Universidad de la República
Facultad de Ciencias Sociales
DEPARTAMENTO DE ECONOMIA

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The outcome of different bargaining models: the effects on wages, employment and the employment mix

A.Cassoni & G.Labadie

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Abstract

The paper analyses data on wages, employment and labour composition in the Uruguayan manufacturing sector during 1985-1999 in order to get some evidence on the effects of union action on these variables. The whole period is first studied using a model in which no assumptions on the underlying bargaining model are made. The results support the hypothesis of two different bargaining frameworks in the 80s and 90s. Therefore, a right-to-manage bargaining model is specified for the 80s and a recursive contracts model for the 90s. Union effects are such that while in the 80s the effect of trade unions were to increase wages and hence decrease employment, in the nineties they moderated wage demands in exchange of more job stability. They not only managed to have a positive direct effect on employment but also to buffer the negative effects of increased openness and demand fluctuations on employment. The existence of unions also had an impact on labour composition, favouring a higher share of non-production workers in total employment. The result can be linked to the fact that firms moved to more capital intensive – or at least more skilled labour intensive-technologies to avoid union costs. A final finding is related to the fact that the change in the Uruguayan bargaining regime at the beginning of the 90s – by which the mandatory extension of contracts vanished – favoured a more decentralised negotiation scheme and thus ended with the homogenous impact found in the 80s, since coordination in bargaining was lost.

Resumen

El trabajo utiliza datos sobre salarios, empleo y composición de la mano de obra parta el sector manufacturero uruguayo 1985-1999 de forma de buscar evidencia sobre los efectos de los sindicatos sobre estas variables. Primero se analiza el período completo sin hacer ningún supuesto sobre el modelo de negociación subyacente. Los resultados apoyan la hipótesis de la existencia de dos modelos diferentes en los 80s y 90s. Por lo tanto se especifica un modelo '*right-to-manage*' en los 80s y un modelo de contratos recursivos en los 90s. Los efectos de los sindicatos fueron tales que en la primer década aumentaron salarios y disminuyeron empleo, mientras en la segunda moderaron sus demandas salariales a cambio de mayor estabilidad laboral. No sólo lograron tener un efecto directo positivo sobre el empleo en algunas industrias sino que también pudieron suavizar los efectos negativos de la apertura comercial y de las fluctuaciones de la demanda. La existencia de sindicatos tuvo también un efecto sobre la composición de la mano de obra, favoreciendo un uso relativamente mayor de empleados en el total. El resultado puede asociarse al hecho que las empresas se movieron hacia tecnología más intensivas en capital – o al menos en trabajo calificado – como forma de evitar algunos de los costos asociados a la acción sindical. Un último hallazgo se refiere al hecho que el cambio en el esquema de negociación ocurrido a comienzos de los 90s – por el que los contratos dejaron de ser homologados – favoreció la negociación descentralizada y, de esta forma, terminó con los efectos homogéneos entre industrias de la acción sindical al desvanecerse la alta coordinación de la negociación observada en los 80s.

Introduction

Previous work on the impact of labour market institutions has shown the significance of unionisation relative to other institutional constraints in order to understand the relevant sources of rigidities in employment, mobility and performance of the Uruguayan labour markets (Cassoni *et al.*, 1995). The response of wages to macroeconomic conditions has also been examined at the macro level concluding that the observed compression and lower response are the consequences of the resumption of collective bargaining (Cassoni *et al.*, 1996).

The analysis for the period 1975-1997 has shown the impact of different institutional and labour relations settings on wages and employment, in a period where unions were banned (1973-84), when they were legalised and there was tripartite bargaining at the industry level with mandatory extension to all firms within the sector (1985-1991), and finally when there was an increased decentralisation and firm-specific bargaining with no enforceability of contracts (starting institutionally in 1992, but observed in 1993). The effects on wages and labour demand were examined for these different periods and the main findings indicate:

- Unions were able to successfully negotiate higher wages for blue-collar workers in the period 1985-1991, with an elasticity of 0.15, calculated at the mean value of union density. As a result, while employment fell, unions were able to protect against job loss by reducing wage elasticities from 0.69 (1973-84) to 0.22 (1985-97). This is concluded after characterising the bargaining framework as a 'right-to-manage' model (Nickell, 1982), which implies that there is no bargaining over employment
- The employment-output elasticity fell by more than 50 percent, from 0.83 to 0.31
- Significantly, no evidence was found indicating that the return of bargaining lengthened the amount of time needed for employment to adjust

Starting in 1992, there was a change in the bargaining system, with the Government abandoning the tripartite negotiation and relaxing the enforcement of collective agreements at the industry level. At the same time, lower tariffs became actually binding constraints around 1993-94, increasing the exposure of firms to international and regional competition in the Mercosur. As a result, it was observed that some collective agreements explicitly considered

employment as part of the negotiations, suggesting that there was a change in the union objective function and the bargaining model to be considered. Using the same 'right-to-manage' model for the whole period, the main results found for blue-collar workers were:

- The union wage differential for blue-collar workers vanished in 1993 in some industries
- Labour demand shifted to the left
- Openness at the industry level has an impact on the wage differential, reducing it

The number of temporal observations when that research was done was scarce to compare the different regimes so as to provide a complete 'statistical experiment'. If bargaining over employment started being a common practice after 1993, it might be the case that the impossibility of correctly modelling the new setting stemmed from having observation for only 4 years. Further, no data on non-production workers were available before 1983, so that the models before and after 1985 could only be estimated for production workers. Finally, external shocks and their effects on the bargaining outcome were introduced in a very simple form without differentiating the export and the import substitutive sectors.

This study tries to go beyond the previous work and examine if it is possible to model the outcome of bargaining using different models depending on the time period. If decentralised bargaining started being a generalised practice in the second half of the nineties and job stability clauses were found in those collective agreements, then the right-to-manage model would not be an adequate instrument to analyse wages and employment in that sub-period. Further, data availability allows one to model the union effects on labour demand for both white and blue-collar workers. The distinction is important, especially in the nineties in Uruguay, as the change in the competitive pressure faced by manufacturing firms could have forced them to change the employment mix they used. Finally, it is here intended to model the effects of openness depending on them being changing import or export shares in the industry, since the nineties was a period of substantial variation in the external conditions with non-negligible effects in the different manufacturing sectors.

The impact of unionisation on employment levels, speed of adjustment and wage differentials for white and blue-collar workers is thus analysed using a pooled cross-section time-series of manufacturing industries during 1985-1999. The available collective agreements point at a right-to-manage model as the adequate instrument to study wages and employment before 1993, while an efficient or recursive model would be suitable after that date. However, in

order to also have empirical evidence supporting the hypothesis, a model for the whole period is proposed. The paper first develops the theoretical models to be used. After describing the data, the results of estimation are summarised. The final section concludes.

Theoretical and empirical models

Union behaviour has been modelled either using the monopoly union model, assuming that unions have the power to impose their preferred wage policy on the firm, which then determines employment from its labour demand curve (see references in Pencavel, 1991) or using a bargaining model. The conceptual issues that bargaining models pose are related to:

1. What do the parties bargain over - wages, employment, other issues?
2. What are the union preferences or objective function?
3. Is bargaining a sequential process -taking place over wages first and then over labour- or is it done over wages and employment at the same time?

A right-to-manage model must be specified whenever the level of employment is unilaterally decided at the firm after wages have been bargained over. This model is particularly appealing when negotiations over wages take place at the industry level, since it is difficult that the level of employment can be bargained at that level –at least at the same time- fitting the Uruguayan case for the period until 1993. On the other hand, when bargaining takes place at the firm level and employment stability is explicitly included in the bargaining agenda, a recursive or efficient contracts model is more adequate. Thus, from a theoretical point of view one should analyse the Uruguayan experience specifying two different bargaining models depending on the time period.

The analysis of the contents of a high proportion of the collective agreements signed along 1985-1999 also supports the hypothesis. If there was any negotiation on employment in the first sub-period, this was likely to have taken place at the firm level, after bargaining over the wage. However, these arrangements, if they existed, were not subject to observation. In the nineties, on the other hand, many contracts did include job stability clauses, mechanisms to rotate in the unemployment insurance system; agreed ways of introducing new technologies. Further, a especial purpose survey carried out in 1996 also reveals workers in many firms

were covered by firm-level agreements and that employment clauses were included in them[1]. While 52% of firms did not have any sort of collective agreements, workers in 7% of them were covered by both firm and industry level contracts. On the other hand, 15% of firms had only signed firm-level agreements with their workers, the percentage increasing to 23% if large firms only are considered. Clauses related to employment are found in 15% of those firms with firm-level collective agreements.

In spite of all of the above supporting the use of different bargaining models, indirect empirical evidence on the appropriateness of them is also here analysed. Following the strategy proposed by Boal and Pencavel (1994), a model for the whole period is firstly estimated, avoiding the specification of a bargaining model and just including union effects on both the wage and the labour demand equations.

The model for the whole period: 1985-1999

The main assumption used by Boal and Pencavel (1994) is that both union and non-union firms define employment and wages using the same functional form, but possibly with different parameters. In order to do so, they specify a wage and a labour demand equation including a binary variable that is equal to 1 if workers in the firm are unionised and zero otherwise, that in turn interacts with all the parameters. Statistical significance of the interactions is taken as evidence of direct influence of unions on wages and employment. On the other hand, if the coefficients were statistically equal to zero in the model for employment and different from zero in those for the wage, then unions would have an impact on employment only indirectly, *via* the wage elasticity of labour demand. Wage and employment gaps are afterwards calculated using the estimated parameters of the model.

