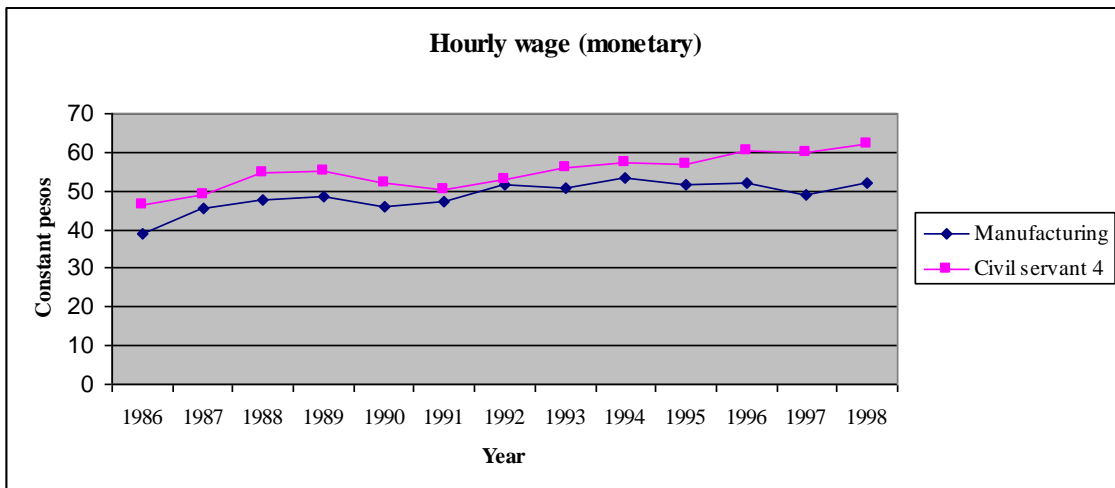
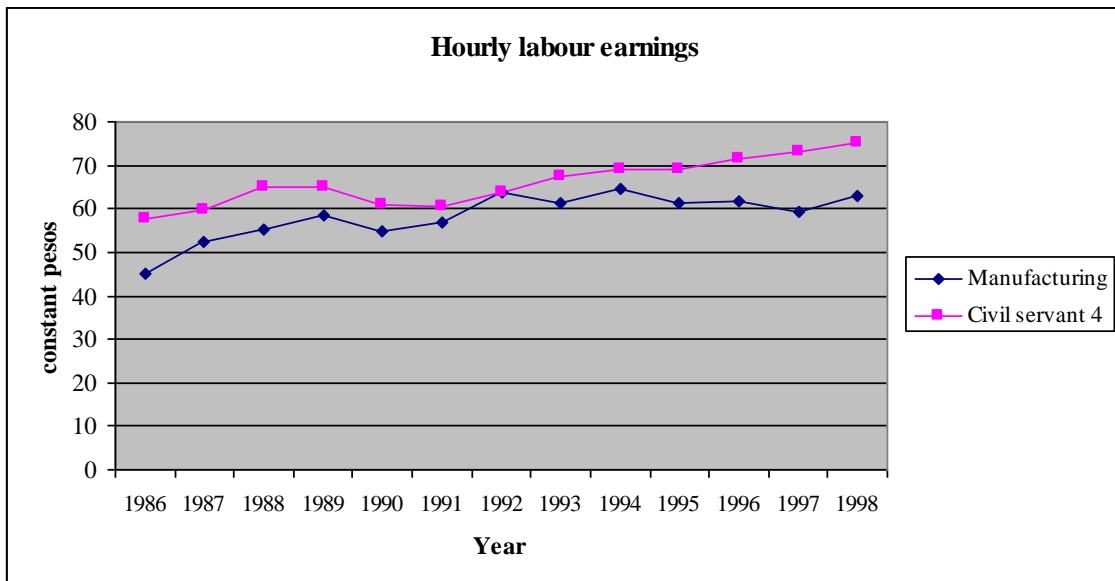
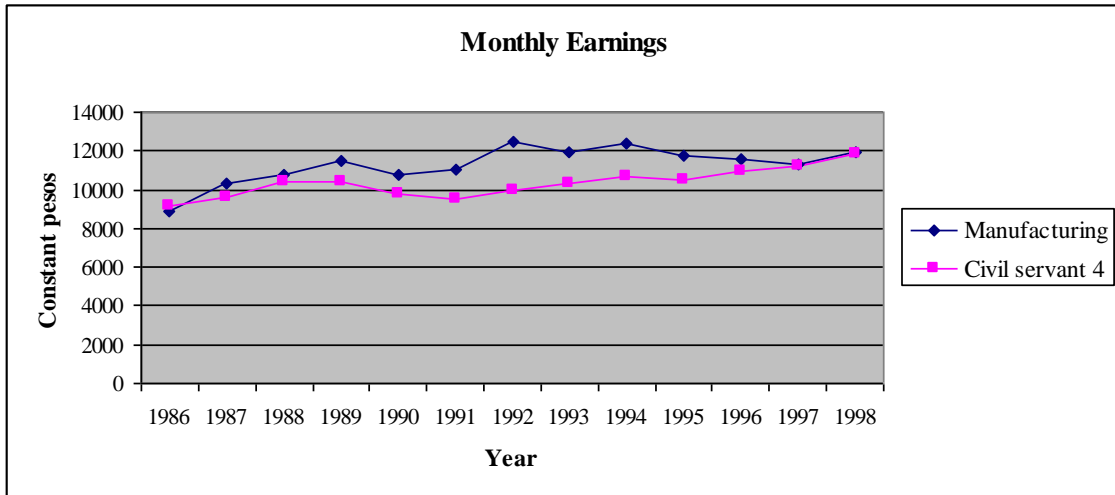
Two-sample t test with equal variances, more than 12 years of schooling=1, less than 12 years of schooling=0, 1988 and 1996

