

Trade Integration and the Politics of Exchange Rate Regime Choice

Jose Fernandez-Albertos
Department of Government
Harvard University
albertos@fas.harvard.edu

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1 Introduction: Understanding Exchange Rate Preferences to Understand Exchange Rate Choices

To explain variation in exchange rate regime choices, the dominant economic literature mainly focused on efficiency considerations. Whether a country adopt a fixed or a floating regimes, according to this type of explanations, is a function of some characteristics of the economy that make one particular currency arrangement more 'appropriate' than the alternatives. For instance, the theory of optimum currency areas hypothesizes that trade integration, by amplifying the benefits that a peg provides, while reducing its costs in terms of monetary autonomy, should be associated with a preference for fixed exchange rate regimes. However, these efficiency concerns have largely failed to account for the empirical observation that there is no clear and direct relationship between trade integration and exchange rate regime choice.

To understand the nature of this relationship, this paper proposes a different approach. It starts by recognizing that the decision to adopt a currency regime is inherently a political one, i.e. one that must adjudicate between conflicting interests in society. The first question we ought to answer is therefore how economic integration affects the distribution of power domestically. Once we know the identity of these political 'winners', we can proceed to analyze in detail what their exchange rate regime preferences are. This analysis is key because, as the economy opens up, so will their preferences be more commonly translated into actual policy choices.

The main argument can be structured as follows. The fundamental effect that economic internationalization has at the domestic level is to empower the exporting sector of the economy, for two reasons: First and foremost, their relative size increases as trade links intensify; second, the whole economic becomes more dependent on this sector's performance. As this group gains political leverage, so will their preferences be more politically influential in the exchange rate policy realm. However, as we will see, the preferences of this group towards exchange rate regimes are not unconditional, as most previous political-economy studies have implicitly postulated. Typically, political-economy analysis of exchange rate regime preferences have pointed out that, in principle, exporters should welcome fixed exchange rate regimes because nominal stability facilitates international transactions (Hefeker 1997, Frieden 2002). But as this chapter will try to convey, nominal stability might not be the only consequence that a fixed exchange rate regime has on exporters' wellbeing. More precisely,

a fixed exchange rate regime might, under certain circumstances, unleash undesirable wage developments for the internationally exposed sectors of the economy. Whether these undesirable effects outweigh or not the benefits that nominal stability provides will depend, I will argue, on some key institutional features of the economy. Once the role of the institutional context is taken into consideration, it will become evident why exporters will not always express the same exchange rate preference, and consequently, why the internationalization of the economy and the concomitant greater political leverage of the exposed sectors has prompted *divergent* exchange rate regime *choices* across different institutional scenarios.

Figure 1 summarizes schematically the two stages of the explanatory argument. To explain how exchange rate regime choices are affected by the political effects of economic internationalization, we first have to understand how the exchange rate preferences of exporters are formed in the first place. This is the purpose of the model that I present next.

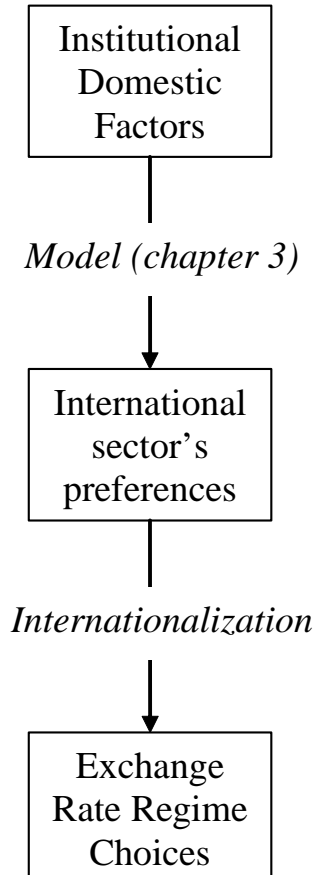
The remaining of the paper is organized as follows. It starts by presenting the model and deriving its most important predictions, both formally and narratively. In the last section, I test the empirical validity of the model's main claims examining de fact exchange rate regime choice in OECD from 1975 to 2000. A final section summarizing the main claims and results concludes.

2 The Model

2.1 Preliminaries.

The model is primarily aimed to show how the economic wellbeing of the internationalized sector of the economy is affected by the exchange rate regime in place, and how some institutional features of the domestic economy mediate these effects. The model considers only two possible ideal-type monetary regimes: a fixed (*FIX*) and a floating (*FLOAT*) regime. In a floating exchange rate regime, the monetary authority is simply driven by its desired to keep inflation and unemployment down, as in the classic Barro and Gordon's (1985) formulation. In a fixed exchange rate regime, the monetary authority also minimizes unemployment and inflation as dictated by its utility function, but, additionally, is credibly committed to keep the nominal exchange rate stable against some foreign anchor. This implies, under conditions of full international capital mobility and the need to maintain the external balance, that the domestic price

Figure 1: A Political-Economy Explanation of the Relationship between Trade Integration and Exchange Rate Regime Choices.



of tradables ought to be in line with the price of international tradables.¹

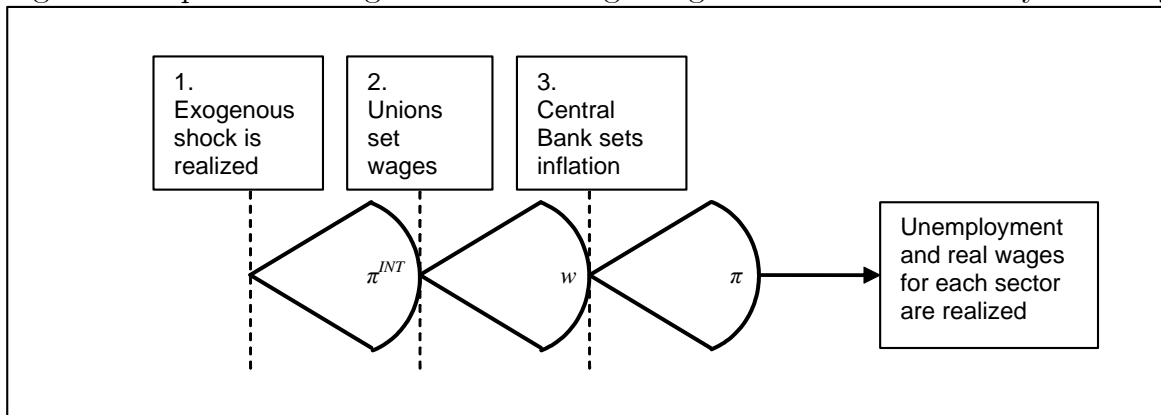
There are three economic groups in society: exporters (EX), import-competers (IM), and non-tradables (NT). Labor and capital are sector-specific. Workers are organized into monopoly unions, who, as in standard models of wage setting, are able to push up nominal wages in their firms, but are constrained by the fact that firms will respond to these wage increases by cutting employment². The only difference be-

¹Under this analytical distinction, fixed exchange rate regimes cover not only exchange rate pegs, but also more 'hard' currency arrangements such as currency boards, monetary unions, or the adoption of a foreign currency (e.g. dollarization).

Admittedly, real-world currency arrangements are much more complex than what this simple distinction suggests. Nevertheless, this characterization of exchange rate regimes does capture the most defining feature of monetary regimes: whether domestic monetary policy is aimed at maintaining a given nominal exchange rate, or not.

²This abstraction is used only to characterize the trade-off between real wages and employment

Figure 2: Sequence of the game between wage bargainers and the monetary authority



tween workers in tradables (exporters and import-competers) and nontradables resides in that while the latter always have the ability to trade wage increases for jobs, unions in tradables can only do so under a floating exchange rate regime. More precisely, the assumption is that the labor demand curve of firms in the tradable sector becomes completely horizontal under a fixed exchange rate regime. Albeit extremely simplifying, this captures the fundamental difference between the exposed and the sheltered sectors of the economy when confronted with exchange rate regimes: the tradable sector, which, by definition, competes in international markets, is able to push up wages only if the mismatch between domestic and foreign prices is compensated by changes in the nominal exchange rate. Under a flexible exchange rate regime, a currency depreciation³ restores the international competitiveness of firms in tradables whenever domestic prices and international prices diverge. This allows workers in those firms to ask for nominal wage increases, just as their nontradable counterparts do. Under a fixed exchange rate regime, in contrast, workers in tradables are aware that *any* nominal wage increase beyond international price developments will automatically translate into loss of international competitiveness and, consequently, unemployment.

that workers must face when asking for wage increases. Later I discuss the consequences for the model of a system in which workers' representatives are completely powerless with respect to wage-setting.

³I will use depreciation and devaluation through the dissertation interchangeably. Both terms refer to a loss of value in terms of another currency. Conventionally, a currency *depreciates* if its value changes as a result of supply and demand conditions in the currency exchange market, and it is *devalued* if it is the government who decides to change its relative value. That is why the term 'depreciation' is better suited to refer to a relative loss of value of a currency under a flexible exchange rate regimes, while 'devaluation' refers to the same phenomenon, but when it is the result of a government's decision to 'realign' the currency under a peg.

The sequence of the game between wage-setters and the monetary authority is represented in figure 2. First, a shock affecting the relative price of foreign-produced goods is realized. Then, unions in nontradables and tradables simultaneously set their nominal wage increases. In the final step, the monetary authority responds to that nominal wage increase by setting the price level according to its commitments with respect to the exchange rate (if any), unemployment, and inflation.

The game is solved by backwards induction. Therefore, I first obtain the expected responses of the monetary authority to union's wage demands in the last node of the game (the price level π). Secondly, we obtain the union's utility-maximizing wage demands, given the expected reaction of the monetary authority (w^*). The last step is to compare the sectors' expected utilities under different monetary regimes and different values of the exogenous values of the model parameters. To advance the main results of the model, it can be shown that exporters' attitudes towards exchange rate regimes are expected to be mediated by some key characteristics of the political economy. Most importantly, the model shows that higher levels of centralization of wage bargaining, make exporters more favorable of fixed exchange rate regimes. Let us see why.

2.2 The set-up⁴

Let us start by defining the workers' utility function. As indicated, workers are represented by monopoly unions who decide over the nominal wage increase, constrained by the expected reduction in unemployment that the increase will eventually generate. The trade-off between real wages and unemployment is reflected in their utility function: for simplicity, I will assume that workers value equally increases in real wages and reductions in unemployment, so that the utility function of a given union in sector i will be:

$$W_i = (1 - \gamma_i)\left(-\frac{1}{2}U_i + \frac{1}{2}(w_i - \pi)\right) - \gamma_i(|\Delta e|) \quad (1)$$

where U refers to the unemployment level, w to the nominal wage increase, π to the inflation rate, and γ is a parameter measuring the sector's sensibility to nominal fluctuations in the exchange rate e ⁵, relative to the unemployment and real wage

⁴The model is largely inspired by Iversen (1998, 1999), from whom I have borrowed also the notation. With respect to that model, the one presented here introduces a sectoral division between tradables and nontradables, and discusses the implications of the existence of an exchange rate commitment for the monetary authority's behavior, and, indirectly, for wage bargaining.

⁵As explained below, the volatility of the exchange rate (e) is a function of the absolute difference

concerns. Nominal currency fluctuations, as conventional political-economy analyses of exchange rate regime preferences have long emphasized, have obvious distributional consequences⁶, implying that γ should vary across sectors. In line with these arguments, I will assume that nominal stability is *in principle* inconsequential for nontradables ($\gamma_{NT} = 0$), but it is positively valued by exporters ($\gamma_{EX} > 0$), because predictability facilitates international transactions. This goes in line with the received wisdom that exporters should be the 'natural constituency' for pegs, as the traditional OCA literature and its political-economy corollaries contend. (But, as we shall see in a moment, the choice of the exchange rate regime also has consequences for the formation of wages, and these effects might, under certain circumstances, reduce or even offset the benefits that a peg provides to this group). Finally, import-competers' preferences towards exchange rate volatility could go either way. On the one hand, currency volatility benefits them as it gives them a 'home advantage' versus foreign competitors who offer more volatile prices. On the other hand, import-competers might dislike volatility as it forces them to face more unpredictable competitors across time. Given this ambiguity, I will assume that $\gamma_{IC} = 0$, the same as for nontradables.