It has been widely demonstrated by now that these statistical tests cannot be conclusive. Thus the exercise only attempts to find further support for the specification of two different bargaining models in the Uruguayan case. The inclusion/exclusion of variables such as the alternative wage or union density in the employment equation need not be incompatible with a right-to-manage model (see for example the discussions done on the subject by Pencavel, 1991;

[1] The Survey 'Strategies and employment policy of manufacturing firms' was carried out by the Department of Economics at the Social Sciences Faculty of the University of Uruguay. The sample used was very similar to that used by those generating official statistics, so that its results are consistent with the data here analysed.

or Booth, 1995). Further, Carruth and Oswald (1987) and Oswald (1993) have demonstrated that the contract curve may lie on the labour demand curve under certain circumstances.

Let L be total employment, which in turn is divided in production and non-production workers (L_p and L_{np}, respectively). A standard labour demand function would have employment dependant on output (q) and the price of labour (w) relative to the product price (pp), while the distribution of jobs among production and non-production workers will depend on their relative wages ($w_p - w_{np}$), which can be expressed in natural logs as:

$$L = \beta_0 + \beta_1(w-pp) + \beta_2 q \qquad (1)$$

$$L_{np} - L_p = \beta_3 + \beta_4(w_{np} - w_p) \qquad (2)$$

Labour supply, on the other hand, depends on the wage level relative to the price of consumption goods (cp) and on the reservation wage (w^r):

$$L = \alpha_0 + \alpha_1(w-cp) + \alpha_2(w^r-cp) \qquad (3)$$

Solving for the wage using equations (1) and (3) the wage equation in logs is:

$$w-pp = \gamma_0 + \gamma_1(pp-cp) + \gamma_2(w^r-cp) \qquad (4)$$

The parameters defining the above equations however could be different depending on the extent of unionisation; the structure of bargaining; and/or union bargaining power. Further, the equations themselves may include other variables that would account for market conditions and observable characteristics of the industrial sectors (**X**). Hence, the system can be restated as:

$$L = (b_{00} + b_{01}U) + (b_{10} + b_{11}U)(w-pp) + (b_{20} + b_{21}U)q + (\mathbf{b}_{30} + \mathbf{b}_{31}U)\mathbf{X} \qquad (5)$$

$$L_{np} - L_p = (b_{40} + b_{41}U) + (b_{50} + b_{51}U)(w_{np} - w_p) + (\mathbf{b}_{60} + \mathbf{b}_{61}U)\mathbf{X} \qquad (6)$$

$$w-pp = (b_{70}+b_{71}U) + (b_{80}+b_{81}U)(pp-cp) + (b_{90}+b_{91}U)(w^r-cp) + (\mathbf{b}_{100} + \mathbf{b}_{101}U)\mathbf{X} \qquad (7)$$

U reflects union effects, so that statistically insignificant coefficients for the union variables in equations (5) and (6) would imply they have no direct effect on employment and/or the employment composition.

Given the institutional changes that took place at the beginning of the nineties, interactions with temporal binary variables will also be included in order to study the existence of changes in the underlying bargaining models in the early nineties.

There are not non-union industries in Uruguay since 1985. However, the extent of unionisation does vary by industry and in time. Hence, wage gaps can be easily calculated following Boal and Pencavel's methodology with slight modifications. First, the different gaps (employment, employment composition, and wage) have to be calculated at the mean value of union (U_M) for each industry. Second, it has to be assumed that there are no differences in all variables, except for the wage and the employment mix, between union and non-union sectors[2]. The gaps are defined according to:

$$\Delta L = b_{01}U_M + b_{11}U_M (w\text{-}pp)_{NU} + (b_{10} + b_{11}U_M)\Delta(w\text{-}pp) + b_{21}U_M q + \mathbf{b}_{31}U_M\mathbf{X}$$

$$\Delta L_{np/p} = b_{41}U_M + b_{51}U_M (w_{np}\text{-}w_p) + \mathbf{b}_{61}U_M\mathbf{X}$$

$$\Delta w = b_{71}U_M + b_{81}U_M (pp\text{-}cp) + b_{91}U_M (w^r\text{-}cp) + \mathbf{b}_{101}\mathbf{U}_M\mathbf{X}$$

The model for the first sub-period: 1985-1991

The model postulated for the first sub-period implies that in a first stage employers and workers bargain over the wage level. Once the wage is set, the firm decides the level of employment according to its labour demand function. Firms are assumed to use a technology with two inputs, capital and labour. Maximisation of profits thus yields a two-equations system of derived demands, given the price of inputs and other observable characteristics of the industries and the markets they operate in. Labour is not homogeneous and can be classified in two categories: according to the worker being directly involved in production or not (production and non-production workers). Hence, given total employment, the adequate

mix between blue and white-collar workers is decided depending on the relative wage of both categories. In bargaining, unions do not differentiate among production and non-production workers but negotiate a common wage increase for all workers. However, relative wages may change, as managers may prefer to increase them above the minimum set at the negotiation table. Further, they might also substitute one type of worker by the other depending on the characteristics of the market the firm operates in or the external shocks that take place. These effects are included in the relative demand for production and non-production workers. Therefore, the estimable model, with variables measured in natural logs, is:

$$K = \alpha_0 + \alpha_1(p_c - pp) + \alpha_2 q + \alpha_3 \mathbf{X} \qquad (8)$$

$$L = \beta_0 + \beta_1(w - pp) + \beta_2 q + \beta_3 \mathbf{X} \qquad (9)$$

$$L_{np} - L_p = \beta_4 + \beta_5(w_{np} - w_p) + \beta_6 \mathbf{X} \qquad (10)$$

Where K accounts for capital services; q is value added; L is total employment; L_{np} refers to non-production workers; L_p refers to production workers; **X** is a vector of variables accounting for market conditions; while $(p_c - pp)$, $(w - pp)$, $(w_{np} - pp)$ and $(w_p - pp)$ are the prices of capital services, labour, non-production and production workers, respectively, relative to the product price, pp.

The utility function of unions is derived form a median voter framework, assuming that they maximise a surplus over an alternative income w^a. Union members care about the real wage in terms of the consumption price index. The alternative income is linked to average earnings in the informal sector, average unemployment benefits and wages in other industries in the previous time period. The utility function of unions is, thus:

$$\Gamma(w, w^a, cp, cp_{-1}, L) = [(w/cp) - (w^a/cp)_{-1})]L^{\phi}$$

Where cp is the consumption price and ϕ is a parameter reflecting the weight given to employment in the union utility function[3]. The generalized Nash bargaining can be stated as:

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[2] Non-union wages are union wages minus the estimated wage gap: $(w-pp)_{NU} = (w-pp)_U - \Delta w$. The composition of the labour input for non-union sectors is calculated analogously.

[3] The relevant measure for the alternative wage refers to the time period prior to bargaining. Thus, it has to be deflated by the consumption price index of that same period (cp_{-1}).

$$\underset{w}{\text{Max}}\ Y = (\Gamma-\Gamma_0)^{\alpha}(\Pi-\Pi_0)^{1-\alpha}$$

$$\text{s. to} \quad L = L^{*}$$

Where Γ and Π are the utility functions of unions and employers, respectively; L^{*} is the optimum level of employment as determined by equation (9); Γ_0 and Π_0 are the fall-back positions of each player, which are assumed to be zero; and α is the bargaining power of unions.

Subject to the assumption that the capital level is given, once bargaining over the wage and labour demand occur, the solution to the Nash bargain yields an equation for the average wage level as follows:

$$(w/pp)^{*} = \eta(\mathbf{X},\mathbf{U},\phi)f[(w^{a}/cp)_{-1}, pp/cp)] \qquad (11)$$

Where $\eta(\mathbf{X},\mathbf{U},\phi)$, the mark-up over the alternative income, is a function of the bargaining power of the union, which in turn depends on market conditions (**X**) such as the exposure of firms to competition or the occurrence of external shocks; the union's affiliation rate and the extent of firm-level bargaining as measures of union strength (**U**). It also depends on the weight given to employment in the union objective function (ϕ). The assumed changes in the mark-up when these variables and parameters vary are:

$$\partial\eta/\partial\alpha > 0 \quad \partial\alpha/\partial\mathbf{U} > 0 \quad \partial\alpha/\partial\mathbf{X} \leq 0 \qquad \text{so that:}$$

$$\partial\eta/\partial\mathbf{U} > 0 \quad \partial\eta/\partial\mathbf{X} \leq 0 \quad \partial\eta/\partial\phi \geq 0$$

Given unions care about the real wage in terms of consumption goods while firms are interested in the cost of labour relative to the price of their products, the wedge between those two prices will also enter the wage equation. No data on capital services are available. Thus, the model to be estimated over the 1985-1991 sub-period is the 3-equations system (9) to (11). The exclusion of equation (8), however, will generate simultaneity bias of unknown size[4].

The model for the second sub-period: 1992-1999

The evidence stemming from the collective agreements signed in the 1992-1999 sub-period shows bargaining also took place over employment. One specification that takes this fact into account is the recursive contracts model. The generalized Nash bargain is stated as:

$$\underset{w}{\text{Max}}\ Y = (\Gamma-\Gamma_0)^{\alpha}(\Pi-\Pi_0)^{1-\alpha}$$

$$\text{s.to}\ \ L = L^{*}$$

Where L^{*} is determined according to:

$$\underset{L}{\text{Max}}\ Z = (\Gamma-\Gamma_0)^{\beta}(\Pi-\Pi_0)^{1-\beta}$$

The parameters α and β reflect the bargaining power of the union in wage and employment negotiations respectively. They are here assumed to be a function of union density and the structure of bargaining (the extent of coverage of firm-level agreements).

