

# Exchange-Rate Volatility as Employment Protection

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## Abstract

Two issues; the liberalisation of labour markets and monetary unification, have taken centre stage in policy debates on the future of the European Union. We show that both have the effect of raising capital mobility as well as labour-market flexibility. The reduction of exchange-rate fluctuations reduces the cost of both entering a market – by setting up companies and hiring new employees – as well as exiting by dismantling existing capital structures and firing employees. Thus the adoption of a single currency has effects very similar to the removal of employment-protection legislation and other direct restrictions on hiring and firing. The distinction between structural reforms in the labour market and monetary reforms may for this reason not be very helpful in finding the keys to higher employment growth in Europe. However, exchange-rate volatility is more harmful for the entry of new firms, particularly promising, high-risk ventures.

**Keywords:** Exchange-rate volatility, firing costs, labour-market flexibility.

**JEL:** E32, J23, J24, J54

Our evaluation is that at some point in time we will be enjoying a climate where there will be a stable currency.

Carlos Ghosn, Nissan chief executive, announcing plans to build the new Micra small car in Britain rather than France.  
(Financial Times, 26 January 2001)

## I. Introduction

State-mandated redundancy payments were introduced in many European countries from the late 1950s through to the early 1970s.<sup>1,2</sup> These firing restrictions have been blamed for the poor employment performance of many European countries (see for example Lindbeck and Snower (1988) and Lazear (1990)). The period since the first oil-price shock of 1973 has been characterised by high levels of unemployment in European countries. In contrast, employment in the USA has been less protected by state regulation and US unemployment has been lower than in Europe since 1973.

A number of studies have attempted to estimate the extent to which employment-protection provisions can account for European unemployment and unemployment persistence.<sup>3</sup> These studies generally find that firing costs reduce employment variability over the business cycle. There is less agreement on their effect on the average level of unemployment. Bentolila and Bertola (1990) use a theoretical model to show that due to time discounting the effect on the firing decision should be stronger than the effect on the hiring decision which makes firing costs have a positive impact on average unemployment. This prediction is however rejected in an empirical study by Lazear (1990) who finds an

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<sup>1</sup> In Britain, statutory redundancy pay was introduced with the passage of the 1965 Redundancy Payments Act, and re-enacted in the 1978 Employment Protection (Consolidation) Act.

<sup>2</sup> Some hypotheses have been advanced that suggest an economic rationale for employment protection laws. For example, it has been suggested that firing costs reduce the problem of moral hazard associated with state unemployment benefit systems, since they prevent firms laying off workers too readily in order to take advantage of statutory unemployment insurance. Another hypothesis is that mandated firing costs give workers some bargaining power, and therefore redress the perceived imbalance between capital and labour (Buechtemann (1992)). Saint-Paul (1996) views the introduction of firing costs in terms of political economy, involving a redistribution between skilled and unskilled labour, or between employed and unemployed workers. Finally, Bentolila and Bertola (1990:399) suggest that, where demand fluctuations arise because of Keynesian coordination failures rather than through the operation of competitive markets, firing costs might improve workers' welfare due to an aggregate demand externalities.

<sup>3</sup> See inter alia Bertola (1990), Bentolila and Bertola (1990), Lazear (1990) and chapters in Buechtemann (1992)). See Burda (1992) for a search-theoretic model of firing costs. For a comparison between temporary labour contracts with no firing costs, and permanent contracts with firing costs, see Bentolila and Saint-Paul (1992) and Bentolila and Dolado (1994).

inverse relationship between employment and firing costs in a panel of OECD countries. Studies by Layard and Nickell (1999) and Scarpetta (1996) support these empirical results. Recent papers by Chen and Zoega (1999) and Chen, Snower and Zoega (2001) reconcile the theory with the evidence by showing explicitly how the effect of firing costs on average unemployment depends on the macroeconomic environment. In particular, low rates of growth of productivity and a high level of macroeconomic volatility can cause the effect on unemployment to become positive. For this reason, employment protection may have reduced average unemployment during Europe's "golden age" – the 1950s and 1960s – while contributing to rising unemployment in the 1970s and 1980s.

Following in the footsteps of Layard, Nickell and Jackman (1991), a comprehensive study by the OECD (Jobs Study, 1994) recommends that European labour markets be deregulated. Such regulations would involve a reduction in state-mandated redundancy payments, a reduced duration of unemployment benefits and an increase in active labour-market expenditures.<sup>4</sup> A recent volume edited by Bertola et al. (2001) also finds a role for product-market deregulation. Importantly, countries with the most heavily regulated product markets also tend to have the most regulated labour markets so it is difficult to empirically distinguish between their effects on economic performance.