The monetary authority minimizes inflation and unemployment, according to the standard formulation of the central bank's utility function:

$$W_{CB} = -\iota\pi^2 - (1 - \iota)U^2 \quad (2)$$

where ι measures the degree of 'conservatism', or relative preference for price stability versus employment.

Total unemployment is simply modelled as a function of the unaccommodated total wage increase:

$$U = w - \pi \quad (3)$$

Wages are decided by monopoly unions covering equally sized portions of the economy. The size of this wage bargaining units is given by the centralization parameter

between the domestic price of tradables (π^T) and the international price shock (π^{INT}).

⁶In the traditional interpretation, the choice of the exchange rate regime involves a trade-off between the benefits of nominal stability that a peg provides, and the costs it imposes in terms of loss of domestic monetary autonomy under conditions of international capital mobility. Different sectors of the economy value different the two extremes of the trade-off: domestic-oriented sectors will tend to prefer not to sacrifice monetary autonomy, while exporters will value more the nominal stability that a peg guarantees. See Broz and Frieden (2001).

c , which is defined as the inverse of the number of wage bargaining units N , so that c ranges from $\frac{1}{N}$ to 1, where $c = 1$ denotes total wage bargaining centralization.

The external constraint is given by the need to keep the balance of payments in equilibrium. For this to be the case, the domestic price of tradables (π^T) must equal the price of foreign tradable goods (π^{INT} , which is realized at the beginning of the game), adjusted for the nominal exchange rate e .

$$\pi^T = e * \pi^{INT} \quad (4)$$

The international price shock (π^{INT}) has zero mean, and its variance is given by the degree of international exposure of the economy:

$$var(\pi^{INT}) = \frac{1}{\phi^2} - 1 \quad (5)$$

where ϕ represents the share of the nontradable sector in the economy, so that the volatility of the exchange rate equals zero if no tradable sector exists ($\phi = 1$).

Finally, we define the expected change in the nominal exchange rate ($|\Delta e|$) under a float and under a peg as follows:

$$\begin{aligned} |\Delta e|(FLOAT) &= var(\pi^{INT}) + \frac{\pi}{var(\pi^{INT})} \\ |\Delta e|(FIX) &= 0 \end{aligned} \quad (6)$$

Under a floating regime, the expected change in the nominal exchange rate is a positive function of the domestic price level and the volatility of the international price shock⁷. Under a fixed exchange rate regime, by definition, the nominal exchange rate does not change.

2.3 Wage-Setting Under Different Exchange Rate Regimes

Under a floating exchange rate regime, any difference between the price of tradables at home and abroad (π^T, π^{INT}) will spur a change in e^8 that will keep the external balance constraint (equation 4) satisfied. The fact that the nominal exchange rate e always restores the competitiveness of tradables cancels any differences of tradables and

⁷This formulation guarantees that when the domestic price level is zero, the change in the nominal exchange rate is just a direct function of the volatility of the international price shock, and that the positive effect of price levels on volatility is mitigated as international price shocks become more volatile.

⁸As shown in expression 6.

nontradables with respect to wage bargaining (exporters, however, are still sensitive to nominal exchange rate volatility). As a result, under a float all sectors will demand the same nominal wage increases, implying that $\pi^T = \pi^{NT} = \pi = e * \pi^{INT}$ ⁹.

We first analyze the last node of the game: the decision of the monetary authority to select a rate of inflation that minimizes unemployment and inflation, taking the wage demand schedule as exogenous. This rate of inflation is obtained by equalizing the derivative of its utility function (equation 2) with respect to π to zero, and then solving for π :

$$\frac{\partial}{\partial \pi}(-\iota \pi^2 - (1 - \iota)(w - \pi)^2) = 0 \quad (7)$$

$$\pi^* = (1 - \iota) w \quad (8)$$

The expression simply shows that the central bank chooses a higher price level when confronted with higher wage demands, and the slope of this reaction function is given by ι , the degree of conservatism of the bank.

Knowing that the central bank will react as indicated in equation 8, we can now solve for the optimal nominal wage increase that unions will choose in the previous stage of the game. To do so, we first plug π^* as defined in 7 into equation 3. With this new expression for unemployment, unions select the utility-maximizing wage increase, bearing in mind that the unemployment effect of their individual wage increase will be weighted by the centralization parameter c ¹⁰. This optimal wage increase is given by the following expression:

$$w^*(FLOAT) = \frac{1}{2} - \frac{1}{2}c \quad (9)$$

The equilibrium price level π^* is obtained by plugging this expression back into 8, the central bank reaction function:

⁹In effect, the tradable sector should weight the gain in purchasing power by following the nominal wage increases in the nontradable sector against the cost incurred in terms exchange rate volatility. In theory, when nominal stability is very important for exporters (high λ), they could decide to target the international price shock when deciding over their sectoral wage increases. However, I assume that the effect of the individual wage-bargainer in the tradable sector on the nominal exchange rate e is negligible, so it will never be able to stabilize unilaterally the exchange rate. Later I discuss at length why it is very unlikely that tradables will manage to unilaterally impose a "de facto peg".

¹⁰The reason for this is that the effect of wage increases on unemployment (via the central bank's reaction function) is small if the union's wage agreement is circumscribed to a small portion of the economy, but grows as the same wage agreement applies to larger portions of the labor force.

$$\pi^*(FLOAT) = (1 - \iota) \left(\frac{1}{2} - \frac{1}{2}c \right) \quad (10)$$

This is the equilibrium price level in a floating regime. By taking the derivative of this expression with respect to c , we can see how the price level changes as a response to variation in the degree of wage bargaining centralization:

$$\frac{\partial \pi^*}{\partial c} = -\frac{1}{2} + \frac{1}{2}\iota \quad (11)$$

The negative sign of this expression indicates that *higher levels of centralization reduce the equilibrium price level*. Centralization of wage bargaining, by making unions more aware of the unemployment consequences of their sectoral agreements, induces wage restraint, which guarantees lower prices. This effect is however smaller when the monetary authority is particularly concerned with inflation (high ι). The reason for this result is that, when confronting a nonaccommodating central banker who cares little about the employment consequences of low inflation, unions will have an extra incentive to exercise wage restraint, since they will suffer sooner the (undesired) employment consequences of militant wage demands. What this implies is that these two institutional devices (coordination of wage bargaining and nonaccommodating central banks) can be understood as substitutes (Iversen 1999): price stability can be achieved either directly by establishing a credible monetary authority that cares little about the negative consequences of a restrictive monetary policy in terms of unemployment, or indirectly by centralizing wage bargaining¹¹.

Let us now examine the same interaction between wage bargainers and monetary authorities under a fixed exchange rate regime.

The immediate consequence of the exchange rate commitment is that it alters the conduct of monetary policy. The central bank, as in the floating case, will minimize unemployment and inflation as dictated by its loss function (2). But monetary policy must now also secure a stable exchange rate. By definition, this is only achieved if the domestic price level of tradables (π^T) equals the international price level (π^{INT}) (otherwise, changes in the nominal exchange rate are necessary to restore balance-of-payments equilibrium). Since the international price level is zero on average, the average price level selected for tradables will be, also on average, zero. In other words, the monetary authority becomes completely unaccommodating with respect to exporters'

¹¹For a review on the different theories on the interaction between central bank independence and wage bargaining institutions see Franzese (2002a, chapter 4, and 2002b)

and import-competers' wage demands. Given that the general price level can be decomposed as the weighted sum of inflation in each sector ($\pi = \phi\pi^{NT} + (1 - \phi)\pi^T$), where ϕ measures the size of the nontradable sector, inflation under a peg will simply equal the price level of nontradables, weighted by its relative size: $\pi(FIX) = \phi\pi^{NT12}$. If the whole economy is composed of nontradables, this reduces to the floating example (central bank's monetary policy is geared completely towards domestic objectives, and the exchange rate is irrelevant because there are no tradable goods). If, in the other extreme, all sectors are tradable, monetary policy is completely constrained by the need to keep the level of prices in line with international ones.

Confronted with a completely nonaccommodating monetary authority, wage bargainers in tradables will never demand wage increases beyond the international price level. Note that, in contrast with the situation under a float, the nonaccommodating monetary stance of the central bank does not require coordination between wage bargainers to achieve wage restraint in tradables. The reason is that any individual wage bargainer in this sector that decides to increase wages beyond the international price level will be simply wiped out by foreign competition.

Under a peg regime, therefore, strategic wage bargaining is only *available* to nontradables. This implies that the relationship between unemployment and wage increases in nontradables can now be written as

$$U(FIX) = \phi w^{NT} - \pi \tag{12}$$

This yields a new expression for the central bank reaction function:

$$\pi = (1 - \iota) \phi w^{NT} \tag{13}$$

Given total wage restraint in tradables, the central bank will only respond to nominal wage demands in nontradables, weighted by the relative size of this sector(ϕ):

With this new unemployment expression and the new central bank reaction function, unions' optimal wage increase under a peg is¹³

¹²Note that this implies that, for any positive value of the overall price level, the prices of nontradables will be even higher, $\pi^{NT} = \frac{\pi}{\phi}$, by an amount proportional to the size of the tradable sector ($1 - \phi$).

¹³Unions now select the wage nominal increase that maximize the following expression: $-\frac{1}{2}(\phi cw - (1 - \iota) \phi w) + \frac{1}{2}(w - (1 - \iota) \phi w)$

$$w^{NT*}(FIX) = \frac{1}{2} - \frac{1}{2}c\phi \quad (14)$$

As before, substituting the wage demand in 13 for 14 yields the equilibrium price level under a peg regime:

$$\pi^*(FIX) = (1 - \iota) \phi \left(\frac{1}{2} - \frac{1}{2}c\phi \right) \quad (15)$$

The derivative of this expression with respect to c yields the effect of centralization of wage bargaining on prices under a fixed exchange rate regime:

$$\frac{\partial \pi^*}{\partial c} = - \left(\frac{1}{2} - \frac{1}{2}\iota \right) \phi^2 \quad (16)$$

When compared with 11, expression 16 indicates that the effect of centralization on prices is smaller under a peg than under a float ($0 < \phi < 1$). It also shows that the wage-restraining effect of centralization shrinks as the tradable sector ($1 - \phi$) expands. For low levels of trade exposure (high ϕ), centralization of wage bargaining reduces the price level in the same degree as under a floating exchange rate regime¹⁴. But when the size of the tradable sector looms larger, the salutary consequences of centralization of wage bargaining on domestic inflation decrease. As a result, increases in the weight of tradables in the economy means that higher levels of centralization will be required to provide the same degree of wage restraint in the nontradable sector.

2.4 Comparison of regimes

We are finally ready to answer the original question: which regime will the internationally-oriented sector of the economy prefer, and under what circumstances? To do so, we just have to compare the exporters' expected utilities given the equilibrium real wages and unemployment levels under a float and under a peg, and see how the relative value of these utilities vary as the value of model parameters value change.

When choosing between a fixed and a floating exchange rate regime, exporters face a fundamental trade-off: they must choose between minimizing the relative real wage

¹⁴It is worth noting that we are only considering the effect of centralization of wage bargaining among nontradables. This is so because tradables in a fixed exchange rate regime are assumed to be inherently unable to push up wages, and hence cannot participate as strategic actors in wage-setting. If, as one could argue, higher levels of centralization are also associated also with a higher influence of tradables in wage bargaining across the economy, the main result of the model (i.e. that centralization makes the exporting sector to embrace fixed exchange rates) would be further strengthened.

loss associated with a peg regime or limiting the harm caused by nominal exchange rate volatility. When the real wage concern dominates, a floating exchange rate regime will be more attractive. When nominal stability is more important, a fixed exchange rate regime will be instead the sector's preference. Any variable that aggravates the "real wage loss" problem will be thus associated with greater preferences for floats¹⁵. This is the why lower levels of centralization of wage bargaining and central bank conservatism make exporters more fond of flexible exchange rate regimes. As they increase the equilibrium price level (and hence the tradables' real wage loss under a peg), so does the relative costs of a peg. On the other hand, any change that brings about a greater cost of nominal instability, such an increase in the γ parameter, or a greater internationalization of the economy ($1 - \phi$) will, by amplifying the gains from pegging, make exporters lean towards this type of exchange rate arrangement.