Solving the maximisation problem yields the following system of equations:

$$L = f[(w-pp), (w^{a}-cp)_{-1}, (pp-cp), q, \mathbf{X}, \mathbf{U}, \phi] \qquad (12)$$

$$w-pp = g(\mathbf{X}, \mathbf{U}, \phi, (w^{a}-cp)_{-1}, (pp-cp)] \qquad (13)$$

$$L_{np} - L_{p} = h[\mathbf{X}, \mathbf{U}, (w_{np}-w_{p})] \qquad (14)$$

The employment level will be on the contract curve whenever the bargaining power of unions when negotiating wages and employment is the same. It will be nearest to its value according to the labour demand function the lowest the union bargaining power over employment (β). The effect of union density on bargaining power in both stages is positive and that of external conditions negative as before. However, increases in α and β will not necessarily generate increases in wages and employment (Manning, 1987). It all depends on the differences between them and also on the weight given to employment in the union objective function. On the other hand, the more the concern of unions about job stability, the lower the wage level and the higher the employment level bargained. Given the assumed utility functions, the following can be stated:

1. $\partial w^{*}/\partial\alpha$ unknown, depending on relative size of α and ϕ
2. $\partial L^{*}/\partial\alpha$ unknown, given $\partial w^{*}/\partial\alpha$ is so

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[4] Since a variable accounting for the difference between product and consumption prices is included, and product prices partially incorporate the price of capital, the biases are expected to be small.

3. $\partial w^*/\partial \beta = 0 \qquad \partial w^*/\partial \phi < 0$
4. $\partial L^*/\partial \beta > 0 \qquad \partial L^*/\partial \phi > 0$

Special care has to be taken regarding some specific issues in estimating the above models. First, endogeneity of output has already been proved in previous research for the Uruguayan manufacturing sector, so the variable has to be properly instrumented. Some of the variables that model external shocks for each industry might be endogenous too, as is the case of import penetration or export share. Second, the models specified impose that parameters are the same for the six manufacturing industries and in time. The restrictions are strong and thus should be thoroughly tested for.

The data

The units of observation are the 2-digit manufacturing industries along 1985-1999, on a quarterly basis. Only six out of eight are used, due to data availability in the period 1985-1999: food, beverage & tobacco; textiles & leather; paper; chemicals & oil products; non-metallic minerals; and metal products. Descriptive statistics of the variables involved are shown in Table 7.1 below.

Table 7.1 Descriptive statistics of selected variables by industry 1985 – 1999

Industry	Union density	%workers covered by firm-level bargaining	Exports/ Sales	Imports/ Consum.	Relative prices Uruguay-R of W	Exports + Imports/ GDP Economy	Equival. tariff
Total Manufacturing	0.3322	0.0534	0.2450	0.3957	0.9321	0.6530	0.8100
	(0.171)	(0.093)	(0.034)	(0.126)	(0.244)	(0.142)	(0.188)
Food, Beverage & Tobacco	0.3401	0.0482	0.2564	0.0934	0.9066	0.6530	0.8100
	(0.096)	(0.070)	(0.038)	(0.050)	(0.238)	(0.142)	(0.188)
Textiles & Leather	0.3314	0.0403	0.567)	0.3615	0.9540	0.6530	0.8100
	(0.160)	(0.060)	(0.095)	(0.217)	(0.303)	(0.142)	(0.188)
Paper	0.3230	0.1069	0.0991	0.2685	0.8870	0.6530	0.8100
	(0.059)	(0.100)	(0.035)	(0.097)	(0.171)	(0.142)	(0.188)
Chemicals & oil	0.5772	0.0265	0.1216	0.4082	0.9781	0.6530	0.8100
	(0.055)	(0.027)	(0.061)	(0.115)	(0.259)	(0.142)	(0.188)
Non-metallic minerals	0.1377	0.0937	0.1340	0.2775	0.8342	0.6530	0.8100
	(0.088)	(0.159)	(0.035)	(0.124)	(0.281)	(0.142)	(0.188)
Metal products	0.2837	0.0048	0.0854	0.7443	1.0328	0.6530	0.8100
	(0.164)	(0.011)	(0.054)	(0.166)	(0.114)	(0.142)	(0.188)

	Employ-ment	Blue/white collars	Wage level	Relative wage blue/white -collars	Alternat. wage	Price wedge	GDP

Total Manufacturing	4.2010	0.4820	2.2334	-0.2132	1.8199	-0.0974	1.3432
	(0.313)	(0.158)	(0.157)	(0.057)	(0.040)	(0103)	(0.353)
Food, Beverage & Tobacco	4.6404	0.4901	2.1623	-0.2125	1.8101	-0.0561	1.8040
	(0.064)	(0.048)	(0.099)	(0.021)	(0.029)	(0.059)	(0.056)
Textiles & Leather	4.4987	0.7308	2.1353	-0.2899	1.7878	-0.1232	1.4748
	(0.153)	(0.042)	(0.113)	(0.034)	(0.031)	(0.121)	(0.088)
Paper	3.9317	0.3262	2.300	-0.1396	1.8312	-0.1208	1.0033
	(0.081)	(0.044)	(0.141)	(0.033)	(0.034)	(0.084)	(0.053)
Chemicals & oil	4.1610	0.2829	2.413	-0.2026	1.8691	-0.1051	1.6645
	(0.095)	(0.040)	(0.768)	(0.022)	(0.034)	(0.116)	(0.088)
Non-metallic minerals	3.7905	0.5691	2.1708	-0.2420	1.8130	-0.0596	0.8391
	(0.091)	(0.082)	(0.109)	(0.037)	(0.026)	(0.094)	(0.071)
Metal products	4.1875	0.4929	2.2181	-0.1927	1.8079	-0.1200	1.2734
	(0.107)	(0.040)	(0.111)	(0.049)	(0.029)	(0.110)	(0.113)

Notes: Mean values are reported, with standard deviation in brackets below. Variables in logs are employment, wages, relative wages blue/white-collar workers, alternative wage, price wedge (production/consumption price indexes) and GDP. All other variables are percentages.
Sources: National Institute of Statistics; Central Bank of Uruguay; Customs Office.

The estimated models use data on output, number of workers –production and non-production workers- and wages that stem from the Quarterly and Annual Industrial Surveys (National Institute of Statistics-INE). The Quarterly Survey publishes indexes while yearly the Annual Survey reports values. Both sources are used to build quarterly time series of values for the above variables, referring to monthly values calculated as an average on a quarterly basis. Data on product prices refer to the PPI at the 2-digit level (INE).

A cost of labour variable is used instead of wages. It is built adding all non-wage costs – legal and bargained - to the wage. Data on non-wage costs were taken from Picardo *et al.* (1997) and from Cassoni and Ferre (1997). Information on bargained non-wage costs stem from the manufacturing collective agreements signed between 1985 and 1999.

Union density is defined as the affiliation rate, by industry. The time series is built using data on membership reported by the central union (PIT-CNT) in each congress and of total employment (production and non-production workers). These congresses took place in 1985, 1987, 1990, 1993 and 1996-97. No data on membership are available by occupational category. Thus, it is not possible to calculate union density for production and non-production workers separately.

External shocks are measured as the relative exposure of the industry to foreign competition both locally and internationally. Two types are here considered trying to differentiate overall external shocks from those specific to each 2-digit industry. Overall openness has been proxied in the literature using various indicators. There are two broad categories that refer either to the economic results or to the direct incidence of trade policy. Among the former group there is still another classification: measures accounting for the results of trade liberalisation on the amount of production subject to trade; and those reflecting the level of price distortion. A known criticism that has to be overcome if indicators based on quantities are used is that related to not measuring quantities in constant prices, as the variations in the relative price of tradables/non-tradables would distort the real index. Secondly, the relative size of the tradable sector will also generate biases (Low, Olarreaga and Suarez, 1999). One of the most popular indicators for degree of openness based on price distortions is the ratio of the local price of tradables relative to the international price (Dollar index). However, its use has been extensively criticised as it reflects at the same time other phenomena related to the trade policy being export or import oriented (Rodrik and Rodriguez, 1999). Berlinski (2000) proposed an alternative measure based on the relative prices between export and import substitutive sectors in an economy. These in turn depend on the international price and the exchange rate, as well as on the local trade policy. The trade policy measure includes both taxes and other protection barriers, so that all sources of distortions are included in the indicator. Vaillant (2000) has calculated the time series of the implicit 'equivalent tariff' for Uruguay and shown that its evolution is very similar to the indicators of openness based on quantities following the methodology as proposed by Low *et al.* (1999)[5].

Regarding industry-specific external shocks the indicator based on quantities is defined as the ratio of imports plus exports over gross production in constant prices. Alternatively, one could try to measure separately the impact of increases in exports and in imports on the performance of the different firms. Two variables can be built: the share of exports in total sales and the share of imports in total consumption, generally known as import penetration. Consumption of goods should include both national and foreign goods, so that it is defined as GDP minus exports plus imports. An indicator based on relative prices is also built. It is defined as the ratio of local relative prices times the exchange rate to international relative

[5] Since relative prices in 't' (rp_t) are defined as $(p^T/p^{NT})_t/(p^{*T}/p^{*NT})_t$, that is local tradable to non-tradables prices divided by international relative prices, and this in turn equals the tariff in the base year divided by the tariff in 't', the 'equivalent' tariff τ_t is equal to $[(1+\tau_0)/rp_t]-1$.

prices. Relative prices are the production price of goods (PPI) of each sector divided by an implicit deflator of non-tradables goods (goods from all sectors except manufacturing, fishing, agriculture and leverage).