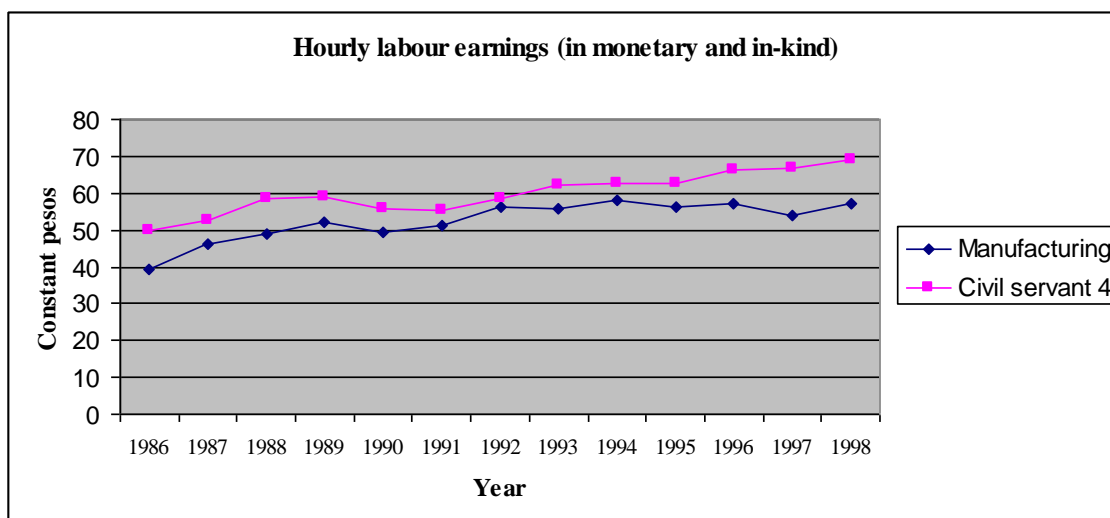
Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	9458	.0849138	.0007502	.0729634	.0834431	.0863844
1	3738	.0670656	.00084	.0513544	.0654187	.0687124
combined	13196	.0798579	.0005922	.0680229	.0786972	.0810186
diff		.0178482	.001305		.0152902	.0204062

diff = mean(0) - mean(1) t = 13.6766
 Ho: diff = 0 degrees of freedom = 13194

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
 Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000

Appendix 3: Evolution of earnings and wage variables by treated and control group





Appendix 4: T-test for the outcome variables in 1988 and 1996

a) For year 1988

```
. ttest y_lab_def, by(tratado)
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3863	10454.55	111.0701	6903.341	10236.79	10672.32
1	3667	11043.48	178.5418	10811.73	10693.43	11393.53
combined	7530	10741.35	104.0031	9024.929	10537.48	10945.23
diff		-588.9287	207.9798		-996.6272	-181.2302

```
diff = mean(0) - mean(1)
Ho: diff = 0
t = -2.8317
degrees of freedom = 7528
```

```
Ha: diff < 0
Pr(T < t) = 0.0023
Ha: diff != 0
Pr(|T| > |t|) = 0.0046
Ha: diff > 0
Pr(T > t) = 0.9977
```

```
. ttest w_horal_def, by(tratado)
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3863	65.45604	.8164288	50.74353	63.85536	67.05671
1	3667	56.18011	1.083554	65.61545	54.05568	58.30454
combined	7530	60.9388	.6757676	58.64012	59.6141	62.26349
diff		9.275928	1.34785		6.633766	11.91809

```
diff = mean(0) - mean(1)
Ho: diff = 0
t = 6.8820
degrees of freedom = 7528
```

```
Ha: diff < 0
Pr(T < t) = 1.0000
Ha: diff != 0
Pr(|T| > |t|) = 0.0000
Ha: diff > 0
Pr(T > t) = 0.0000
```



```
. ttest w_hora2_def, by(tratado)
```

```
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3863	55.08107	.6537989	40.63559	53.79925	56.36289
1	3667	48.62609	.9572836	57.96903	46.74922	50.50295
combined	7530	51.93759	.5754681	49.93657	50.80951	53.06566
diff		6.454984	1.148997		4.202629	8.707338