Table 1 summarizes the marginal effects of higher values of each of the model parameters on the exporters' exchange rate preferences.

Table 1: Marginal Effects on Exporters' Preferences Towards Exchange Rate Regimes

| Parameter(x) | $\frac{\partial W_{EX}(FLOAT)}{\partial x}$ | $\frac{\partial W_{EX}(FIX)}{\partial x}$ | Effect on Preferences |
|---|--|--|-----------------------|
| Sensitivity to Nominal Exchange Rate (γ) | $\phi^2 \left(\left(\frac{1}{2} - \frac{\iota}{2} \right) c - \left(\frac{1}{2} - \frac{\iota}{2} \right) \right) - \frac{1}{\phi^2} + 1$ | $\phi \left(\left(\frac{1}{2} - \frac{\iota}{2} \right) - \left(\frac{1}{2} - \frac{\iota}{2} \right) c \phi \right)$ | Fix |
| Size of Nontradables (ϕ) | $\gamma \left(\frac{2}{\phi^3} + \phi (c(1-i) - (1-i)) \right)$ | $(2c\phi - 1)(1 - \gamma) \left(\frac{1}{4} - \frac{\iota}{4} \right)$ | Float |
| CB Conservatism (ι) | $\phi^2 \gamma \left(\frac{1}{2} - \frac{\iota}{2} \right)$ | $\left(\frac{1}{4} - \frac{1}{4} c \phi \right) (\phi - \phi \gamma)$ | Fix |
| Centralization of WB (c) | $\left(\frac{1}{2} - \frac{\iota}{2} \right) \phi^2 \gamma$ | $\left(\frac{1}{4} - \frac{\iota}{4} \right) \phi^2 (1 - \gamma)$ | Fix |

Although formal proofs the net results presented in the last column are provided in the Appendix to this chapter, it is nevertheless useful to present the intuitions behind them.

¹⁵Holden's (2002) and Varianen's (2001) models arrive essentially at a similar conclusion: tradables' real wage is negatively affected by a fixed exchange rate regime. However, they do not include in their model the standard benefit that this sector might derive from nominal currency stability.

Unsurprisingly, the sensitivity to the nominal exchange rate is associated with a preference for pegs. Greater sensitivity to currency volatility lowers the utility received under a float ($\frac{\partial W_{EX}(FLOAT)}{\partial \gamma} < 0$) because this regime delivers a more volatile exchange rate. Under a peg, however, greater sensitivity to changes in the exchange rate increase the exporters' welfare because the relative weight of the real wage loss is reduced ($\frac{\partial W_{EX}(FIX)}{\partial \gamma} < 0$). As a result, as the export sector becomes more concerned with nominal stability, they tend to prefer fixed to floating exchange rate regimes.

The effect of the size of nontradables on the exchange rate preference of the exporting sector is less obvious. Under a float, a larger size of the nontradable sector is unambiguously associated with a greater utility $\frac{\partial W_{EX}(FLOAT)}{\partial \phi} > 0$, as greater exposure to international shocks increases currency volatility. Under a fix, however, the size of nontradables have two counterweighting effects: on the one hand, a smaller size of nontradables incentivates wage militancy in that sector, as the central bank responds in a *de facto* more 'accommodating' fashion to wage demands. However, a smaller size of nontradables also implies that the aggregate effect of this new structure of incentives will be smaller too. As a result, the welfare effect of an increase in the size of the nontradable sector in the economy for exporters under a peg is ambiguous. It can be shown, however, that when this effect is positive, it will never make the utility under a peg greater than the utility under a float i.e. an increase in ϕ might lead to change in preference from a peg to a float, but never the other way around.

Anti-inflationary preferences of the central bank are, both under a float and under a peg, associated with welfare gains for the exporting sector ($\frac{\partial W_{EX}(FLOAT)}{\partial \iota} > 0$ and $\frac{\partial W_{EX}(FIX)}{\partial \iota} > 0$), but for different reasons. In a fixed exchange rate regime, a nonaccommodating monetary authority reduces wage militancy in nontradables, and hence raises the real wage of tradables. In a floating exchange rate, in contrast, the salutary effect of a conservative central bank derives from the reduction in the exchange rate volatility that the lower price level brings about. However, because this effect is tempered by the degree of exposure to the international economy, it will never be strong enough to spur a change in preferences in favor of a floating exchange rate regime. As a result, higher degrees of monetary conservatism will invariably lead to stronger preference for pegs in the exporting sector.

Similarly, centralization of wage bargaining, our main parameter of interest, improves exporters position under both currency regimes ($\frac{\partial W_{EX}(FLOAT)}{\partial c} > 0$ and

$\frac{\partial W_{EX}(FIX)}{\partial c} > 0$). From expressions 11 and 16, centralization lowers the general price level, which in turn reduces the expected exchange rate volatility under a float, and the real wage loss under a peg. This latter effect dominates: As in the previous case, however, it can be shown that while higher levels of centralization might, under a certain range of model parameters, make exporters change their preference from a float to a peg, the opposite will never occur. The intuition behind that result is straight forward: for the effect on volatility to be greater than the effect on real wage loss, exporters have to be extraordinarily concerned about exchange rate volatility (γ must be very high). But if currency stability is such an important concern for exporters, then a fixed exchange rate regime will be preferable anyway (as the previous result for γ shows). Wage bargaining centralization, therefore, will be associated with stronger preferences for pegs on the exporting sector.

In order to illustrate the impact of these parameters on exporters' exchange rate regime preferences, compare their magnitudes, and analyze how they interact with one another, figures 3 through 5 plot the preferred regime for exporters under different combinations of a pair of variables, keeping the remaining parameters of the model constant. Table 2 describes the parameter values at which the nonrepresented variables in each graph have been fixed.

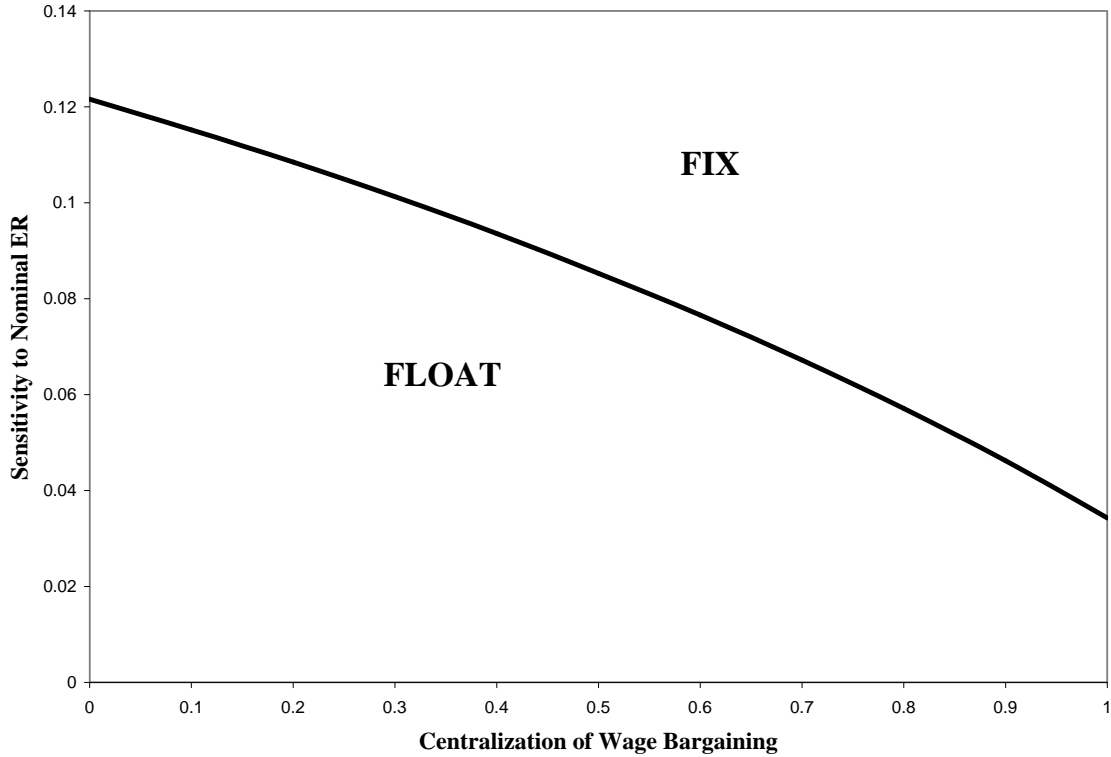
Table 2: Parameter Values Used for the Numerical Examples

| Variable | Value |
|----------|-------|
| ϕ | 0.8 |
| ι | 0.5 |
| γ | 0.1 |

Figure 3 shows the utility-maximizing exchange rate regime for the exporting sector under different values of centralization of wage bargaining (c) and sensibility to nominal instability (γ). As nominal instability becomes more of a concern for exporters, a fixed exchange rate regime becomes more attractive. But for a given level of exchange rate 'sensitivity', greater centralization of wage bargaining also make exporters more favorable to pegs.

The next graph performs a similar exercise comparing the effects of centralization of wage bargaining (c) and the size of the tradable sector ($1 - \phi$). The figure shows that the exchange rate regime preference of the exporting sector is a function of the size of the tradable sector. As the economy becomes more exposed to the international

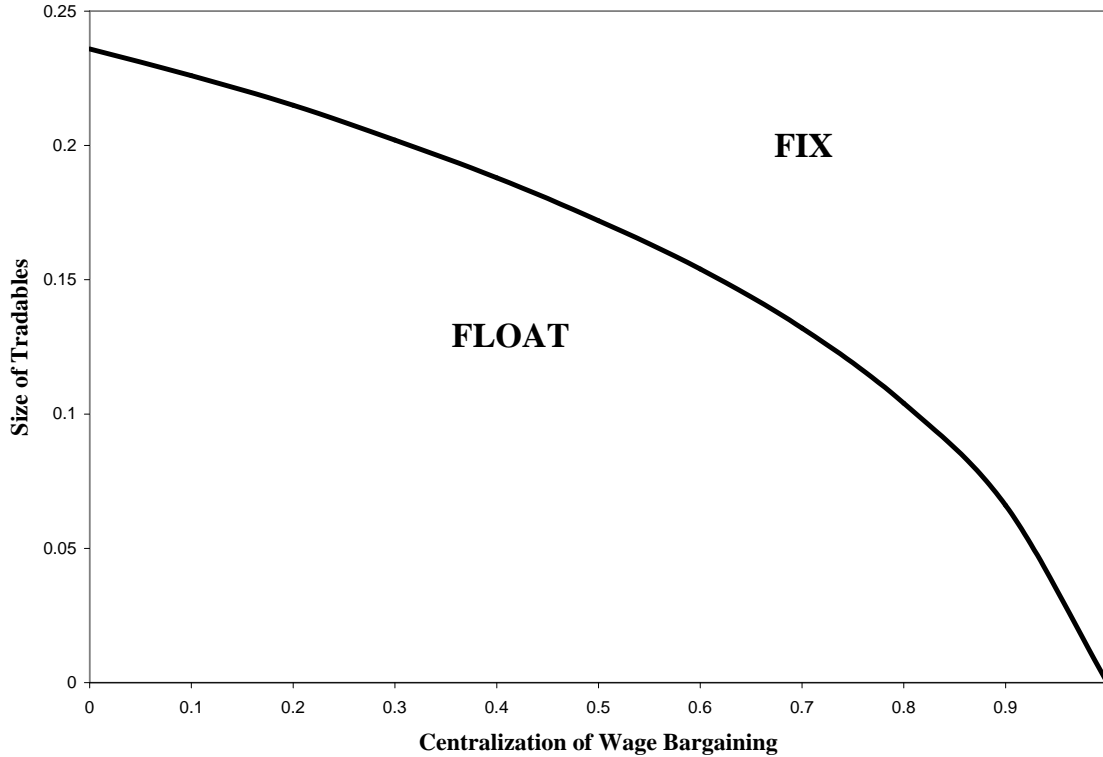
Figure 3: Sensitivity to Nominal Volatility (γ), Centralization of Wage Bargaining (c), and Exporters' Exchange Rate Regime Preference



economy, lower levels of centralization are required to make a fix more desirable than a float. As the OCA theory would predict, high levels of 'exposure' (i.e when nontradables represent a small fraction of the economy), the costs of floating relative to fixing become too prohibitive (for this sector). But the negative slope of the indifference line in figure 4 shows that the exact point at which exporters will lean towards a peg is affected by the level at which wages are negotiated. Because centralization fosters wage militancy and thus reduces inflation, the real wage costs associated with a peg are reduced. As a result, for high levels of centralization of wage bargaining, king, for a similar size of the nontradable sector, a fixed exchange rate more preferable as centralization increases.