The bargaining models to be used assume that unions negotiate to get the highest possible mark-up over an alternative wage. This alternative wage can also be thought of as the opportunity cost of working or reservation wage if no bargaining model is assumed. The alternative income is defined as the weighted average of what the worker would earn if hired in the manufacturing sector in order to account for his/her specific skills (which is proxied by the average wage in manufacturing excluding that of the specific sector); the income the worker would receive if he/she becomes unemployed and collects unemployment benefits (50% of his/her last wage received); and the average income of self-employed individuals, under the assumption that if the worker cannot find a job in the formal sector, he/she would prefer to undertake an informal job instead of remaining unemployed. The latter is calculated using information from the Household Survey, as well as the weights, that are being defined as the annual frequency of each category. The relevant measure to be considered when bargaining takes place is not the current alternative income, which is further not known, but that prevailing in the previous time period.

Results for the whole period

Equations (5) to (7) were estimated by the method of Instrumental Variables using PcGive (1998). Given that the structure of bargaining changed in 1992, temporal stability of the parameters was tested for and resulted statistically significant in many cases. Differences by industry were also found in the parameter measuring direct union effects. Fixed effects by industry were included. Further, fixed effects were found to vary at the beginning of the nineties in the equation describing employment composition, so they were accounted for using dummy variables.

Regarding the variables included to model specific characteristics of the industries, the indicators of overall and sectoral degree of openness based on prices above described were used for the sake of simplicity, given the aim of this exercise. The strategy implies that no difference is here analysed between the effects of competitive pressure in local and international markets. The wage equation includes the employment mix as a predetermined variable so as to account for possible differences in the average wage due to labour composition (white-collars earn generally more than twice the wage of blue-collars).

The models were initially estimated allowing for 4 lags of each variable and were afterwards reduced sequentially. Table A.1 in the appendix summarises the results of estimation for the three equations while Table 7.2 displays the results relative to the existence of union effects.

No union direct effects are found on employment or on the composition of employment up to 1993. Further, coefficients for all variables interacting with union density are statistically zero. However, after 1993 some of them are found to be statistically significant. Further, there is evidence of unions having an indirect effect on employment *via* reducing the elasticity of substitution between capital and labour since 1993. Regarding the wage equation union effects, both direct and indirect, are found to be present all along the period, but changes are also found at the beginning of the nineties.

Table 7.2 Estimated union effects 1985 - 1999

	Employment Composition	***Wage Level***	***Employment Level***
Union density	-0.0265 (0.170)	7.2961 (3.248)	-0.4293 (0.319)
Industry 31 * Union	-0.4749 (0.285)	0.1733 (0.138)	_____
Industry 32 * Union	0.0178 (0.078)	1.2924 (0.566)	_____
Industry 34 * Union	-0.0166 (0.113)	-1.4731 (0.583)	_____
Industry 35 * Union	-0.0973 (0.143)	-0.7833 (0.417)	_____
Industry 36 * Union	-0.1289 (0.102)	0.4738 (0.225)	_____
Relative wage blue-white * Union	-0.5802 (0.409)	_____	_____
Wedge * Union	_____	-0.0615 (0.556)	_____
Wedge 4 lags * Union	_____	-0.5609 (0.352)	_____
Alternative wage * Union	_____	-2.2747 (1.141)	_____
Employment composition * Union	_____	-5.2711 (2.273)	_____
Product demand * Union	_____	_____	-0.0400 (0.055)
Wage level * Union	_____	_____	0.1483 (0.128)
Rel. prices Uruguay/Rest World * Union	-0.0097 (0.101)	0.0206 (0.211)	0.0614 (0.042)
Equivalent tariff * Union	-0.1430 (0.113)	-0.4840 (0.238)	0.0397 (0.066)
Dependent variable 1 lag * Union	-0.1159 (0.108)	0.0468 (0.039)	0.0010 (0.010)
Dependent variable 2 lags * Union	0.0822 (0.110)	_____	0.0022 (0.009)
Dependent variable 3 lags * Union	0.1258 (0.081)	_____	0.0069 (0.007)
Dummy 1993 * Union	0.0061 (0.256)	-2.7160 (1.458)	-0.2094 (0.225)
Industry 31* Union * Dummy 1993	0.5619 (0.345)	_____	0.0190 (0.059)
Industry 32* Union * Dummy 1993	-0.1119 (0.156)	_____	-0.1820 (0.053)
Industry 34* Union * Dummy 1993	0.3970 (0.220)	_____	0.0580 (0.060)
Industry 35* Union * Dummy 1993	0.1940 (0.243)	_____	0.1199 (0.051)
Industry 36* Union * Dummy 1993	-2.8014 (0.426)	_____	-0.2880 (0.110)
Rel.wage blue-white * Union*Dummy 1993	0.2839 (0.497)	_____	_____
Wedge * Union * Dummy 1993	_____	2.9352 (1.155)	_____
Wedge 4 lags * Union * Dummy 1993	_____	0.4494 (0.363)	_____
Alternative wage * Union * Dummy 1993	_____	2.0044 (0.856)	_____
Employment composition * Union	_____	0.1544 (0.289)	_____
Product demand * Union * Dummy 1993	_____	_____	-0.0569 (0.097)

Wage level * Union* Dummy 1993	_____	_____	0.4718 (0.162)
Rel.prices Uru/R of W*Union*Dummy 1993	-0.0186 (0.183)	-0.9085 (0.378)	0.0442 (0.100)
Equivalent tariff * Union * Dummy 1993	0.1316 (0.124)	0.0563 (0.202)	0.0081 (0.072)
Dependent var. 1 lag*Union*Dummy 1993	0.0368 (0.106)	0.0435 (0.148)	0.0017 (0.007)
Dependent var. 2 lags*Union*Dummy 1993	-0.0670 (0.108)	_____	-0.0007 (0.007)
Dependent var. 3 lags*Union*Dummy 1993	0.0487 (0.086)	_____	-0.0005 (0.005)

Note: Industries are: food, beverage & tobacco (31); textiles & leather (32); paper (34); chemicals & oil (35); non-metallic minerals (36); metal products (38). Heteroskedasticity consistent standard errors (White, 1980) are in parenthesis besides each estimated coefficient.

The estimated gaps are such that unionisation meant a higher wage level and a lower employment level in the second half of the eighties, with no effect on the composition of labour (Table 7.3). In the nineties, unions reduced the ratio of blue to white-collar workers, generated an increase in the wage level but managed to protect against job loss (although the magnitude of the effect is obviously overstated). The rise in the wage level is smaller than in the previous period, in spite of the fact that reducing the proportion of production workers leads to increases in the average wage. Both facts point at a different mechanism for wage setting at work relative to the eighties.

Table 7.3 Estimated gaps

	1985 - 1992	**1993 - 1999**
Employment mix	0	-3%
Wage level	21%	6%
Employment level	-22%	362%

Source: Table A.1 in the appendix

Since union differentials are calculated at the mean value of membership, their magnitude varies by industry when the estimated coefficients are found to be statistically different in the cross section. In the eighties, on average, the union/non-union wage differential is 21%. That is, de-unionisation in manufacturing would have implied that wages were 21% lower than what they actually were (implying an elasticity of 0.04). Since no effects of union on labour demand were found, the employment differential is –0.22 (that is, the wage effect times the wage elasticity of labour demand).

In the nineties, on the other hand, union effects are found also on the level and composition of labour. The estimated gap for the employment mix is –3%. In reducing the ratio of blue to white-collar workers, unions increase the average wage. However, other indirect effects and their direct effect on the wage level determine that the wage differential in the nineties is lower than before (6%). Regarding the employment gap its estimated magnitude is too large,

however signalling at positive union effects on employment. This is possibly due to the fact that there are too many sources of variation that are not properly accounted for in this simple model.

The results, however, do support the existence of union effects in the Uruguayan case that varied in the early nineties. Together with all the other evidence here reported, the specification of two bargaining models - one for the eighties and one for the nineties – is in place.

Results for the right-to-manage model: 1985-1992

The specification of the model follows equations (9) to (11). The estimation method used is Instrumental Variables for each equation. Variables accounting for external shocks are the indicators measured in quantities as described above. The ratio of imports and exports over GDP for the whole economy is used to measure overall external shocks while import penetration and exports share by industry are included to model competitive pressure on firms at the sectoral level. The latter two variables are possibly endogenous to the model. Hence the relative price Uruguay - Rest of the world is used as an instrument for both variables, following the proposal in Abowd and Allain (1996). The equivalent tariff is used as an instrument for the overall degree of openness, in spite of endogeneity of an economy wide measure being more dubious than that of the other two variables. The methodology followed consisted in specifying first an econometrically correct dynamic version of the models with fixed effects by industry and an adequate set of instruments, starting with 4 lags for all variables except those that are used as additional controls (unionisation, external shocks). All control variables are included in the initial specification. In a second stage, the dynamics were reduced and afterwards differences by industry in the estimated parameters were tested for and included in the model when statistically significant. The fourth step consisted in eliminating the control variables that were not significant so as to avoid possible collinearity, especially among those related to competitive pressure. The final specifications are summarized in Table 7.4[6]. The results are consistent with those stemming from equations (5) to (7), although the magnitude of the differentials is sometimes different.

[6] The output of the initial estimated equations is included in Table A.2 in the appendix.

The models show stability in the cross-section and in time. The homogeneity of the effect of unions on wages among industries reflects the fact that bargaining was quite synchronised and co-ordinated in the period. The estimated impact of union action on the average wage level is such that complete unionisation in the period would have generated a 7% increase in wages, evaluated at the mean value of union density (40%). This figure is smaller than that found for blue-collar workers (22%) implying that one of the consequences of union action was to increase the relative price of blue-collar workers with respect to the less unionised white-collar workers. The result is consistent with unions reducing wage differentials and inducing higher levels of substitution than would have taken place otherwise. Finally, the estimated effect of union action on employment, *via* the wage elasticity of labour demand, was to lower employment in –0.5% *per* each 10 percentage points increase in membership. Given the mean value of union density in the period, full unionisation would have meant a 3% decrease in labour demand.