```
diff = mean(0) - mean(1) t = 5.6179  
Ho: diff = 0 degrees of freedom = 7528
```

```
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0  
Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000
```

```
. ttest w_hora3_def, by(tratado)
```

```
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3863	58.70891	.6656351	41.37124	57.40388	60.01394
1	3667	49.80618	.9619537	58.25184	47.92017	51.6922
combined	7530	54.37341	.5819329	50.49756	53.23266	55.51416
diff		8.902722	1.159808		6.629176	11.17627

```
diff = mean(0) - mean(1) t = 7.6760  
Ho: diff = 0 degrees of freedom = 7528
```

```
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0  
Pr(T < t) = 1.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 0.0000
```

```
. ttest pr_des, by(tratado)
```

```
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3863	.0574301	.0007597	.0472147	.0559407	.0589194
1	3667	.0813012	.001233	.0746631	.0788838	.0837185
combined	7530	.069055	.0007289	.0632473	.0676262	.0704837
diff		-.0238711	.0014321		-.0266785	-.0210637

```
diff = mean(0) - mean(1) t = -16.6683  
Ho: diff = 0 degrees of freedom = 7528
```

```
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0  
Pr(T < t) = 0.0000 Pr(|T| > |t|) = 0.0000 Pr(T > t) = 1.0000
```

b) For year 1996

```
. ttest y_lab_def, by(tratado)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3054	11093.54	135.7058	7499.512	10827.45	11359.62
1	2631	12139.73	242.6971	12448.73	11663.83	12615.63
combined	5685	11577.71	134.0701	10108.74	11314.88	11840.54
diff		-1046.194	268.5509		-1572.656	-519.7316

```
diff = mean(0) - mean(1)
Ho: diff = 0
t = -3.8957
degrees of freedom = 5683
```

```
Ha: diff < 0
Pr(T < t) = 0.0000
Ha: diff != 0
Pr(|T| > |t|) = 0.0001
Ha: diff > 0
Pr(T > t) = 1.0000
```

```
. ttest w_horal_def, by(tratado)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3054	72.66239	1.017688	56.24047	70.66697	74.65781
1	2631	62.94509	1.236382	63.4181	60.52071	65.36947
combined	5685	68.16526	.7939207	59.86078	66.60887	69.72164
diff		9.7173	1.587169		6.605842	12.82876

```
diff = mean(0) - mean(1)
Ho: diff = 0
t = 6.1224
degrees of freedom = 5683
```

```
Ha: diff < 0
Pr(T < t) = 1.0000
Ha: diff != 0
Pr(|T| > |t|) = 0.0000
Ha: diff > 0
Pr(T > t) = 0.0000
```

```
. ttest w_hora2_def, by(tratado)
```

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3054	60.73208	.8982699	49.64109	58.9708	62.49335
1	2631	53.01425	1.071121	54.94132	50.91393	55.11458
combined	5685	57.16029	.6936192	52.29815	55.80053	58.52005
diff		7.717826	1.387445		4.997905	10.43775

```
diff = mean(0) - mean(1)
Ho: diff = 0
t = 5.5626
degrees of freedom = 5683
```

```
Ha: diff < 0
Pr(T < t) = 1.0000
Ha: diff != 0
Pr(|T| > |t|) = 0.0000
Ha: diff > 0
Pr(T > t) = 0.0000
```

```
. ttest w_hora3_def, by(tratado)
```

```
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3054	66.74558	.9158512	50.61269	64.94983	68.54133
1	2631	57.97227	1.086496	55.72992	55.84179	60.10274
combined	5685	62.68532	.7058153	53.21773	61.30165	64.06898
diff		8.773312	1.410887		6.007434	11.53919

```
diff = mean(0) - mean(1)                                t = 6.2183  
Ho: diff = 0                                           degrees of freedom = 5683
```

```
Ha: diff < 0                Ha: diff != 0                Ha: diff > 0  
Pr(T < t) = 1.0000          Pr(|T| > |t|) = 0.0000          Pr(T > t) = 0.0000
```

```
. ttest pr_des, by(tratado)
```

```
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
0	3041	.0748768	.001002	.0552579	.072912	.0768415
1	2625	.115858	.001657	.0848971	.1126088	.1191072
combined	5666	.093863	.0009758	.0734488	.0919501	.0957758
diff		-.0409813	.0018797		-.0446662	-.0372963

```
diff = mean(0) - mean(1)                                t = -21.8020  
Ho: diff = 0                                           degrees of freedom = 5664
```

```
Ha: diff < 0                Ha: diff != 0                Ha: diff > 0  
Pr(T < t) = 0.0000          Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```