Finally, figure 5 looks at the joint effect of centralization of wage bargaining and the degree of conservatism of the central bank. Again, centralization makes exporters more favorable to pegs, but the degree of aversion to inflation of the central bank is not inconsequential for this choice. Nonaccommodating central banks (high ι), by imposing wage discipline on unions in the nontradable sector, make a fixed exchange rate regime

Figure 4: Size of the Tradable Sector ($1 - \phi$), Centralization of Wage Bargaining (c), and Exporters' Exchange Rate Regime Preference

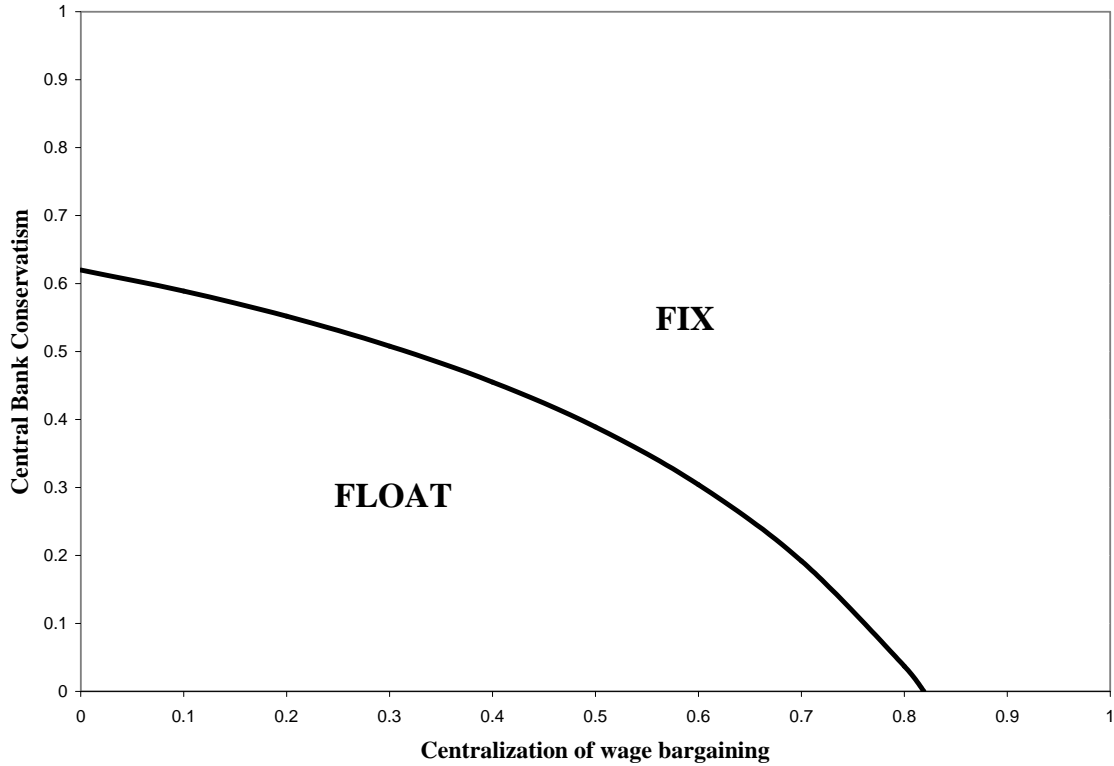


less costly in terms of relative wages for the exporting sector¹⁶. The more accommodating the central bank becomes (the more it cares about unemployment relative to prices), the more militant unions in nontradable become, and the more costly will it be a fixed exchange rate regime for exporters. As a result, exporters will only prefer pegs if greater levels of centralization of wage bargaining compensates for the more accommodating nature of the central bank. In other words, as the negative slope of the 'indifference' line illustrates, there are two ways of achieving wage restraint (which is what makes a fixed exchange rate regime attractive for exporters): a nonaccommodating monetary authority, and a centralized wage-bargaining system. Under high values of these two parameters, the preference for pegs of the internationalized sector intensifies.

All in all, what all these numerical examples highlight is that higher levels of wage

¹⁶This exemplify the fact that higher levels of central bank conservatism and centralization of wage bargaining can be understood as policy substitutes, as previously argued.

Figure 5: Conservatism of the Central Bank (ι), Centralization of Wage Bargaining (c), and Exporters' Exchange Rate Regime Preference



bargaining centralization should be associated with more positive attitudes of the exporting sector towards fixed exchange rate regimes. We have also identified some factors that make floating a relatively more attractive option for this group: a smaller size of the tradable sector, an accommodating central bank which does not punish wage militancy in nontradables, or a limited sensitivity of the sector to nominal changes of the exchange rate. The numerical simulations show, however, that the effect of changes in all these parameters on the exporters' propensity to prefer flexible regimes can be circumvented, or at least mitigated, by centralizing the wage-setting. In other words, centralization of wage bargaining *lowers the conditional requirements* for which a fixed exchange rate regime is preferred by exporters: when wage setting is very centralized, a fixed exchange rate regime might become the exporters' choice even when the sector is not strongly affected by nominal currency fluctuations, the economy is internationally isolated, or the central bank is not particularly anti-inflationary.

2.5 Summarizing the argument

Let us recap by dissecting the logic of the model. To start with, the model assumes that, in principle, a fixed regime is preferred by exporters because it eliminates volatility in the exchange rate, which facilitates international transactions (at least with the countries within the same monetary area). But, besides this 'benefit', the model also incorporates a second and less benign consequence that a fixed regime might have on tradables (exporters and import-competers). Under a peg, the obligation to keep tradable prices in line with international ones automatically disciplines wage behavior in this sector. This, in turn, alleviates the anti-inflationary 'burden' on the central bank: since a portion of the economy exercise wage restraint *motu proprio*, the monetary authorities, *to achieve the same degree of price stability*, will behave in a more accommodating way when confronting wage demands originated on the the other sector (non-tradables). Aware of this *dovish* stance, wage-setters in nontradables will accordingly exercise less wage restraint than before, because the relationship between their wage demands and unemployment weakens. Finally, the resulting higher nominal wages and prices in the nontradable sector unambiguously harm tradables, since their wages have been *de facto* indexed to international price developments. This mismatch between high nontradable prices and stagnant tradable ones implies a real wage gain for those in the latter sector, and a real wage loss for those in the former. This second distributional consequence of a fixed exchange rate regime –widely recognize in the literature on preferences towards exchange-rate *levels*¹⁷, but often neglected in political-economy analyses of exchange rate regime choice– is, I would argue, key to understand the contingent nature of the internationalized sector's support for fixed exchange rate regimes across political-economy contexts. As the model shows, the magnitude of this second-order distributional effect depends on some key institutional variables – most notably, the degree of conservatism of the central bank, and the level of centralization of wage bargaining.

To see why centralization matters for exchange rate regime choice, one has to understand first what the unions' rationale for wage militancy is. Unions behave militantly (that is, ask for high wages) because while the benefits associated with nominal wage increases are fully internalized by the individual wage-setter, the employment conse-

¹⁷As this literature has emphasized (see Frieden and Broz 2006 for a brief review) the choice over the *level* of the exchange rate involves a trade-off between competitiveness and purchasing power, in which different groups should be expected to hold conflicting preferences –exporters and import-competers favoring a devalued currency and consumers an overvalued one.

quences, which are spread across the economy, are not. As most of the neocorporatist literature of the 80s argued¹⁸, the degree of centralization of wage bargaining crucially affects the magnitude of this mismatch between particularistic gains and collective losses. When unions are very atomized, their wage agreements would have no discernible effect on the central bank's policies, and thus will be little connected to total employment. Under such circumstances, individual unions will find in their interest not to exercise wage restraint, even though the same behavior across the economy will translate into undesirable high levels of unemployment. Employment concerns will however become more prominent for unions as the same wage agreements cover more sectors of the economy, i.e. as wage bargaining becomes more centralized. Therefore, *ceteris paribus*, wage restraint will be more likely to be exercised under high levels of centralization of wage bargaining.

The fact that wage restraint has different distributional consequences under a peg than under a float is what makes centralization central to understand exchange rate regime preferences. Under a float, low centralization is not harmful for tradables because wage militancy *lifts up all boats equally*, i.e. no differences in wages between tradables and nontradables develop. This contrasts with the situation under a peg, where wage militancy can be indeed very harmful for tradables. Centralization, by curbing wage militancy, automatically limits the distributional wage effect of fixed exchange rate regimes, making exporters more inclined to such currency arrangements. Under high levels of centralization, exporters will be able to realize the benefits of a stable nominal exchange rate, without suffering the costs of high nontradable prices¹⁹.

Two main hypotheses emerge out of this theoretical exercise. First, the internationally-oriented sector of the economy will be more likely to develop pro-fixed exchange rate regime preferences in contexts with high levels of wage bargaining centralization and conservative (independent) central banks. Second, under the assumption that economic integration politically empowers the most internationalized sectors, the choice

¹⁸The 'econompassing' logic is often associated with the classic Olsonian argument about the provision of collective goods.. The argument that workers' behavior will be less harmful for the economy only when their representative organizations *encompass* a majority of the labor force lies at the heart of the neocorporatist literature of the 80s (Cameron 1984, Lange and Garrett 1985). According to this literature, the 'politics of concertation' required by the stagflation of the 70s were only feasible in contexts where such corporatist institutions existed, what in turn explains the better macroeconomic performance of corporatist countries.

¹⁹Centralization has the same 'hollowing' effect on import-competers, but as this group does not benefit from currency stability, the model predicts that they will never prefer a fixed exchange rate regime. All that can be said is that under high levels of wage bargaining centralization, import-competers *dislike less* a fixed exchange rate regime.

of the exchange rate regime will be more dependent on this group's preferences as the economy opens up to international markets. Accordingly, trade integration should be associated with the adoption of fixed exchange rate regimes when wage bargaining is highly centralized and the monetary authority is independent, but with adoptions of more flexible currency arrangements otherwise. In the remaining of the paper I test the empirical validity of the second of these theoretical claims.