Table 7.4 Estimated models 1985 - 1992
(long-run coefficients)

	Employment Composition	**Wage Level**	**Employment Level**
Imports/Consumption	-0.4715 (0.302)	0	0
Export share (industry)	0	0	0
Openness (economy)	0.6105 (0.288)	0.4269 (0.115)	0
Union density	____	0.1085 (0.044)	____
Relative wage blue/white-collars	-1.4393 (0.266)	____	____
Blue/white-collars	____	-0.2447 (0.077)	____
Wedge	____	-0.7655 (0.170)	____
Alternative wage	____	0.4037 (0.169)	____
GDP	____	____	0.4677 (0.245)
Wage	____	____	-0.4245 (0.134)
Number of observations (T)	174	162	162
Sample	1985.4-1992.4	1986.2-1992.4	1986.2-1992.4
Sargan test of over-identifying restrictions $\chi 2$(nºover-id.instruments)	1.41e-006 [0.9991]**	7.5074 [0.0234]*	19.483 [0.0214]*
Normality test (Jarque-Bera) $\chi 2$ (2)	58.205 [0.0000]**	1.2738 [0.5289]	18.395 [0.0001]**
Heteroskedasticity F[m, T-m] m = nº restrictions	1.7027 [0.0453]*	1.4413 [0.1025]	2.4004 [0.0050]**
Autocorrelation order 2 $\chi 2$ (2)	2.2196 [0.3296]	3.1614 [0.2058]	0.1973 [0.9061]
Testing all coefficients = 0 $\chi 2$ (k) k = nº predetermined vars.	5430.1 [0.000]**	3364.8 [0.000]**	67046 [0.000]**

Instruments used	Relative price Uruguay- Rest of the world Equivalent tariff	Employment mix lagged; Relative wage blue/white-collars; Equivalent tariff	Employment mix lagged; Relative wage blue/white-collars; Union; Alternative wage; Wage lagged; Wedge; GDP lagged

Note: The equations include binary variables by industry and *per* quarter. Standard errors are in parenthesis besides the estimates (heteroskedastic consistent standard errors in the employment equation). Tests statistics are reported with p-values in parenthesis below. A '*' means the hypothesis is rejected at 95% confidence while if '**' it is so at 99% confidence.

Bargaining at the firm level was not a generalised practice in the period (only 1% of workers were covered by these contracts on average). However, the variable was included and no statistically significant effect was detected by the data.

External shocks had an effect only on the wage level and the employment mix. The overall increased openness of the economy promoted wage inflation, as it allowed the economy to grow based on exports of primary and manufacturing goods to a protected regional market (under regional agreements as CAUCE and PEC), in which wage increases could still be passed on to consumer prices. The effect is however reduced since it also promoted a more intensive use of non-production workers. Increases in import penetration, on the other hand, generated the opposite, thus also pushing up average wages *via* the labour composition effect.

Consistent with previous findings, the elasticity of substitution between capital and labour is below 1, and so is the output elasticity of labour demand. The partial elasticity of substitution between blue and white-collar workers is large (-1.43, statistically equal to 1 at the 95% confidence), indicating that firms were able to adjust their labour mix to changes in relative pay without much resistance from trade unions. The result is not unexpected if trade unions are not concerned about employment.

Results using a recursive contracts model: 1992-1999

The model for this sub-period is that stated in equations (12) to (14). The Instrumental Variables method was used and the methodology followed was analogous to that stated in the previous section. Results for the initial models are listed in the appendix (Table A.3) while the estimated parameters of the final equations are summarised in Table 7.5.

The estimated equations are not stable anymore in the cross-section. Union direct effects vary by industry in all models. Further, in the model describing the composition of employment the impact of import penetration is also different depending on the manufacturing sector. The result can be associated to two phenomena. Firstly, bargaining stopped being a co-ordinated process, with trade unions becoming a lot more independent from each other and less linked to the central union. Secondly, increased openness and especially import penetration meant different challenges for the diverse manufacturing activities.

Table 7.5 Estimated models 1992 - 1999
(long-run coefficients)

	Employment Composition	**Wage Level**	**Employment Level**
Imports/Consumption (industry)	___	0	-1.109 (0.392)
Imports/Consumption*Ind.31	-2.914 (4.476)	____	____
Imports/Consumption*Ind.32	-1.639 (0.797)	____	____
Imports/Consumption*Ind.34	-10.656 (4.192)	____	____
Imports/Consumption*Ind.35	1.007 (3.608)	____	____
Imports/Consumption*Ind.36	1.554 (1.285)	____	____
Imports/Consumption*Ind.38	-14.34 (4.056)	____	____
Imp./Cons*Union density	____	0	1.787 (0.787)
Imp./Cons*Union density*Ind.31	9.745 (18.74)	____	____
Imp./Cons*Union density*Ind.32	6.525 (4.050)	____	____
Imp./Cons*Union density*Ind.34	38.81 (14.77)	____	____
Imp./Cons*Union density*Ind.35	-1.610 (6.494)	____	____
Imp./Cons*Union density*Ind.36	-27.01 (15.69)	____	____
Imp./Cons*Union density*Ind.38	65.52 (19.12)	____	____
Export share (industry)	0	-1.371 (0.576)	0
Export share * Union density	0	4.488 (1.986)	0
Union density*Ind.31	-1.450 (2.428)	-4.028 (2.045)	1.0446 (0.829)
Union density*Ind.32	-3.760 (2.136)	-6.435 (3.546)	0.3916 (0.899)
Union density*Ind.34	-12.88 (5.149)	-2.4715 (1.396)	-0.1934 (0.660)
Union density*Ind.35	0.6763 (3.239)	-2.8078 (1.532)	0.5266 (0.941)
Union density*Ind.36	8.990 (6.942)	-3.1035 (2.713)	-1.7884 (0.955)
Union density*Ind.38	-60.05 (17.49)	-2.8295 (1.722)	-0.6964 (1.116)
Relative wage blue/white-collars	-1.462 (0.302)	____	____
Blue/white-collars	____	-0.694 (0.617)	____
Blue/white-collars*Union density	____	5.234 (3.280)	____
Wedge	____	-1.88 (0.433)	0
Alternative wage	____	0.9798 (0.243)	0.3402 (0.156)
GDP	____	____	0.3147 (0.174)
GDP*Union density	____	____	-0.6866 (0.431)
Wage	____	____	-0.3885 (0.157)
%Workers covered by firm-level	-0.0671 (0.080)	0.0131 (0.100)	____
%Workers covered by fla * Ind.31	____	-0.2135 (0.125)	-0.124 (0.130)
%Workers covered by fla * Ind.32	____	0.0131 (0.100)	1.031 (0.461)

%Workers covered by fla * Ind.34	____	0.0131 (0.100)	-0.5539 (0.153)
%Workers covered by fla * Ind.35	____	0.0131 (0.100)	-0.7485 (0.301)
%Workers covered by fla * Ind.36	____	0.0131 (0.100)	-0.0524 (0.058)
%Workers covered by fla * Ind.38	____	-1.4149 (0.764)	-2.555 (1.101)
Number of observations (T) Sample	168 1993.1-1999.4	168 1993.1-1999.4	180 1992.3-1999.4
Sargan test of over-identifying restrictions $\chi 2$(nº over-iden.instruments)	0.2279 [0.6331]	3.1053 [0.3757]	12.822 [0.0251]*
Normality test (Jarque-Bera) $\chi 2$ (2)	24.302 [0.0000]**	1.4036 [0.4957]	4.3655 [0.1127]
(Table 7.5 continued)			
Heteroskedasticity F[m, T-m] m = nº restrictions	1.5622 [0.0368]*	0.85343 [0.7084]	1.8104 [0.0066]**
Autocorrelation order 2 $\chi 2$ (2)	3.819 [0.1482]	1.2458 [0.5364]	1.8674 [0.3931]
Testing all coefficients = 0 $\chi 2$ (k) k = nº predetermined vars.	6521.6 [0.000]**	4381.2 [0.000]**	56761 [0.000]**
Instruments used	Relative price Uruguay- Rest of the world Imports/Consumption lagged	Relative price Uruguay- Rest of the world; Employment mix lagged; Relative wage blue/white-collars lagged; Export share lagged	Employment mix; Wage lagged; Wedge lagged; GDP lagged; GDP*Union lagged; Relative price Uruguay- Rest of the world

Notes: Industries are: food, beverage & tobacco (31); textiles & leather (32); paper (34); chemicals & oil (35); non-metallic minerals (36); metal products (38). The equations include binary variables by industry and *per* quarter. Standard errors are in parenthesis besides the estimates (heteroskedastic consistent standard errors in the employment equation). Tests statistics are reported with p-values in parenthesis below. A '*' means the hypothesis is rejected at 95% confidence while if '**' it is so at 99% confidence.

Unions decrease the proportion of production workers in all industries except for chemicals & oil [7]. One possible explanation for the result is that unions resist technical change towards more skilled labour-intensive technologies. The estimated effect of import penetration is in the same direction and a lot higher than in the previous period, thus further promoting changes in the employment mix in order to compete with products that in the nineties were originated mainly from the rest of the world instead of coming from regional markets.

[7] A large public enterprise dominates this industry, so that a different result is not surprising, given it has different rules than the private sector to hire and fire workers while workers are organised in a quite strong union.

However, interactions between union density and import penetration were also statistically significant, so that unions managed to buffer the negative effects of imports on the composition of employment. The overall effect on the employment mix is negative for all industries, except for chemicals & oil (Table 7.6).