The discussion about labour-market flexibility has taken place parallel to the debate, decision and introduction of a single currency in Europe. However, the effects of the deregulation of labour- and product markets and the choice of an exchange-rate regime have so far had the loosest of connections in policy debates. While there is a literature on the effects of monetary union on incentives for structural reforms, no analogy has been drawn between their respective effects on capital mobility, output and employment. The objective of this paper is to show that this presumption may not be accurate in that irrevocably fixed exchange rates – in the form of a single currency – facilitate the mobility of firms and labour-market flexibility in comparison with floating rates. We will show that the choice of an exchange rate regime has direct implications for hiring and firing – and by extension the

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<sup>4</sup> We should note that while there appears to be a consensus that deregulation may reduce structural unemployment, there is less consensus about the origins of high unemployment in Europe in the first place. Many of the institutions and legislation in effect today were also in effect before the advent of the high-unemployment era and can be traced back to the late 1940, early 1950s in many cases. This brings us to the old question of why European unemployment was so low in the 1950s and 1960s and why the "rigid" labour markets performed so well then and, apparently, so badly today.

entry and exit of firms – in the same way as does the regulation of labour and product markets.

Our analysis will show that volatile exchange rates reduce capital mobility and churning in the labour market and hence also any political pressure to protect workers from dismissals. In contrast, a single currency may raise capital mobility – by bringing more stable relative prices – and make it easier for firms to hire and fire workers. Increased unemployment fluctuations may then cause pressures for employment protection to build if there is increasing marginal disutility of unemployment in the minds of policy makers or labour-market participants (see Calmfors, 1998).

We will argue that macroeconomic factors – such as the choice between fixed and flexible exchange rates – should be included in any study of product and labour-market flexibility. If product- and labour-market regulations impair labour-market performance, the same may be said about a volatile macroeconomic environment. We start by reviewing the existing literature on the link between monetary union and labour-market reforms.

## **II. Literature**

The unemployment problem in Europe is widely viewed as one of high structural<sup>5</sup> – as opposed to cyclical – unemployment (the *Jobs Study*, 1994). It is therefore important to know whether giving up monetary independence and/or increasing product-market competition is likely to lead to labour-market reforms that may reduce structural unemployment.

At this stage there exist a number of conjectures about the likely effect of a monetary union on labour-market reforms and institutions. We divide these into two groups. First, the monetary regime may affect incentives to change legislation – such as the level and duration of benefits, eligibility criteria, and employment-protection legislation. Second, the behaviour of unions and employers may change following the loss of monetary independence. This is due to a possible change in the strategic behaviour of the three agents: unions, employers and central banks. According to Sibert and Sutherland (2000), the incentive for labour-market reform is likely to be reduced when monetary

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<sup>5</sup> Phelps (1994) was the first to use the expression *structural unemployment* to refer to a moving natural rate of unemployment.

independence is lost. This occurs if the incentive to inflate is larger at higher rates of structural unemployment because voters do not differentiate between cyclical and structural unemployment. Hence the pressure to undertake fundamental labour-market reforms may be greater in countries that have their own monetary policy because such reforms are likely to reduce the temptation to inflate. In the European context, the pressure is reduced following the adoption of the single currency because the European central bank bases its decisions on the average of unemployment all member countries.<sup>6</sup> In this way, high structural unemployment in one country imposes a negative externality on other countries in the form of an inflation bias. The externality arises because of the centralised nature of monetary policy and the decentralised nature of labour-market policy.<sup>7</sup>

A similar argument can be applied to the behaviour of unions (Cukierman and Lippi; 1997, 1999). A large and centralised labour union that dislikes inflation is likely to restrain its real-wage demands in order to keep unemployment down and hence reduce the incentive to inflate. In a monetary union, this tendency is reduced because the union now has less to fear from a central bank shared by many countries, which takes into account unemployment in all member countries. This is again an externality problem. A large union in any member country imposes a negative externality on other countries when its wage demands result in higher domestic unemployment. The externality is then felt in higher rates of inflation in the other countries. Similarly, there is an external benefit to wage moderation by a large, national union.

Yet another argument in the same direction is due to Lindbeck (1996) and Calmfors (2001) who emphasize the complementarity of labour-market reforms and monetary policy. Successful reforms lead to a fall in structural unemployment but actual unemployment only gradually converges to this new equilibrium. The speed of adjustment depends on the speed at which real wages can be reduced. This can come

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<sup>6</sup> The emphasis on inflation targeting by the European Central Bank strengthens this argument further.