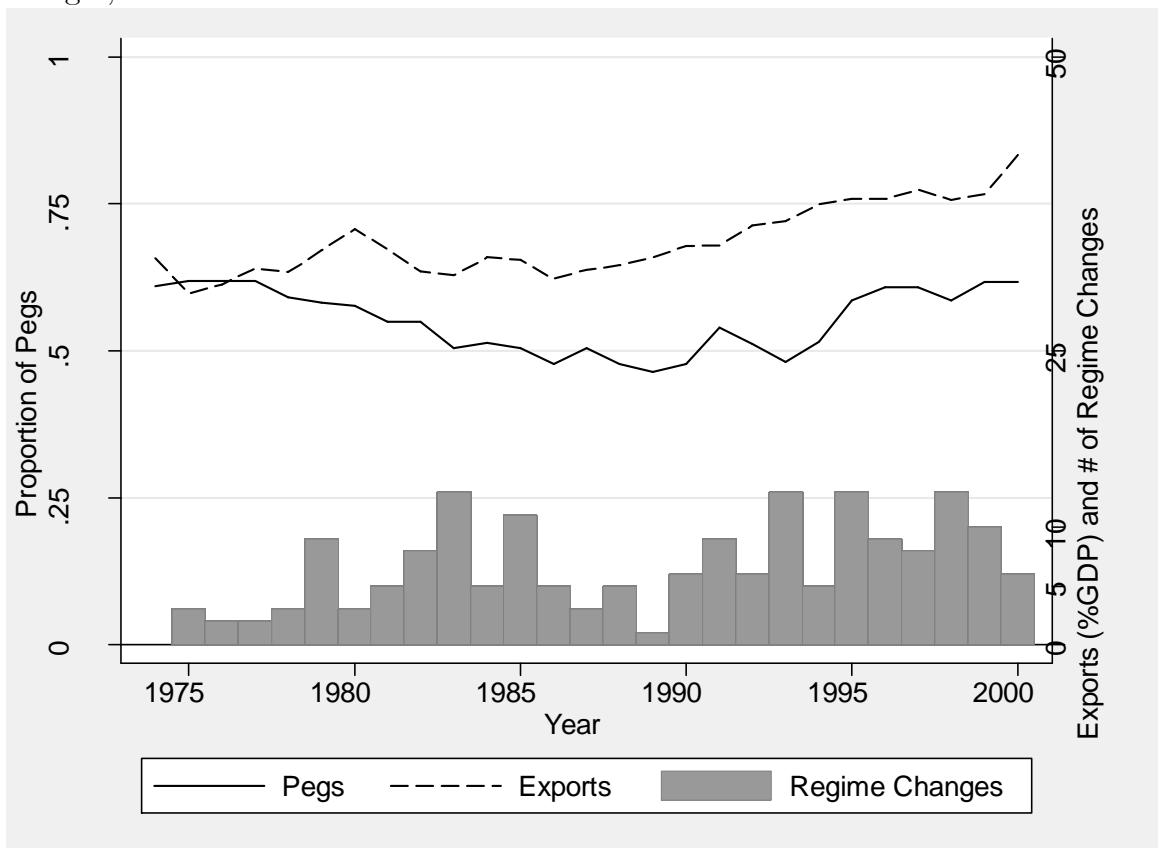
3 Evidence

Figure 6 presents the evolution of the mean level of exports (as percentage of GDP), the proportion of countries under de facto exchange rate pegs, and the number of regime transitions from 1975 to 2000. As the figure clearly shows, the worldwide expansion of trade links since the 80s has not been corresponded by a clear tendency in the adoption of a particular kind of exchange rate regime. At face value, this already contradicts the main postulate of OCA theory, which contends that as the incentives to peg should be greater as economic internationalization increases. From a global perspective at least, exchange rate pegs are as popular today as they were at the collapse of the Bretton-Woods era. Interestingly enough, the graph also shows that this has not been the result of lack of regime changes during this period. This must imply that some countries that were under exchange rate pegs decided to adopt more flexible currency arrangements, while others decided to move in the opposite direction. Curiously, studies aimed to analyze these changes in particular regions have blamed trade-related pressures for these opposite trends. A larger degree of exposure to international prices make demands for devaluation more politically powerful in some cases, therefore increasing the attractiveness of floats in some contexts (Brock Blomberg et al 2005, Klein and Marion 1997), but at the same time the intensity of trade links has been associated with greater demand for exchange rate stability, and thus pegs, in others (Frieden 2002)²⁰.

The theory advanced here offers one possible way of solving this puzzle. According to this theory, the political groups benefitted by trade integration are not expected to prefer always the same exchange rate regime. On the contrary, the institutional contexts they live under will lead them to exert preferences for fixed exchange rate

²⁰For a review of the political economy literature on exchange rate policy, see Broz and Frieden 2001, 2006..

Figure 6: Proportion of exchange rate pegs, mean level of exports and number of regime changes, 1975-2000.



regimes in some cases, but for more flexible arrangements in others. In what follows I try to see whether the effect that trade integration has on the exchange rate regime is in fact mediated by the insitutional parameters discussed in the model: central bank independence and coordination of wage bargaining.

3.1 Data and Methods

As conventional in most recent analysis of exchange rate policy, instead of the IMF purely declarative measure, I use as dependent variable a de facto measure of exchange rate regime developed by Reinhart and Rogoff (2003). These authors have convincingly shown that governments' actual exchange rate policies often deviate from their declared regime as reported in the IMF's Annual Report on Exchange Rate Arrangements and

Exchange Rate Restrictions.²¹ Also, real world exchange rate regimes, rather than being pure 'pegs' or 'floats', can often be characterized as 'intermediate regimes' – although the 'hollowing of the middle' (Eichengreen 1994) hypothesis contends that intermediate arrangements are more difficult to sustain in the era of free international capital mobility²². Figure ?? and the remaining of the empirical analysis uses one of the most standard dichotomizations one could do from the Reinhart and Rogoff 14-points classification. I classify as 'pegs' those regimes ranging from to 'no separate legal tender' (i.e. the more extreme form of monetary unification) to a 'de facto crawling band that is narrower than or equal to +/-2%), and as 'floats' all the remaining more flexible regimes.

To concentrate on the evolution of exchange rate regimes after the collapse of the Bretton-Woods monetary system, the time-span of the dataset goes from 1974 to 2000. The countries included are OECD countries for which comparable data on the two main institutional parameters of interest (centralization of wage bargaining and central bank independence) exist.

Since the dependent variable is dichotomous, and the data is in time-series form, I follow the model proposed in Beck et al (1998), and estimate the following logit model to control for duration dependence.

$$P(y_{it} = 1 | \mathbf{x}_{it}) = \frac{1}{1 + e^{-(\mathbf{x}_{it}\beta + \kappa_{t-t_0})}}$$

, where κ_{t-t_0} is a dummy variable marking the length of the sequence of float years that precede the current observation²³. In practical terms, this method requires the inclusion in the logit specification of a series of dummy variables indicating whether an event was experienced at t-1, t-2, t-3, etc... To limit the number of coefficients to be estimated, Beck et al recommend to substitute these dummies for a variable indicating

²¹Astonishing as it sounds, Rogoff and Reinhart claim that the declared policy does no better at predicting the actual policy than a purely random guess. Alesina and Wagner (2005) analyze the economic and (mainly political) determinants of the degree of deviation from declared to actual policy.

²²In reality, this hypothesis argues against the sustainability of one specific type of intermediate regimes (namely the so-called "fixed but adjustable" regimes), because of its intrinsic vulnerability to speculative attacks. Other types of intermediate currency arrangements (as managed floats, in which the monetary authority intervenes to adjust the value of the nominal exchange rate, but without prior commitments to specific parities) are not all threaten by increased capital mobility. This could explain why the 'hollowing out of the middle' hypothesis has received not very strong empirical support (see Masson 2001, Corden 2002; see Fischer 2001 for an interpretation of the data in line with the 'hollowing out of the middle' hypothesis).

²³For more details, see Beck et al (1998)

the number of zeros (years under float) observe prior to each observation, plus three cubic splines. and years. In all models that follow, three cubic splines and the number of years under float are included in the estimations (coefficients not shown).

As controls, I include the economic variables that have been found in the economic literature to be associated with a tendency to adopt pegs: the amount foreign liabilities as a proportion of money (more foreign liabilities make floats more costly and thus would make countries more attracted to pegs, as in Calvo and Reinhart 2002), size measured as the log of the GDP (small countries benefit less from the monetary autonomy that a float regime guarantees, as in Honkapohja and Pikkariainen 1994), the previous level of inflation (pegging the currency to a foreign anchor has been used by many governments as a way of borrowing monetary credibility to control domestic inflation, see Corden 2002, Tavlas 2000), and the proportion of exports constituted by agricultural raw products, to control for the expected salience of 'pass-through' concerns on exporters (these kind of tradable goods, highly sensitive to real price changes, should lead exporters to value less nominal stability, see Frieden 2002) Finally, recent studies in international political economy (Simmons et al 2006) emphasize the interconnected nature of economic policies across countries. Since the incentives to adopt a fixed exchange rate regime might depend on the number of countries that also have a peg, I include as a control the proportion of the sample GDP that is covered by fixed exchange rate regimes²⁴.

To test the two main theoretical propositions of the model, I include in the specification interacted terms between the institutional variables and the degree of export intensity. I measure central bank independence or conservatism with the legal independence index developed by Cukierman (1992), and extended by Guillen and Polillo (2005). The indicator of the degree of centralization of wage-setting is taken from Golden and Wallerstein (2006)²⁵²⁶. If, as the model suggest, centralization of wage bargaining and/or the degree of political conservatism of the central bank make the international sector more attracted to pegs, and the level of exports proxies for the

²⁴In fact, given the externalities produced by exchange rate choices in other countries, this policy area is a perfect candidate for international policy diffusion effects to be significant. The evidence I present below strongly suggest that this the case, and that the null hypothesis of 'policy independence', as Simmons et al. put it, can be easily rejected by the data.

²⁵Data sources and more information about the variables used can be found in Appendix B.

²⁶This index ranges from 1 to 5, with higher values meaning higher levels of centralization. The exact coding is as follows: 1 = plant-level wage-setting, 2 = industry-level wage-setting without sanctions, 3 = industry-level wage-setting with sanctions, 4 = central wage-setting without sanctions, 5 = central wage-setting with sanctions.

political leverage of this sector, then we should expect these interacted terms to be positive.

3.2 Results

Figure 7: Dependent Variable: 1: De facto fixed exchange rate regime. 0: De facto floating

| | (1) | (2) | (3) | (4) | (5) |
|------------------|---------------------|---------------------|---------------------|----------------------|----------------------|
| Exports | -0.063* (0.036) | -0.083 (0.069) | -0.225** (0.070) | -0.436** (0.132) | -0.632** (0.204) |
| CWB | | 0.079 (0.525) | | -0.929 (0.593) | -0.821 (0.680) |
| Exports*CWB | | 0.006 (0.016) | | 0.042** (0.020) | 0.036* (0.021) |
| CBI | | | -9.364** (4.237) | -14.654** (5.252) | -14.871** (6.988) |
| Exports*CBI | | | 0.444** (0.146) | 0.653** (0.197) | 0.738** (0.251) |
| Foreign Liab. | 1.286** (0.359) | 1.312** (0.362) | 1.571** (0.396) | 1.750** (0.429) | 1.534** (0.450) |
| Log GDP | -0.848** (0.384) | -0.703 (0.440) | -1.133** (0.457) | -1.176** (0.555) | -1.813** (0.743) |
| Lagged inflation | 3.409 (6.921) | 1.849 (7.145) | 7.021 (7.803) | 7.024 (8.321) | 13.886 (9.967) |
| Raw Agg Exports | -0.046 (0.081) | -0.028 (0.084) | -0.083 (0.082) | -0.048 (0.092) | 0.255 (0.159) |
| Union Density | | | | | -20.568* (10.640) |
| Exports*Union D. | | | | | 0.491 (0.326) |
| Difussion | 11.864** (5.126) | 12.259** (5.167) | 11.348** (5.247) | 12.786** (5.462) | 16.836** (6.267) |
| Federalism | | | | | -2.751** (1.175) |
| Multiparty govt | | | | | 1.199 (0.732) |
| Pseudo R2 | .7637 | .7658 | .7897 | .7994 | .8216 |
| N | 398 | 398 | 398 | 398 | 385 |

Column (1) in table 7 present the estimates of a simple economic model. Foreign liabilities and the smallness of the economy are significantly associated with the propensity to have a peg regime, as expected. Diffusion, which measures the proportion of the total GDP of countries with fixed exchange rate regimes²⁷ does have a strong and

²⁷In other specifications, I measured 'diffusion' simply as the number of countries that had pegs. When compared to the more subtle measure I use, the substantive results were roughly the same.

highly significant effect: the more countries adopt which is included in The effect of trade integration, measured as the ratio of exports to GDP²⁸, is weakly associated with floats, but the effect is only significant at the 90% level.

Column (2) introduces the first of our hypotheses, by including the degree of coordination of wage bargaining as measured by Golden and Wallerstein and its interaction with the level of exports. However, the interaction of wage bargaining coordination and exports, albeit it has the expected sign, is not statistically significant. Column (3) runs the same model, but with central bank independence instead as the only institutional variable. In this case, central bank independence does seem to mediate the relation between exports and exchange rate regime choice significantly, and in the expected direction.

More interestingly, when the two institutional variables are included in the specification (model 4), the two interacted terms turn to be statistically significant at the conventional levels. In other words, once the effects of central bank independence are controlled for, higher levels of coordination of wage bargaining do seem to turn more positive (or at least less negative, as we will see below) the relation between export intensity and the likelihood of exchange rate pegs. Note also that, once the role of coordination of wage bargaining is included in the specification, the effect of central bank independence is reinforced, but in magnitude and in statistical significance.