Table 7.6 Union effects on employment composition, wages and employment by industry 1992 - 1999

Employment Composition	**Direct Effect**	**Indirect Effect** *via* Import Penetration	**Total Effect**	**Mean value of variables**			
				UD	**IP**	**ES**	**EC**
Total manufacturing	-2,19	2,16	-0,03	0.25	0.48	0.24	0.46
Food, beverage & tobacco	-0,35	0,32	-0,03	0,24	0,14	0,25	0,44
Textiles & leather	-0,72	0,70	-0,02	0,19	0,56	0,65	0,71
Paper	-1,86	2,04	0,17	0,15	0,36	0,12	0,31
Chemicals & oil	0,36	-0,44	-0,08	0,53	0,52	0,16	0,28
Non-metallic minerals	0,76	-0,91	-0,16	0,08	0,40	0,15	0,54
Metal products	-11,31	11,24	-0,07	0,19	0,91	0,14	0,48

Wage Level	**Direct Effect**	**Indirect Effect** *via* Export share	**Indirect Effect** *via* Employment composition	**Total Effect**
Total manufacturing	-0,81	0,25	0,53	-0,02
Food, beverage & tobacco	-0,96	0,26	0,56	-0,14
Textiles & leather	-1,23	0,21	0,45	-0,57
Paper	-0,36	0,16	0,41	0,21
Chemicals & oil	-1,50	0,59	1,18	0,27
Non-metallic minerals	-0,26	0,09	0,17	0,00
Metal products	-0,53	0,21	0,42	0,10

Employment Level	**Direct Effect**	**Indirect Effect** *via* Import Penetration	**Indirect Effect** *via* GDP	**Indirect Effect** *via* Wage	**Total Effect**
Total manufacturing	0,05	0,20	-0,16	0,01	0,10
Food, beverage & tobacco	0,25	0,21	-0,16	0,05	0,35
Textiles & leather	0,07	0,17	-0,13	0,22	0,33
Paper	-0,03	0,13	-0,10	-0,08	-0,08
Chemicals & oil	0,28	0,47	-0,37	-0,11	0,28
Non-metallic minerals	-0,15	0,07	-0,06	0,00	-0,13
Metal products	-0,13	0,17	-0,13	-0,04	-0,13

Note: Union effects are calculated at the mean value of variables not in logs for each industry. Means are reported under the heading of UD (union density), IP (import penetration), ES (export share) and EC (employment composition).
Source: Table 7.5

Regarding union impact on wages, the direct estimated effect is negative for all industries. However, competitive pressure as measured by export share has also a negative effect on wages that is buffered by union action. Further, unions were able to smooth the effects of changes in the employment mix on wages, so that the total effect of unions on wages is negative only for exporting industries (food, beverage & tobacco; and textiles & leather) while it is nil for non-metallic minerals.

Unions have direct and indirect effects on the employment level *via* reducing the output elasticity of labour demand as well as the negative impact of import penetration. The overall effect, including that brought forth by the wage, is positive only for the exporting industries and for chemicals & oil.

Given all the estimated effects, full unionisation (starting from 25%) would have meant, on average, a decrease in the ratio of blue to white-collar workers and the wage of around 9% and 6%, respectively, while increasing employment in 30%.

The extent of firm level bargaining has no significant impact on the composition of labour (although the sign is also negative) but there are statistically significant effects on the wage and employment levels for some industries. In Table 7.7 the total effects on the different variables of the extent of coverage of firm level agreements is shown.

Table 7.7 Effects of the extent of coverage on employment composition, wages and employment by industry 1992 – 1999

	Mean Value		Employment Composition	Wage Level			Employment Level		
	FLA	EC	Direct Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	Total Effect
Total manufacturing	0,10	0.46	-0.007	-0.005	-0.017	-0.022	-0.015	0.009	-0.006
Food, bev. & tobacco	0,10	0,44	-0.007	-0.021	-0.016	-0.037	0.000	0.014	0.014
Textiles & leather	0,08	0,71	-0.006	0.001	-0.013	-0.012	0.085	0.005	0.090
Paper	0,20	0,31	-0.013	0.003	-0.032	-0.030	-0.110	0.011	-0.099
Chemicals & oil	0,04	0,28	-0.003	0.001	-0.007	-0.007	-0.033	0.003	-0.031
Non-metallic minerals	0,19	0,54	-0.012	0.002	-0.030	-0.028	0.000	0.011	0.011
Metal products	0,01	0,48	-0.001	-0.017	-0.002	-0.019	-0.030	0.007	-0.023

Note: The effects are calculated at the mean value of variables not in logs for each industry, which are FLA (extent of coverage of firm-level agreements) and EC (employment composition).
Source: Table 7.5

While in food, beverage & tobacco wage increases are lower as the percentage of workers covered by agreements signed at the firm level increase, no statistically significant effect is found on the level of employment for that sector (yet the estimated effect is positive). The opposite holds for paper and for textiles & leather, where no wage effects are statistically different from zero but there are employment effects (negative for the former and positive for the latter industry). Finally, wages in the metal products industry are lower and employment higher than in the rest depending on the proportion of workers covered by firm-level agreements.

All of the above points at different mechanisms at work in the various Uruguayan manufacturing industries. The results of the models show that in the traditionally exporting industries – food, beverage & tobacco; and textiles & leather – the effects of unions in the nineties were to decrease the proportion of non-production workers and the average wage level while increasing employment. Further, increases in the proportion of workers covered by contracts signed at the firm level strengthen the union effects on employment (and on wages in the former case). This behaviour would be expected if unions care and bargain over employment in a context of re-structuring of firms that are in need to introduce new technology and lower its costs. Hence, what is probably taking place in these sectors is that unions concern about job stability increased in the period and so did unions bargaining power over employment.

Something similar takes place in non-metallic minerals. The total union effect on wages is inexistent while the overall effect on employment is negative. However, wages go down and employment goes up as firm level bargaining turns into a more common practice[8].

The case of chemicals & oil is different from all others since a public company dominates the evolution of the statistics of the sector and workers cannot be fired except in very specific cases regulated by law. Union effects on the employment mix are negative but they still manage to significantly increase both wages and employment. However, if workers are covered by agreements signed at the firm level, then the positive effects on employment are reduced. This behaviour is consistent with that of a strong union that need not care much

[8] Non-metallic minerals and paper are the manufacturing industries with a higher percentage of workers covered by firm-level agreements by the end of the nineties (51% and 26%, respectively).

about employment. It is also consistent with a union having similar bargaining power over employment and wages.

Finally, the estimated effects of unions for the paper industry and for metal products, the latter being a traditional import substitutive sector, are to increase wages and decrease employment levels. The sign of the effect of firm level bargaining indicates that decentralised negotiations would revert the effects on wages. Their behaviour is thus that of unionised sectors in which centralised negotiations are carried out with higher bargaining power over wages and low concern on job stability, while decentralised bargaining would be a mechanism that tries to adequate the centralised agreements to the firm's specific situation.

Conclusions

Enough evidence was shown in this paper supporting the idea that two different bargaining models are needed to well describe the behaviour of the Uruguayan manufacturing firms after 1985. The contents of the collective agreements signed as well as the econometric models estimated point at a right-to-manage model as the adequate instrument for the eighties and at a recursive bargaining model for the nineties. Unions have changed their objective function, augmenting their concern about job stability. Unions and firms have changed also the mechanisms through which wages and employment are set. While firms decided the level of employment in the eighties unilaterally, they became involved in negotiations with trade unions in the nineties. It is not possible to determine if bargaining over both items took place simultaneously or sequentially, but there is no doubt that union effects on employment were present in the second sub-period. They are, however, different by industry, thus showing that the synchronised and co-ordinated action of unions that predominated in the eighties no longer holds in the nineties.

As a consequence, the channels through which unions act are different in both time periods. In the late eighties, strong unions that bargained at the industry level only over the wage managed to get a higher proportion of the extra rents. In the nineties, when no protection was possible anymore and with a declining membership in a context of increased unemployment, unions started bargaining at a more decentralised level and negotiations also included employment and work conditions. Unions were able to guarantee job stability up to some extent using different mechanisms in some industries. First, by moderating their wage demands or even allowing wages to fall. Second, by buffering the negative impact of

increased openness - especially that reflected in a larger amount of imported goods - and that of changes in the composition of employment. Third, by smoothing the effect of demand fluctuations on employment.

Import penetration has been substantial all along the period under analysis but especially in the nineties. The common external rate for the countries in the Mercosur meant that imports from the rest of the world increased sharply while Uruguayan exports to the region also rose. Manufacturing firms were forced to move towards more skilled-labour/capital intensive technologies and to reduce costs. This phenomenon is reflected in the models as increases in imports generate reductions in the ratio of production to non-production workers, in the level of employment and indirectly in wage levels, while stronger competitive pressure *via* exports also decreases wage levels.

Decentralised bargaining started being a common practice in the late nineties. This has had an impact on employment, employment mix and wages reinforcing or smoothing the previous effects of union action.

Finally, while a model for all industries is adequate to describe bargaining in the eighties, the empirical evidence shows that the various manufacturing industries have experienced different processes in the nineties, so that instability in the cross section has been a constant in the empirical models estimated. Interestingly enough exporting industries and the sector dominated by a publicly owned firm have quite clear-cut behaviours. Unions in exporting industries are concerned about employment more than the rest, so that they are willing to accept lower relative wage increases. The industry to which a large publicly owned firm belongs got both wages and employment increases due to union action, resembling the behaviour predicted by an efficient contracts model.

More work need to be done to properly take into account all the various phenomena that have taken place in the last decade. Research for each sector is in place given the heterogeneity found and the use of micro data would help to eliminate possible biases in the estimates. More important still would be to analyse the effects of union action on other indicators of firm performance, such as profitability, investment rates or productivity.