<sup>7</sup> One argument for the adoption of a single currency is the elimination of exchange-rate spillovers in the form of beggar-thy-neighbour policies. Independent monetary policy is likely to have external effects on other countries in the union – expansionary monetary policy in one country raises (cyclical) unemployment in other countries. But we have seen that by giving up monetary independence there arises a different kind of an externality problem which reduces the incentive for labour-market reforms and wage moderation and hence acts to elevate structural unemployment throughout the continent.

about through either a decline in nominal wages and/or an increase in the general price level. Of the two, an increase in the price level is likely to reduce real wages faster as resistance to nominal-wage cuts appears to be endemic in market economies, perhaps because of workers' concern about relative wages or the lemons problem (Akerlof, 1970). Because an independent monetary policy can be used to reduce real wages by raising the price level, countries having their own central bank may be more likely to embark on reforms.

The first counterargument is due to Calmfors (2001). He starts out by assuming that the business cycle could become more severe within the EMU due to the loss of monetary policy at the national level and incomplete price- and wage flexibility. With cyclical unemployment more volatile, pressures for reforms meant to reduce structural unemployment are likely to build if there is increasing marginal disutility of unemployment in the minds of policy makers. A higher variance of cyclical unemployment reduces expected utility in such a setting. In contrast, a reduction in average – or structural – unemployment raises expected utility for a given variance of cyclical unemployment.

Another counterargument involves product-market competition. With increased competition following the adoption of a single currency, a different kind of externality arises in the interaction of unions across countries. A large union in one country can, through wage moderation, induce companies to relocate from other countries and hence raise domestic employment at the expense of foreign employment. This leads over time to an outward shift of the domestic labour-demand schedule, which can later form the basis of wage demands.

From this we can conclude that it is entirely unclear whether the loss of monetary policy is more likely to increase or to decrease incentives for labour-market reforms or to make labour unions less militant. However, we will show that the effects of joining a single-currency area, on the one hand, and labour-market deregulation, on the other hand, share many similarities, which make the distinction drawn between the two less important than one might think.

### III. Model

We model the decision to set up (and later to discontinue) the operations of a firm that is wholly owned by domestic citizens and produces its (tradable) output at home for exports. The firm's objective is to maximize shareholder value, which involves maximising the value of the firm in terms of domestic currency.

We assume that the firm's supply of output and the level of (foreign) demand determine the (foreign) price of output, while the domestic price is also a function of the level of the (nominal) exchange rate. The domestic price of output fluctuates with the exchange rate. While the costs of the firm are known with certainty – because labour is the only input – the price of its output is stochastic due to exchange-rate fluctuations. In particular, we assume that the exchange rate follows a Geometric Brownian motion.

There are government regulations that stipulate the payment of redundancy payments in the event of layoffs. These payments are fixed and known a priori. Should the firm decide to move its operations to another country or to discontinue its operations, it faces a sunk cost of paying for the redundancy of all of its employees. There is also a direct cost of setting up operations that takes the form of a cost of hiring and training new workers. For these reasons, labour becomes a quasi-fixed factor of production, as first pointed out by Walter Oi (1962), and the hiring decision – as well as the layoff decision – becomes an intertemporal investment decision. Importantly, decisions to set up a new production unit or to discontinue existing ones amount to an intertemporal investment decision under uncertainty about the future level of exchange rates.

We can use standard methods to calculate the effects of the exchange-rate volatility and the redundancy payments on the decision to set up a new firm – or a branch – and to discontinue the operation of existing ones. We assume that the production function is linear  $Q = gN$  where  $g$  denotes labour productivity,  $N$  is employment and  $Q$  output. There is a foreign demand function for the firms's output, which gives output demanded as a negative function of the (foreign) price  $P^*$ ,  $Q = ZP^{*-1/(1-\gamma)}$ , where  $0 < \gamma < 1$  and  $Z$  denotes the level of demand. The production function and the demand function together give us an expression for the firm's revenues in terms of foreign currency  $R^f$ ,

$$R^f = Z^{1-\gamma} (gN)^\gamma \quad 0 < \gamma < 1. \quad (1)$$

For simplicity, it is assumed that  $g$  and  $N$  are fixed and  $Z$  grows at a fixed rate of  $\eta_Z$ .

Revenues in terms of domestic currency  $R$ , written as

$$R = EZ^{1-\gamma} (gN)^\gamma, \quad 0 < \gamma < 1 \quad (1)$$

are stochastic due to the fluctuations of the exchange rate  $E$ , which follows a geometric Brownian motion;

$$dE = \eta_E E dt + \sigma E dz, \quad (2)$$

where  $z$  is a Wiener process;  $dz = \varepsilon \sqrt{dt}$  since  $\varepsilon$  is a normally distributed random variable with mean zero and a standard deviation of unity;  $\eta_E$  is the drift parameter and  $\sigma$  the variance parameter. By Ito's lemma, the stochastic differential equation for revenue, expressed in domestic currency, is represented by

$$dR = \alpha R dt + \sigma R dz, \quad (3)$$

where  $\alpha = \eta_E + (1 - \mu)\eta_Z$  is the trend growth rate.