The last column of table 7 adds a new set of political controls that could also affect the propensity of a country to adopt a fixed exchange rate regime. Since the argument about the effects of central bank independence and coordination of wage bargaining hinges upon the possibility of workers to push up wages, I control for the degree of unionization, and also interact that variable with export intensity. The interacted term should be negative, indicating that low levels of union density can substitute for the institutional variables discussed before. However, the effect is positive, although not statistically different from zero. This might suggest that, at least for OECD countries, cross-country differences in the ability of workers to influence wages are small enough to overcome the significant effects that these other institutional variables have. I also include in this last estimation dummies for federalism and the presence of multi-party governments. Hallerberg (2003) has argued that central governments in federal

²⁸I operationalize the trade integration measures as the ratio of exports to GDP because this is the variable that better captures the economic salience of the exporting sector, as defined in the model. However, I show below that using the more standard 'trade openness' indicator (imports plus exports as percentage of GDP) does not alter substantively any of the results, which is not surprising given the high correlation between these two variables.

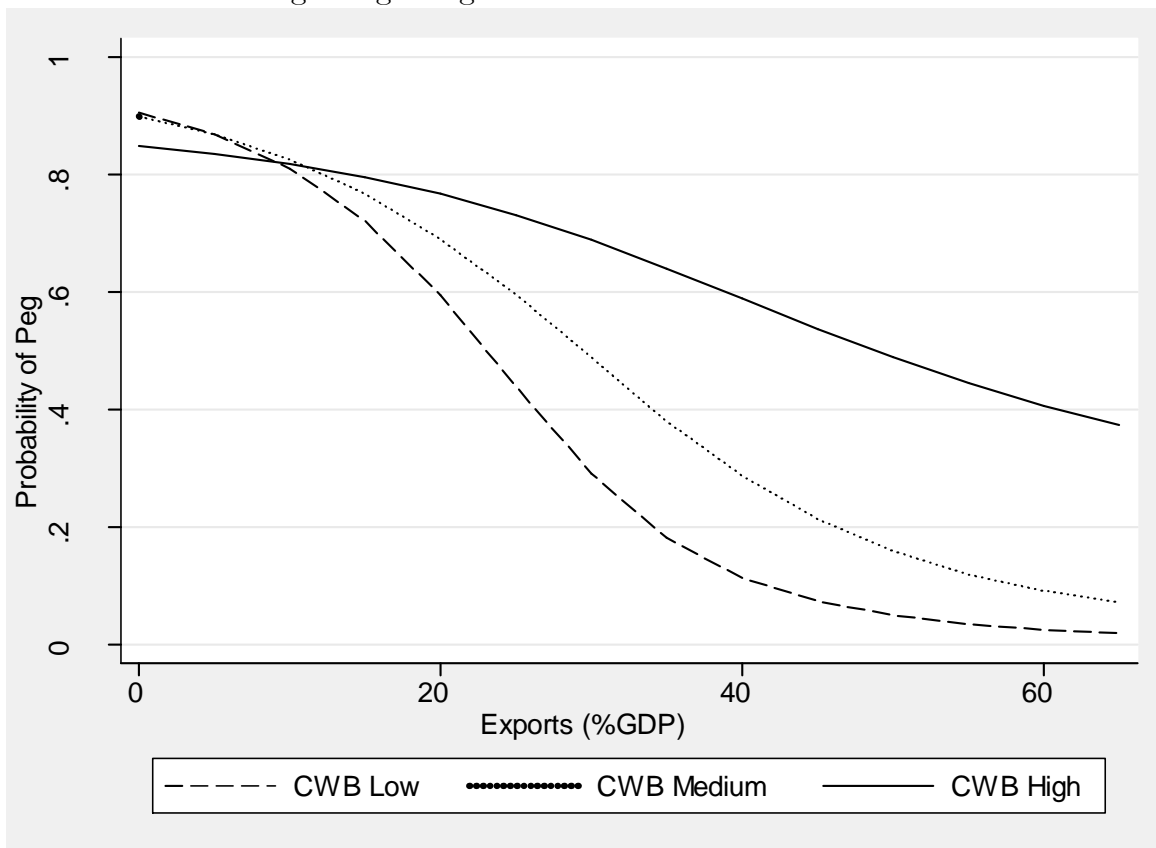
countries prefer floats because their lack of control over fiscal policy makes them very concerned about the control over monetary policy (which requires a flexible exchange rate regime). He also argues that the loss of monetary policy that follows from the adoption of a peg makes single-party governments more likely to prefer floats. While the effect of federalism is in fact negative and statistically significant, no such effect is detected for multiparty governments. More important for our purposes, after the introduction of these controls, the two main parameters of interest (the interacted terms between the institutional variables and the level of exports) remain positive and statistically different from zero.

Since the interpretation of the interacted terms is not straightforward, particularly in nonlinear models, figures 8 through 11 use the estimates from this last model to plot the predicted probabilities of adopting an exchange rate peg for different values of the level of exports as % of GDP. Figure 8 examines the effect of coordination of wage bargaining in that relationship, while figure 9 looks at central bank independence. In all cases the values of the remaining parameters of the model are fixed at their sample means.

Figure 8 shows that higher degrees of coordination of wage bargaining limit the effect that export intensity has on a lower probability of adopting fixed regimes. The model predicts a very high probability of adopting a peg when export exposure is low, independently of the degree of centralization of wage bargaining. As trade integration increases, however, the probability of floats increases, but at different rates, depending on the degree of coordination of wage bargaining. For instance, the model predicts that when exports amount to 40% of the GDP, the probability of experiencing a peg is about .1 if coordination of wage bargaining is at its minimum, but about .6 if coordination of wage bargaining is at its maximum. This heterogeneous effect of trade integration on the probability of adoption of exchange rate regimes is consistent with the theory outlined before.

Figure 9 conducts a similar exercise, but looks at the effect of central bank independence instead. The mediating effect of central bank independence on the relation between trade integration and exchange rate regime choice is even sharper. In line with the expectations from the model, when the central bank is not independent (one standard deviation below the mean), greater exposure to international trade (i.e. greater political leverage of exporters) lead to a higher preference for floats. But when central bank is highly independent (one standard deviation above its mean), the effect of trade

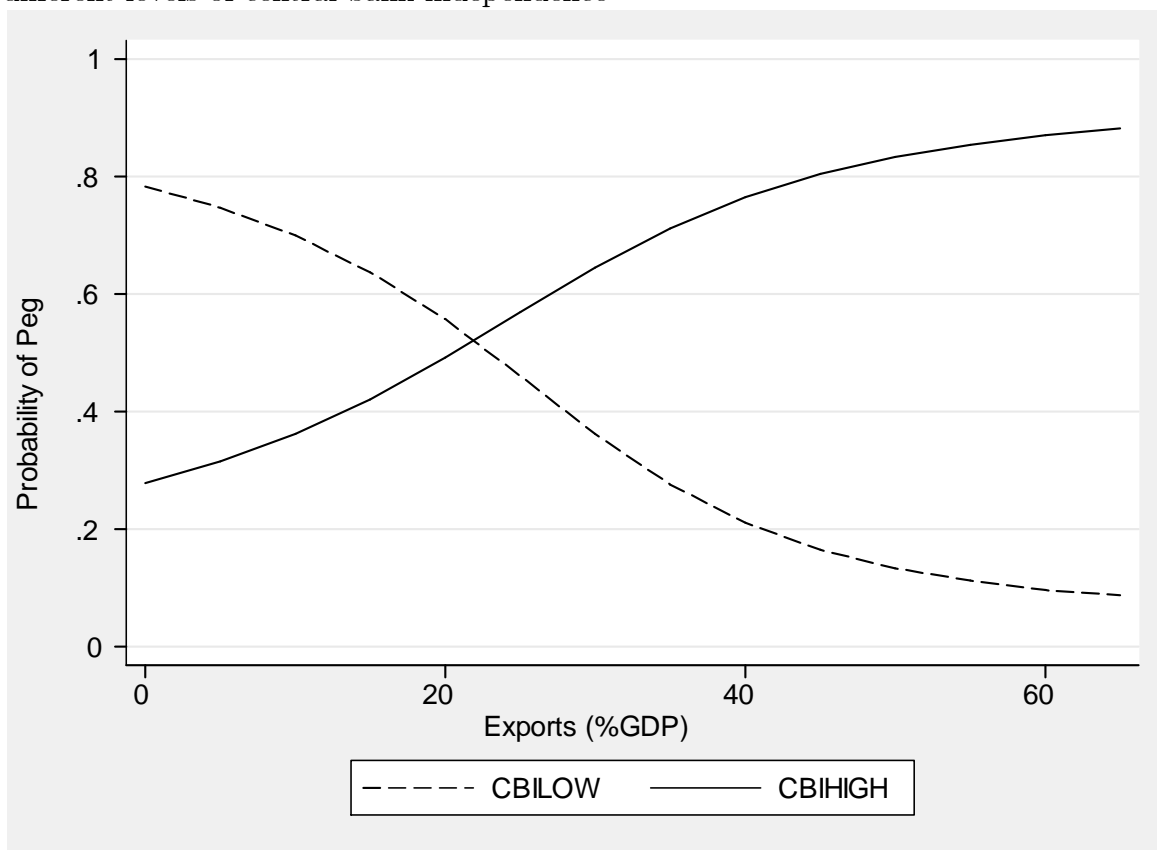
Figure 8: Effect of exports on the probability of adopting a peg under different levels of coordination of wage bargaining



integration on the exchange rate regime choice is reversed: higher levels of exports lead to higher probability of pegs.

Figure 11 plots the joint effect of the two type of institutions that according to the model should affect the exporters preference toward exchange rate regimes. The solid line plots the predicted probability of a exchange rate peg for different values of export intensity when the values of central bank independence and coordination of wage bargaining are one standard deviation below their respective sample means, accompanied by the 90% confidence intervals (again, keeping the remaining covariates fixed at their sample means). The dashed line performs the same exercise, but when these two variables are one standard deviation above their mean instead. does the same. The figure nicely captures the main argument of the paper. At low levels of trade integration, the decision of adopting a peg or a float is not significantly related to the institutions in place: the predicted probability of adopting a peg is higher if central

Figure 9: Effect of the level of exports of the probability of adopting a peg under different levels of central bank independence



bank independence and coordination of wage bargaining is low, but the difference is not statistically significant (the confident level regions overlap). But at higher levels of internationalization, as exporters' preference become more politically relevant, whether a country will have a peg or a float will be greatly determined by the political-economy institutional environment. If central bank independence and coordination of wage bargaining are high, it is very likely that the country will have a fixed exchange rate regime. If, on the contrary, central bank independence is low, and wage bargaining is decentralized, higher levels of exports will be associated with a high probability of a float regime.

Figure 10: Effect of exports on the probability of adopting a peg under the joint effect of high and low levels of central bank independence and coordination of wage bargaining (with 90% confidence intervals).