Appendix

Table A.1 Estimated coefficients 1985 - 1999

Variable	Employment Composition	Wage Level	Employment Level
Constant	0.1367 (0.070)	-0.6459 (0.859)	0.5652 (0.210)
Quarter 1	-0.0134 (0.004)	-0.0308 (0.007)	-0.0005 (0.003)
Quarter 2	-0.0010 (0.004)	-0.0043 (0.007)	0.0014 (0.003)
Quarter 3	0.0009 (0.004)	-0.0046 (0.007)	-0.0067 (0.002)
Industry 31	0.2109 (0.121)	-0.0715 (0.049)	0.0087 (0.016)
Industry 32	0.0368 (0.031)	-0.3507 (0.153)	0.0135 (0.009)
Industry 34	-0.0205 (0.038)	0.3773 (0.152)	-0.0005 (0.011)
Industry 35	0.0007 (0.086)	0.1180 (0.119)	-0.0262 (0.016)
Industry 36	0.0629 (0.025)	-0.0597 (0.045)	-0.0018 (0.019)
Dummy 1993	-0.0103 (0.025)	_____	_____
Industry 31* Dummy1993	-0.2619 (0.128)	_____	_____
Industry 32* Dummy1993	0.3719 (0.043)	_____	_____
Industry 34* Dummy1993	-0.1492 (0.065)	_____	_____
Industry 35* Dummy1993	-0.1617 (0.131)	_____	_____
Industry 36* Dummy1993	0.1849 (0.045)	_____	_____
Relative wage blue-white collars	-0.2503 (0.130)	_____	_____
Wedge	_____	-0.9134 (0.269)	_____
Wedge 4 lags	_____	-0.1445 (0.226)	_____
Alternative wage	_____	0.5795 (0.337)	_____
Employment composition	_____	1.1193 (0.569)	_____
Product demand	_____	_____	0.0809 (0.038)
Wage level	_____	_____	-0.1003 (0.055)
Relative prices Uruguay/Rest World	0.0133 (0.047)	0.0614 (0.097)	-0.0188 (0.017)
Equivalent tariff	0.0107 (0.037)	0.0675 (0.072)	-0.0046 (0.023)
Dependent variable 1 lag	0.5105 (0.064)	0.4519 (0.110)	0.7461 (0.059)
Dependent variable 2 lags	-0.0326 (0.072)	_____	-0.0124 (0.071)
Dependent variable 3 lags	0.1099 (0.061)	_____	0.1633 (0.056)
Union density	-0.0265 (0.170)	7.2961 (3.248)	-0.4293 (0.319)
Industry 31 * Union	-0.4749 (0.285)	0.1733 (0.138)	_____
Industry 32 * Union	0.0178 (0.078)	1.2924 (0.566)	_____
Industry 34 * Union	-0.0166 (0.113)	-1.4731 (0.583)	_____
Industry 35 * Union	-0.0973 (0.143)	-0.7833 (0.417)	_____
Industry 36 * Union	-0.1289 (0.102)	0.4738 (0.225)	_____
Relative wage blue-white * Union	-0.5802 (0.409)	_____	_____
Wedge * Union	_____	-0.0615 (0.556)	_____
Wedge 4 lags * Union	_____	-0.5609 (0.352)	_____
Alternative wage * Union	_____	-2.2747 (1.141)	_____
Employment composition * Union	_____	-5.2711 (2.273)	_____
Product demand * Union	_____	_____	-0.0400 (0.055)
Wage level * Union	_____	_____	0.1483 (0.128)
Rel. prices Uru/R of W * Union	-0.0097 (0.101)	0.0206 (0.211)	0.0614 (0.042)
Equivalent tariff * Union	-0.1430 (0.113)	-0.4840 (0.238)	0.0397 (0.066)
Dependent variable 1 lag * Union	-0.1159 (0.108)	0.0468 (0.039)	0.0010 (0.010)
Dependent variable 2 lags * Union	0.0822 (0.110)	_____	0.0022 (0.009)
Dependent variable 3 lags * Union	0.1258 (0.081)	_____	0.0069 (0.007)

(Table A.1 continued)			
Dummy 1993 * Union	0.0061 (0.256)	-2.7160 (1.458)	-0.2094 (0.225)
Industry 31* Union * Dummy 1993	0.5619 (0.345)	_____	0.0190 (0.059)
Industry 32* Union * Dummy 1993	-0.1119 (0.156)	_____	-0.1820 (0.053)
Industry 34* Union * Dummy 1993	0.3970 (0.220)	_____	0.0580 (0.060)
Industry 35* Union * Dummy 1993	0.1940 (0.243)	_____	0.1199 (0.051)
Industry 36* Union * Dummy 1993	-2.8014 (0.426)	_____	-0.2880 (0.110)
Rel.wage blue-white*Union*Dummy1993	0.2839 (0.497)	_____	_____
Wedge * Union * Dummy 1993	_____	2.9352 (1.155)	_____
Wedge 4 lags * Union * Dummy 1993	_____	0.4494 (0.363)	_____
Alternative wage * Union * Dummy 1993	_____	2.0044 (0.856)	_____
Employment Comp.*Union*Dummy 1993	_____	0.1544 (0.289)	_____
Product demand * Union * Dummy 1993	_____	_____	-0.0569 (0.097)
Wage level * Union* Dummy 1993	_____	_____	0.4718 (0.162)
Rel.prices Uru/RofW*Union*Dummy 1993	-0.0186 (0.183)	-0.9085 (0.378)	0.0442 (0.100)
Equivalent tariff * Union * Dummy 1993	0.1316 (0.124)	0.0563 (0.202)	0.0081 (0.072)
Dependent var. 1 lag*Union*Dummy1993	0.0368 (0.106)	0.0435 (0.148)	0.0017 (0.007)
Dependent var. 2 lags*Union*Dummy1993	-0.0670 (0.108)	_____	-0.0007 (0.007)
Dependent var. 3 lags*Union*Dummy1993	0.0487 (0.086)	_____	-0.0005 (0.005)
Number of observations (T)	342	336	342
Sample	1985.4-1999.4	1986.1-1999.4	1985.4-1999.4
Sargan test of over-identifying restrictions	_____	3.6744 [0.159]	19.178
$\chi 2$(nº of over-identifying restrictions)			[0.014]*
Normality test (Jarque-Bera)	68.036	179.94	54.921
$\chi 2$ (2)	[0.0000]**	[0.0000] **	[0.0000] **
Heteroskedasticity	2.2695	13.02	2.2908
F[m, T-m] m = nº restrictions	[0.0000]**	[0.0000] **	[0.0000]**
Autocorrelation order 2	1.5459	1.2503	0.7777
$\chi 2$ (2)	[0.4616]	[0.5352]	[0.6778]
Testing all coefficients = 0 F[k,T-k] or	0.97594	4508.5	1.375e+005
$\chi 2$ (k) k = nº predetermined vars.	[0.0000]**	[0.0000]**	[0.0000]**
Estimation method	Least Squares	Instrumental Variables	Instrumental Variables
Instruments used	_____	Employment mix lagged; Relative wage blue/white-collars;	Employment mix lagged; Relative wage blue/white-collars; Wage lagged; Wage *Union lagged; Alternative wage; Wedge; GDP lagged; GDP*Union lagged

Note: Industries are: food, beverage & tobacco (31); textiles & leather (32); paper (34); chemicals & oil (35); non-metallic minerals (36); metal products (38). Heteroskedasticity consistent standard errors (White, 1980) are in parenthesis besides each estimated coefficient. 'Dummy1993' is equal to 0 before 1993.1 and equal to 1 afterwards. Tests statistics are reported with p-values in parenthesis below. A '*' means the hypothesis is rejected at 95% confidence while if '**' it is so at 99% confidence.

Table A.2 Initial specification: estimated coefficients 1985 - 1992

Variable	Employment Composition	Wage Level	Employment Level
Constant	0.1245 (0.054)	1.1600 (0.809)	1.8913 (0.825)
Quarter 1	-0.0193 (0.008)	-0.0566 (0.016)	-0.0134 (0.009)
Quarter 2	0.0068 (0.008)	-0.0118 (0.012)	-0.0048 (0.007)
Quarter 3	-0.0012 (0.008)	-0.0284 (0.019)	-0.0123 (0.006)
Industry 31	-0.0578 (0.082)	0.189 (0.147)	0.1487 (0.091)
Industry 32	0.0071 (0.085)	0.4145 (0.225)	0.0676 (0.074)
Industry 34	-0.0805 (0.056)	-0.0131 (0.118)	0.0345 (0.058)
Industry 35	-0.0813 (0.046)	0.0519 (0.093)	0.0068 (0.036)
Industry 36	-0.0264 (0.055)	0.0723 (0.128)	-0.0229 (0.071)
Export share (industry)	-0.0455 (0.123)	-1.7206 (1.072)	0.2279 (0.258)
Import penetration (industry)	-0.1287 (0.121)	-0.3032 (0.593)	0.2124 (0.144)
Openness (economy)	0.0869 (0.137)	0.6256 (0.386)	-0.1069 (0.102)
Employment composition	_____	-0.1387 (0.323)	_____
Union density	_____	0.3039 (0.833)	_____
Export share * Union density	_____	2.2550 (1.838)	_____
Import penetration * Union density	_____	0.9027 (1.289)	_____
Openness * Union density	_____	-1.0564 (0.863)	_____
Employment composition * Union density	_____	-0.5242 (0.963)	_____
Relative wage	-0.7503 (0.124)	_____	_____
Relative wage 1 lag	0.3865 (0.148)	_____	_____
Relative wage 2 lags	-0.1786 (0.151)	_____	_____
Relative wage 3 lags	0.2547 (0.141)	_____	_____
Relative wage 4 lags	0.0783 (0.143)	_____	_____
Wedge	_____	-0.8605 (0.272)	_____
Wedge 1 lag	_____	0.0892 (0.436)	_____
Wedge 2 lags	_____	0.4146 (0.409)	_____
Wedge 3 lags	_____	-0.3450 (0.424)	_____
Wedge 4 lags	_____	0.0734 (0.368)	_____
Alternative wage	_____	0.7327 (0.403)	_____
Alternative wage 1 lag	_____	-0.7360 (0.537)	_____
Alternative wage 2 lags	_____	0.2780 (0.597)	_____
Alternative wage 3 lags	_____	-0.4675 (0.480)	_____
Alternative wage 4 lags	_____	0.1404 (0.230)	_____
Employment composition	_____	1.1193 (0.569)	_____
Product demand	_____	_____	-0.0189 (0.180)
Product demand 1 lag	_____	_____	0.0066 (0.096)
Product demand 2 lags	_____	_____	0.0957 (0.052)
Product demand 3 lags	_____	_____	-0.0573 (0.052)
Product demand 4 lags	_____	_____	0.1397 (0.097)
Wage level	_____	_____	-0.1737 (0.136)
Wage level 1 lag	_____	_____	0.0696 (0.140)
Wage level 2 lags	_____	_____	-0.0230 (0.098)
Wage level 3 lags	_____	_____	0.0864 (0.094)
Wage level 4 lags	_____	_____	-0.1848 (0.085)
Dependent variable 1 lag	0.5171 (0.086)	0.6256 (0.386)	0.7818 (0.152)
Dependent variable 2 lags	0.0771 (0.096)	0.0791 (0.224)	-0.1923 (0.210)
Dependent variable 3 lags	0.1209 (0.093)	0.2791 (0.206)	0.1403 (0.171)
Dependent variable 4 lags	0.0323 (0.100)	0.0350 (0.235)	-0.1275 (0.204)

(Table A.2 continued)			
Number of observations (T) Sample	168 1986.1-1992.4	162 1986.2- 1999.4	162 1986.2- 1999.4
Sargan test of over-identifying restrictions $\chi 2$(nº of over-identifying restrictions)	0.50531 [0.4772]	1.2143 [0.2705]	5.9342 [0.2041]
Normality test (Jarque-Bera) $\chi 2$ (2)	50.096 [0.0000] **	9.2001 [0.0101] *	12.486 [0.0019] **
Heteroskedasticity F[m, T-m] m = nº restrictions	1.062 [0.3952]	2.1445 [0.0011] **	1.4215 [0.0819]
Autocorrelation order 2 $\chi 2$ (2)	0.08197 [0.9598]	3.4199 [0.1809]	2.9979 [0.2234]
Testing all coefficients = 0 $\chi 2$ (k) k = nº predetermined vars.	5655.9 [0.0000] **	1428.8 [0.0000] **	44416 [0.0000] **
Instruments used	Relative price Uruguay-Rest of World; Equivalent tariff; Import Penetration lagged; Export share lagged	Relative price Uruguay-Rest of World; Equivalent tariff; Employment mix lagged; Relative wage blue/white-collars;	Relative price Uruguay-Rest of World; Equivalent tariff; Employment mix lagged; Relative wage blue/white-collars; Alternative wage current & lagged; Wedge current & lagged; GDP lagged;

Note: Industries are: food, beverage & tobacco (31); textiles & leather (32); paper (34); chemicals & oil (35); non-metallic minerals (36); metal products (38). Standard errors are in parenthesis besides each estimated coefficient (corrected following White (1980) for the wage equation). Tests statistics are reported with p-values in parenthesis below. A '*' means the hypothesis is rejected at 95% confidence while if '**' it is so at 99% confidence.

Table A.3 Initial specification: estimated coefficients 1992 - 1999

Variable	Employment Composition	Wage Level	Employment Level
Constant	0.0353 (0.191)	0.2864 (0.652)	-0.1006 (1.586)
Quarter 1	-0.1526 (0.240)	0.2838 (0.218)	0.0079 (0.018)
Quarter 2	-0.0366 (0.320)	0.3287 (0.312)	-0.0031 (0.007)
Quarter 3	-0.1100 (0.118)	0.1610 (0.102)	-0.0022 (0.009)
Industry 31	-0.1416 (0.096)	0.0336 (0.105)	0.0865 (0.217)
Industry 32	-0.0394 (0.110)	0.1865 (0.182)	0.0973 (0.288)
Industry 34	-0.0093 (0.007)	-0.0230 (0.007)	0.1759 (0.212)
Industry 35	0.0009 (0.007)	-0.0063 (0.005)	0.0591 (0.136)
Industry 36	0.0036 (0.007)	-0.0078 (0.005)	0.1559 (0.226)
Export share (industry)	0.2796 (0.644)	-0.5429 (0.468)	-0.1276 (0.456)
Import penetration (industry)	-0.2651 (0.283)	0.5803 (0.518)	0.1725 (0.422)
Openness (economy)	0.4707 (0.330)	0.0590 (0.651)	0.3117 (0.877)
Employment composition	_____	0.3478 (0.317)	_____
Union density	0.6713 (0.866)	0.5101 (1.862)	0.3682 (1.345)
Export share * Union density	-0.4392 (0.527)	0.4691 (0.455)	-0.0010 (0.277)
Import penetration * Union density	0.3618 (0.268)	-0.8031 (0.854)	0.1629 (0.283)
Openness * Union density	-1.0890 (1.209)	1.0095 (0.954)	-0.4814 (1.893)
Employment composition * Union density	_____	-1.2925 (1.362)	_____
%Workers covered by firm-level contracts	-0.2884 (0.148)	0.2074 (0.096)	-0.0972 (0.248)
Relative wage	-0.3928 (0.167)	_____	_____
Relative wage 1 lag	0.0971 (0.173)	_____	_____
Relative wage 2 lags	0.1936 (0.164)	_____	_____
Relative wage 3 lags	0.0326 (0.160)	_____	_____
Relative wage 4 lags	0.0160 (0.134)	_____	_____
Wedge	_____	-0.9412 (0.320)	_____
Wedge 1 lag	_____	0.6837 (0.431)	_____
Wedge 2 lags	_____	-0.4412 (0.648)	_____
Wedge 3 lags	_____	-0.0366 (0.431)	_____
Wedge 4 lags	_____	1.2644 (0.803)	_____
Alternative wage	_____	-0.1437 (0.236)	0.3789 (0.322)
Alternative wage 1 lag	_____	0.7177 (0.373)	0.0101 (0.441)
Alternative wage 2 lags	_____	-0.0808 (0.291)	0.0072 (0.230)
Alternative wage 3 lags	_____	-1.0084 (0.562)	-0.2351 (0.369)
Alternative wage 4 lags	_____	0.1334 (0.176)	_____
Product demand	_____	_____	0.3609 (0.189)
Product demand 1 lag	_____	_____	-0.1746 (0.109)
Product demand 2 lags	_____	_____	0.0120 (0.067)
Product demand 3 lags	_____	_____	-0.0558 (0.052)
Product demand 4 lags	_____	_____	_____
Wage level	_____	_____	-0.4159 (0.920)
Wage level 1 lag	_____	_____	0.1076 (0.682)
Wage level 2 lags	_____	_____	0.1298 (0.173)
Wage level 3 lags	_____	_____	-0.1146 (0.148)
Wage level 4 lags	_____	_____	_____
Dependent variable 1 lag	0.5308 (0.123)	0.6295 (0.132)	0.6964 (0.246)
Dependent variable 2 lags	-0.1619 (0.093)	-0.2966 (0.247)	-0.0698 (0.225)
Dependent variable 3 lags	0.0480 (0.105)	0.0714 (0.136)	-0.0065 (0.166)
Dependent variable 4 lags	0.0977 (0.082)	0.5263 (0.264)	0.3498 (0.149)

(Table A.3 continued)			
Number of observations (T) Sample	168 1986.1-1992.4	168 1993.1- 1999.4	180 1992.3- 1999.4
Sargan test of over-identifying restrictions $\chi 2$(nº of over-identifying restrictions)	3.1855 [0.0743]	6.6252 [0.3569]	3.1062 [0.3755]
Normality test (Jarque-Bera) $\chi 2$ (2)	25.433 [0.0000]**	1.1551 [0.5613]	4.7558 [0.0927]
Heteroskedasticity F[m, T-m] m = nº restrictions	0.82479 [0.7555]	0.72476 [0.8975]	1.2175 [0.2009]
Autocorrelation order 2 $\chi 2$ (2)	0.25783 [0.7731]	8.5321 [0.0140] *	0.10073 [0.9509]
Testing all coefficients = 0 $\chi 2$ (k) k = nº predetermined vars.	6654.6 [0.0000] **	6032.1 [0.0000] **	26260 [0.0000] **
Instruments used	Relative price Uruguay-Rest of World; Equivalent tariff; Import Penetration lagged; Export share lagged	Relative price Uruguay-Rest of World; Equivalent tariff; Employment mix lagged; Relative wage blue/white-collars lagged;	Relative price Uruguay-Rest of World; Equivalent tariff; Employment mix lagged; Wedge lagged; GDP lagged; Wage lagged

Note: Industries are: food, beverage & tobacco (31); textiles & leather (32); paper (34); chemicals & oil (35); non-metallic minerals (36); metal products (38). Standard errors are in parenthesis besides each estimated coefficient. Tests statistics are reported with p-values in parenthesis below. A '*' means the hypothesis is rejected at 95% confidence while if '**' it is so at 99% confidence.

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