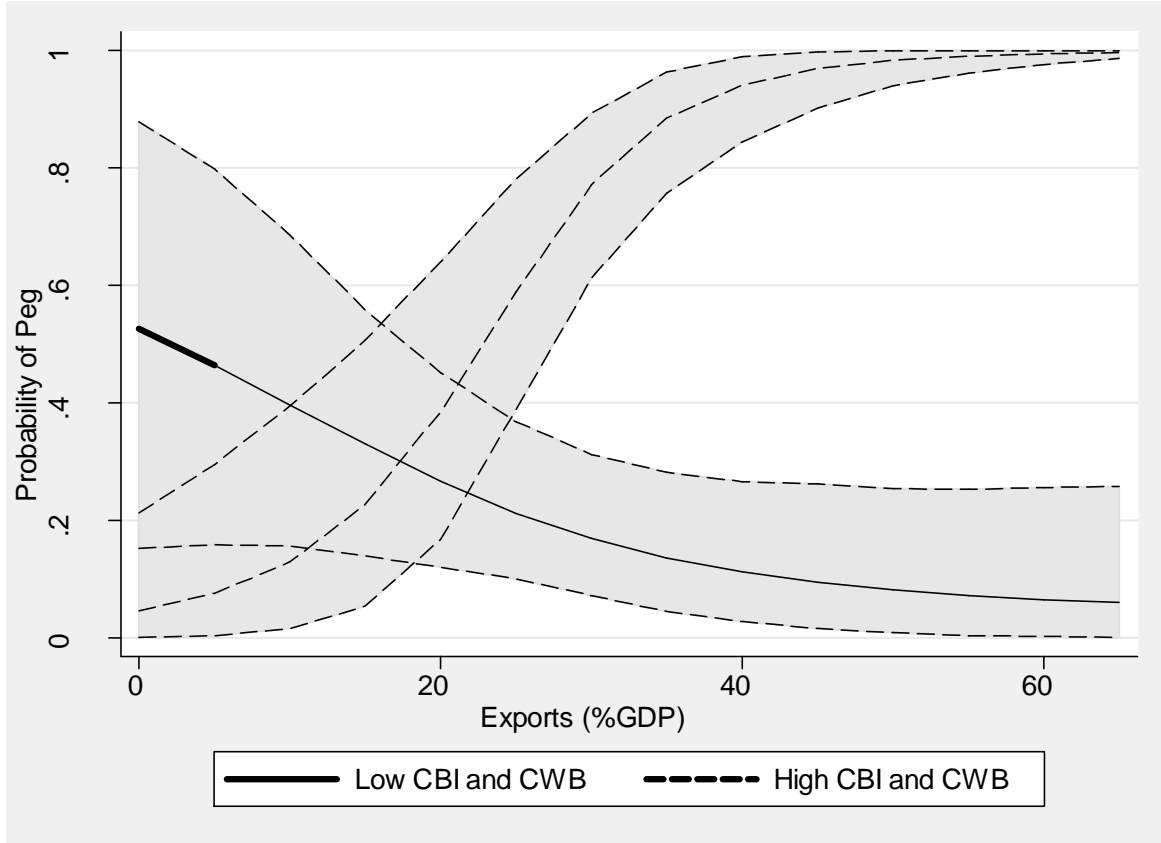


Figure 11:

3.3 Robustness Checks

In this section I perform a series of robustness checks to corroborate the validity of the two mwin findings. In table 12 I replicate model (5) from the previous table but using other measures of wage bargaining coordination or centralization available in the literature. In column 1 ²⁹ I use Iversen’s (1999) measure of centralization, in column 2 I use Kenworthy’s (2001b) time-variant coordination index, and finally, column 3 operationalizes wage bargaining coordination by a 3-point qualitative indicator developed by the OECD (1997). Two results are worth noting. First, the interacted variable is always positive and statistically significant in all three models, and the magnitude

²⁹For a review of the indicators of corporatism, see Kenworthy (2001a, 2003)..

effect is similar to the one reported for the Golden and Wallerstein's indicator used before: Since the highest value of the CWB variable in each of the three models multiplied by the interacted coefficients is always lower in absolute value than the (highly significant) coefficient on exports (first row), higher levels of trade integration lead to higher probability of a floating regime for all values of the CWB variable (keeping all other covariates fixed). But of course, the positive coefficient on the interacted variable shows that the effect is always smaller under high levels of centralization or coordination. Second, the mediating effect of central bank independence as shown in the interacted term remain highly statistically significant in all three models.

Figure 12: DV: De facto peg regime. Different measures of CWB.

| | Iversen | Kenworthy | OECD |
|------------------|----------------------|----------------------|----------------------|
| Exports | -0.517** (0.179) | -0.385** (0.123) | -0.816** (0.263) |
| CWB | -16.697** (7.161) | -1.306** (0.511) | -4.225** (1.743) |
| Exports*CWB | 0.547** (0.247) | 0.050** (0.019) | 0.215** (0.078) |
| CBI | -15.502** (7.414) | -14.768** (6.407) | -25.594** (9.959) |
| Exports*CBI | 0.631** (0.222) | 0.636** (0.214) | 1.056** (0.360) |
| Foreign Liab. | 1.642** (0.619) | 0.970** (0.366) | 2.102** (0.609) |
| Log GDP | -1.824** (0.793) | -0.181 (0.440) | 0.126 (0.598) |
| Lagged inflation | 14.360 (11.575) | 6.145 (6.894) | 17.481** (8.484) |
| Raw Agg Exports | 0.153 (0.158) | 0.051 (0.065) | 0.149 (0.104) |
| Diffusion | 10.621* (5.423) | 7.446* (4.508) | 12.041** (5.371) |
| Federalism | -1.303 (1.256) | -1.031 (0.688) | -0.860 (0.776) |
| Multiparty govt | 1.866** (0.906) | 0.533 (0.595) | 1.155 (0.744) |
| N | 282 | 417 | 401 |
| pseudoR2 | | | |

Table 13 uses, instead of the export intensity variable, the commonly used indicator

of trade openness (exports plus imports as percentage of GDP). Given the high correlation between this and the previous variable, the substantive results obtained before remain unchanged.

Finally, table 14 analyzes whether these results are robust to different categorizations of the dependent variable. The first two columns use the same de facto classification from Reinhart and Rogoff, but with different cut-off points. When the most restrictive categorization is used (column 1), no significant effect of any covariates can be found, with the exception of the diffusion variable. Note however that this is a very restrictive category (only regimes as rigid or more than de facto total pegs qualify)³⁰ When a less rigid definition of peg is used instead (classifying countries who use managed floats as pegs, and floats covering only pure free floating regimes, as in column 3), the results follow very closely the ones reported below: both centralized wage bargaining and central bank independence make a peg more likely as the level of exports increases. It is also worth noting that as the last two columns show, when the declaratory measure of the IMF is used (regardless of the cut-off point used to distinguish between fix and floats³¹), no significant result for our parameters of interest can be found. The fact that virtually none of the economic variables that, according to the literature, are expected to be associated with the choice of exchange rate regime seems to suggest that these dependent variables are in fact bad indicators of actual currency policy.

4 Conclusions

This paper has advanced an institutional theory of exporters' preferences towards exchange rate regimes. In this theory, the choice of the exchange rate regime is assumed to have two consequences for exporters: the monetary rule imposed by a peg limits exchange rate nominal stability (which is positively valued by exporters), but it simultaneously imposes an additional constraint on tradables' wages versus nontradables (which might lead to a real wage loss in the exposed sector). While the acknowledgement of these two effects is little controversial in the political economy literature

³⁰According to the Reinhart and Rogoff data, among OECD countries, only Austria, Belgium, Netherlands and France ever experienced such regimes before 1995..

³¹Column 3 classifies as pegs only countries whose currency is claimed to be pegged to a currency or to a composite of currencies, while column 4 classifies also as pegs countries with intermediate regimes such as managed floating, and includes only 'independent floating' in the flexible category.

Figure 13: Trade as an Explanatory Variable. Dependent Variable: De facto exchange rate peg.

| | (1) | (2) | (3) |
|------------------|---------------------|----------------------|----------------------|
| Trade (% GDP) | -0.030 (0.019) | -0.225** (0.069) | -0.323** (0.104) |
| CWB | | -0.971 (0.608) | -0.822 (0.703) |
| Exports*CWB | | 0.022** (0.010) | 0.019* (0.011) |
| CBI | | -15.132** (5.450) | -14.921** (6.684) |
| Exports*CBI | | 0.345** (0.106) | 0.384** (0.126) |
| Foreign Liab. | 1.273** (0.367) | 1.755** (0.444) | 1.470** (0.463) |
| Log GDP | -0.789** (0.379) | -1.075* (0.560) | -1.699** (0.743) |
| Lagged inflation | 4.357 (6.842) | 7.915 (8.249) | 14.577 (9.923) |
| Raw Agg Exports | -0.037 (0.080) | -0.038 (0.091) | 0.273* (0.155) |
| Union Density | | | -21.833* (11.285) |
| Exports*Union D. | | | 0.264 (0.178) |
| Difussion | 11.906** (5.095) | 13.274** (5.452) | 17.586** (6.317) |
| Federalism | | | -2.797** (1.174) |
| Multiparty govt | | | 1.130 (0.720) |
| Pseudo R2 | .7627 | .7927 | .8212 |
| N | 398 | 398 | 385 |

Figure 14: Different indicators for the dependent ariable: exchange rate peg. De facto and de iure measures, more and less restrictive.

| Dep variable: | Rogoff1 | Rogoff3 | IMF Fix | IMF Fix+Int |
|------------------|-----------------------|-----------------------|----------------------|---------------------|
| Exports | 0.232 (0.214) | -0.620** (0.208) | 0.068 (0.104) | 0.068 (0.079) |
| CWB | -0.669 (2.179) | -2.526* (1.307) | 0.361 (0.576) | -0.199 (0.549) |
| Exports*CBI | -0.021 (0.041) | 0.057** (0.025) | -0.007 (0.020) | 0.007 (0.018) |
| CBI | 21.381 (14.538) | -32.217** (11.876) | 2.478 (3.925) | 0.294 (4.746) |
| Exports*CBI | -0.176 (0.271) | 1.317** (0.513) | -0.058 (0.133) | 0.140 (0.130) |
| Foreign Liab. | 0.431 (0.505) | 1.486** (0.664) | 0.318 (0.309) | -0.328 (0.232) |
| Log GDP | -0.394 (0.862) | -2.390** (0.918) | 0.181 (0.464) | 0.762 (0.519) |
| Lagged inflation | -54.726 (53.028) | 27.574** (9.083) | -22.127** (7.656) | -2.881 (8.615) |
| Raw Agg Exports | 0.327* (0.190) | -0.126 (0.166) | 0.047 (0.102) | 0.275** (0.114) |
| Diffusion | 114.319** (25.111) | 17.537** (4.633) | 26.629** (5.220) | 10.948** (4.059) |
| Federalism | -5.761** (1.840) | 1.353 (1.771) | -1.970** (0.634) | -2.095** (0.941) |
| Multiparty govt | 1.559 (2.914) | 2.334** (1.142) | 1.134* (0.689) | 1.057 (0.697) |
| N | 398 | 398 | 398 | 398 |
| pseudoR2 | .8838 | .8781 | .7958 | .8099 |

on exchange rates, they are seldom analyzed jointly. This paper does that, and proposes a theoretical framework to understand how some institutional features of the political economy affect the salience of the second dimension, and therefore mediate the relationship between trade integration and exchange rate regime choice. When wage bargaining is coordinated and the monetary authority is highly concerned with inflation, exporters' expected real wage loss under a peg will be limited, and they will tend to prefer this type of currency arrangements. In contrast, if such institutions are absent, exporters will lean toward floating regimes, because such regime protects them against the hypothetical real wage loss that they would experience under a peg. If eco-

conomic internationalization magnifies the impact of this group's concerns with regard to exchange rate policy, we should expect trade integration to exert divergent exchange rate regime choices across contexts : pegs would become more popular in countries endowed with these political-economy institutions, and floats where such institutions are weak.

The empirical analysis of the determinants of the adoption of de facto exchange rate pegs in OECD countries seems to corroborate these theoretical claims: export intensity is associated with the adoption of peg regimes in countries with coordinated wage bargaining and, above all, independent central banks, but with more flexible currency arrangements where wage bargaining is decentralized and central banks are politically dependent. These results are robust to the use of different measures of centralization of wage bargaining, to the use of trade openness as a measure of internationalization, and to the use of a less stricter cut-off point to classify de facto fixed exchange rate regimes.

References

- [1] Alesina, A., and A. Wagner. 2006. Choosing (and Reneging On) Exchange Rate Regimes. *Journal of the European Economic Association*.
- [2] Beck, Nathaniel, Jonathan Katz, and Richard Tucker. 1998. Taking Time Seriously: Time-Series-Cross-Section Analysis with a Binary Dependent Variable. *American Journal of Political Science* 42 (4):1260-88.
- [3] Brock Blomberg, S., J. Frieden, and E. Stein. 2005. Sustaining Fixed Rates: The Political Economy of Currency Pegs in Latin America. *Journal of Applied Economics* VIII (2):2-3-225.
- [4] Broz, Lawrence, and Jeffrey Frieden. 2002. The Political Economy of International Monetary Relations. *Annual Review of Political Science* 4:317-343.
- [5] Calvo, G. , and C. Reinhart. 2002. Fear of Floating. *Quarterly Journal of Economics* 117:379-408.
- [6] Cameron, D. R. 1984. Social democracy, corporatism, labour quiescence and the representation of economic interests in advanced capitalist society. In *Order and*

Conflict in Contemporary Capitalism, edited by J. Goldthorpe. Oxford: Clarendon Press.

- [7] Corden, W. M. 2002. *Too Sensational. On the Choice of Exchange Rate Regimes*. Cambridge: MIT Press.
- [8] Cukierman, A. 1992. *Central Bank Strategy, Credibility, and Independence*. Cambridge: MIT Press.
- [9] Eichengreen, B. 1994. *International Monetary Arrangements for the 21st Century*. Washington, DC: Brookings.
- [10] Fischer, S. 2001. Exchange Rate Regimes. Is the Bipolar View Correct? *Journal of Economic Perspectives* 15 (2):3-24.
- [11] Franzese, R. 2001. Strategic Interactions of Monetary Policymakers and Wage/Price Bargainers: A Review with Implications for the European Common-Currency Area , 2001, 28(4): 457-86. *Empirica: Journal of Applied Economics and Economic Policy* 28 (4):457-486.
- [12] Franzese, R. 2002. *Macroeconomic policies of developed democracies*. New York: Cambridge University Press.
- [13] Frieden, J. 2002. Real Sources of European Currency Policy: Sectoral Interests and European Monetary Integration. *International Organization* 56 (4):831-860.
- [14] Frieden, J., and J. L. Broz. 2006. The Political Economy of Exchange Rates. In *Oxford Handbook of Political Economy*, edited by B. Weingast and D. Wittman. Oxford: Oxford University Press.
- [15] Golden, M., and M. Wallerstein. Union Centralization among Advanced Industrial Societies: An Empirical Study. Version 3.1 <http://www.shelley.polisci.ucla.edu/>. 2006 [cited].
- [16] Guillen, M., and S. Polillo. 2005. Globalization Pressures and the State: The Global Spread of Central Bank Independence. *American Journal of Sociology* 110 (6):1764-1802.

- [17] Hallerberg, M. 2003. Veto Players and the Choice of Monetary Institutions. In *The Political Economy of Monetary Institutions*, edited by W. Bernhard, J. L. Broz and W. Clark. Cambridge: MIT Press.
- [18] Hefeker, C. 1997. *Interest Groups and Monetary Integration: The Political Economy of Exchange Regime Choice*. Boulder: Westview.
- [19] Holden, Steinar. 2005. Monetary regimes and the co-ordination of wage setting. *European Economic Review* (49):833-843.
- [20] Honkapohja, S., and P. Pikkarainen. 1994. Country Characteristics and the Choice of the Exchange Rate Regime: Are Mini-Skirts Followed by Maxis? In *Exchange Rate Policies in the Nordic Countries*, edited by J. Akerholm and G. A. London: CEPR.
- [21] Iversen, T. 1998. Wage Bargaining, Central Bank Independence and the Real Effects of Money. *International Organization* 52 (3):469-504.
- [22] Iversen, T. 1999. *Contested Economic Institutions: The Politics of Macroeconomics and Wage Bargaining in Advanced Democracies*. Cambridge: Cambridge University Press.
- [23] Kenworthy, L. 2001. Wage-Setting Measures. A Survey and an Assessment. *World Politics* (54):57-98.
- [24] Kenworthy, L. Wage-Coordination Scores 2001 [cited. Available from <http://www.u.arizona.edu/~lkenwor/>].
- [25] Kenworthy, L. 2003. Quantitative Indicators of Corporatism. *International Journal of Sociology* 33 (3):10-44.
- [26] Lange, P., and Geoffrey Garret. 1985. The Politics of Growth: Strategic Interaction and Economic Performance in the Advanced Industrial Democracies, 1974-1980. *Journal of Politics* 47 (3):792-827.
- [27] OECD. 1997. *Economic Performance and the Structure of Collective Bargaining*. Paris: OECD.
- [28] Reinhart, C., and K. Rogoff. 2003. The Modern History of Exchange Rate Arrangements: A Reinterpretation. *Quarterly Journal of Economics*.

- [29] Simmons, B., F. Dobbin, and G. Garrett. 2006. Introduction: the International Diffusion of Liberalism. *International Organization* 60 (4):781-810.
- [30] Tavlas, G. 2000. On the Exchange Rate as a Nominal Anchor: The Rise and Fall of the Credibility Hypothesis. *Economic Record* 76 (233):183-201.
- [31] Vartianen, J. 2002. Relative wages in monetary union and floating. *Scandinavian Journal of Economics* (104):277-288.
- [32] Westbrook, J. , and T. Willett. 1999. Exchange Rates as Nominal Anchors: An Overview of the Issues. In *Exchange-Rate Policies for Emerging Market Economies*, edited by R. Sweeney, C. Wihlborg and T. Willett. Boulder, CO: Westview.bla bla bla

Appendix A: Proofs of Results Shown in Table 1

The purpose of this Appendix is to derive the 'net effects' of each of the model parameters on the exporters' exchange rate regime preferences, as presented in column 4 of table 1.

Let us start by defining $\frac{\partial PFIX}{\partial x}$ as the effect of the x parameter on the difference between the exporters' utility under a peg and under a float, i.e. $\frac{\partial PFIX}{\partial x} = \frac{\partial(W_{EX}(FIX) - W_{EX}(FL))}{\partial x}$.

The result for γ is straightforward: since $\frac{\partial W_{EX}(FL)}{\partial \gamma} = \phi^2 \left(\left(\frac{1}{2} - \frac{t}{2} \right) c - \left(\frac{1}{2} - \frac{t}{2} \right) \right) - \frac{1}{\phi^2} + 1 \leq 0$ (because ϕ cannot be greater than 1), and $\frac{\partial W_{EX}(FIX)}{\partial \gamma} = \phi \left(\left(\frac{1}{2} - \frac{t}{2} \right) - \left(\frac{1}{2} - \frac{t}{2} \right) c \phi \right) \geq 0$ (because both c and ϕ cannot be negative), then $\frac{\partial PFIX}{\partial \gamma}$, i.e. the difference in value between a fixed exchange rate regime and a floating one is increasing in γ . As a consequence, increases in the sensitivity towards the nominal exchange rate can only lead to a change in preference from a float to a peg.

Let us derive the result for the size of nontradables (ϕ). Knowing that $\frac{\partial W_{EX}(FL)}{\partial \phi} \geq 0$, whenever $\frac{\partial W_{EX}(FIX)}{\partial \phi}$ is not positive (which occurs if $2c\phi \leq 1$), then $\frac{\partial PFIX}{\partial \phi} \leq 0$. and the difference in utilities under a fix and a peg would be decreasing in ϕ . But if c and ϕ are high enough, it might be the case that $\frac{\partial W_{EX}(FIX)}{\partial \phi} > \frac{\partial W_{EX}(FL)}{\partial \phi}$.

The sign of $\frac{\partial PFIX}{\partial \phi}$ is thus indeterminate. Upon closer scrutiny, however, we can demonstrate that for the range of values in which $\frac{\partial PFIX}{\partial \phi} < 0$, the exporters will never change their preference from a peg to a float. Assume $\phi = 1$ and $c = 1$. Since $\frac{\partial W_{EX}(FIX)}{\partial \gamma} \frac{\partial \gamma}{\partial \phi} > 0$ while $\frac{\partial W_{EX}(FL)}{\partial \gamma} \frac{\partial \gamma}{\partial \phi} < 0$, and $\frac{\partial W_{EX}(FIX)}{\partial \gamma} \frac{\partial \gamma}{\partial \phi} > \frac{\partial W_{EX}(FL)}{\partial \gamma} \frac{\partial \gamma}{\partial \phi}$, this is the combination of these two parameters at which $\frac{\partial PFIX}{\partial \phi}$ should be greater (a peg being more preferable than a float). However, it can be shown that under these values of c and ϕ , $W_{EX}(FL) = W_{EX}(FIX)$ (i.e. the utility provided by a peg is not higher than the one provided by a float) which implies that for all remaining combinations of c and ϕ (which must entail lower values of either of these two parameters), $W_{EX}(FL) > W_{EX}(FIX)$. In other words, when $\frac{\partial PFIX}{\partial \phi} > 0$, no change in preferences in the direction in favor of fixed regimes can occur. Because increases in ϕ might lead to a change in preferences towards floats (if the conditions for $\frac{\partial PFIX}{\partial \phi} < 0$ hold), but increases in ϕ cannot lead to change towards pegs when $\frac{\partial PFIX}{\partial \phi} > 0$, then we can conclude that as the size of nontradable sector expands, exporters will be more likely to prefer floats to pegs.

A higher degree of conservatism of the central bank (ι) improves exporters' welfare both under a peg ($\frac{\partial W_{EX}(FIX)}{\partial \gamma} \geq 0$) and under a float ($\frac{\partial W_{EX}(FL)}{\partial \gamma} \geq 0$), and, as in the case of ϕ , $\frac{\partial PFIX}{\partial \iota}$ could be either positive or negative. However, it is again possible to rule out one of the two possible preference changes that the indeterminacy of the sign of $\frac{\partial PFIX}{\partial \iota}$ seems to imply. Assume $\phi = 1$. Given $\frac{\partial W_{EX}(FIX)}{\partial \iota}$ and $\frac{\partial W_{EX}(FL)}{\partial \iota}$, for $\frac{\partial PFIX}{\partial \iota}$ to be negative (i.e. for a higher level of conservatism be associated with a greater preference for pegs), γ must be greater than $\frac{1}{3}$. It can be shown that, at $\gamma = \frac{1}{3}$, $W_{EX}(FIX) = W_{EX}(FL)$. By virtue of the result for γ obtained above, any value of γ greater than $\frac{1}{3}$ will never lead to a change of preference from a peg to a float. And from the result for ϕ , nor will any value of ϕ smaller than 1. Summarizing, for the 'salutary' effects of ι under a float to be greater than under a fix, a combination of parameters is required such that a floating exchange rate regime will never be preferred to a peg.

We are finally ready to evaluate the effect of centralization of wage bargaining on exporters' exchange rate regime preferences. Given the derivatives of $W_{EX}(FL)$ and $\partial W_{EX}(FIX)$ with respect to c , and after some algebra, it can be easily shown that

$\frac{\partial PFIX}{\partial \iota} > 0$ if $\gamma > \frac{1}{3}$, and $\frac{\partial PFIX}{\partial \iota} \leq 0$. Evaluating the exporters' utilities under $\gamma > \frac{1}{3}$ and $\phi = 1$ shows that $W_{EX}(FL) = W_{EX}(FIX)$. From the previous results, larger values of γ and lower values of ϕ lead, if anything, to stronger preferences in favor of pegs. As a result, therefore, greater levels of centralization might lead to a change in preference *towards pegs* if $\gamma < \frac{1}{3}$, and will keep exporters committed to pegs otherwise.

Appendix B. Data Sources.

Table 3:

| Variable | Definition | Mean (Range) | Source |
|---------------|--------------------------------|----------------------|-----------------------------|
| Exports | Exports as % GDP | 34.25 (7.21-151.89) | World Bank, WDI |
| Trade | Exports + Imports as % GDP | 69.01 (15.99-282.89) | World Bank, WDI |
| Raw Agg. Exp. | Raw Aggricult Exports (% exp) | 4.60 (.42-30.61) | World Bank, WDI |
| Log GDP | Log of GDP | 12.36 (8.24-16.01) | IMF, IFS |
| Inflation | Consumer Price Index | .08 (-.007-1.398) | IMF, IFS |
| Foreign Liab. | Ratio of Foreign Liab / Money | 5.14 (0-165.08) | IMF, IFS |
| CBI | Cukierman legal measure | .42 (.17-.92) | Guillen & Polillo (2005) |
| CWB Golden | Centralization of wage-setting | 3.15 (1-5) | Golden & Wallerstein (2006) |
| CWB Iversen | Degree of Centralization | .31 (.071-.654) | Iversen (1999) |
| CWB Kenw. | Kenworthy coordination index | 3.34 (1-5) | Kenworthy (2001b) |
| CWB OECD | OECD Wage Coor index | 2.12 (1-3) | OECD (1997) |
| Union density | Net Union Density | .40 (.08-.82) | Golden & Wallerstein (2006) |