Current profits in domestic currency can then be written as

$$\text{Current Profits} = R - C, \quad (4)$$

where  $C$  denotes the fixed daily operative costs. It is assumed that the firm faces a fixed rate of death  $\lambda$ , which measures the probability that the firm goes out of business at each moment in time. Firms maximise shareholder value, which is equal to the expected discounted value of profits  $V$ . The Bellman equation follows;

$$(r + \lambda)V = \frac{1}{2} \sigma^2 R^2 V_{RR} + (r - \delta)R V_R + R - C, \quad (5)$$

where  $r$  is the risk-free rate of interest and  $\delta = \mu - \alpha$ . The parameter  $\delta$  derives from a no-arbitrage condition and  $\mu$  represents the appropriate risk-adjusted discount rate.

If there are no adjustment costs of entry (hiring),  $I$ , and/or exit (firing),  $E$ , each factory's expected, present-discounted value of future profits,  $V^P$ , is represented by:

$$V^P = \frac{R}{\delta + \lambda} - \frac{C}{r + \lambda} \quad (6)$$

The meaning of the discount rate for revenues  $\delta$  is straightforward: It is equal to the risk-adjusted rate minus the expected growth rate, which is due to both the expected exchange-rate depreciation and demand growth. The daily operative cost is fixed and



therefore its discount rate is only the risk-free rate. Note that  $V^P$  is also a particular solution to the Bellman equation (5).

The option values (the value of the option to set up a new firm and the value of the option to discontinue the operations of an existing one) comes from the homogenous part of the Bellman equation (5):

$$(r + \lambda)V = \frac{1}{2}\sigma^2 R^2 V_{RR} + (r - \delta)R V_R \quad (7)$$

The general (homogenous) solutions,  $V^H$ , to this differential equation are

$$V^H = A_1 R^{\beta_1} + A_2 R^{\beta_2}, \quad (8)$$

where  $\beta_1$  and  $\beta_2$  are the roots for characteristic equations and

$$\beta_1 = \frac{1}{2} - \frac{r - \delta}{\sigma^2} + \sqrt{\left(\frac{r - \delta}{\sigma^2} - \frac{1}{2}\right)^2 + \frac{2(r + \lambda)}{\sigma^2}} > 1, \quad (9.1)$$

$$\beta_2 = \frac{1}{2} - \frac{r - \delta}{\sigma^2} - \sqrt{\left(\frac{r - \delta}{\sigma^2} - \frac{1}{2}\right)^2 + \frac{2(r + \lambda)}{\sigma^2}} < 0. \quad (9.2)$$

When  $R$  approaches zero, the value of the option to set up a new firm,  $V_I^H$ , should go to zero since no one would enter when there are no revenues at all. Thus,

$$V_I^H = A_1 R^{\beta_1}. \quad (10.1)$$

Similarly, when  $R$  approaches infinity, the value of the option to exit,  $V_E^H$ , should go to zero. Thus

$$V_E^H = A_2 R^{\beta_2}, \quad (10.2)$$

which implies that no firm would close down a factory in a boom of that magnitude.

When the representative firm decides to hire workers to set up a new production facility it gains  $V^P$  and the option to discontinue its operations in the future,  $V_E^H$ , pays the training – or entry – costs  $I$  and sacrifices an option to enter later  $V_I^H$ . When, during an economic downturn, the firm then decides to close down its operations and fire incumbent workers, it gains  $-V^P$  (since  $V^P$  is then a negative number) and an option to re-enter  $V_I^H$ , pays the redundancy payments or exit costs  $E$ , and sacrifices an option to go out of business later,  $V_E^H$ . Therefore the value-matching conditions look as follows;

$$\frac{R_I}{\delta + \lambda} - \frac{C}{r + \lambda} + A_2 R_I^{\beta_2} = I + A_1 R_I^{\beta_1}, \quad (11)$$

$$-\left(\frac{R_E}{\delta + \lambda} - \frac{C}{r + \lambda}\right) + A_1 R_E^{\beta_1} = E + A_2 R_E^{\beta_2}. \quad (12)$$

Finally, the smooth-pasting conditions follow:

$$\frac{1}{\delta + \lambda} + A_2 \beta_2 R_I^{\beta_2 - 1} = A_1 \beta_1 R_I^{\beta_1 - 1}, \quad (13)$$

$$-\frac{1}{\delta + \lambda} + A_1 \beta_1 R_E^{\beta_1 - 1} = A_2 \beta_2 R_E^{\beta_2 - 1}. \quad (14)$$

Equations (11), (12), (13) and (14) form a non-linear system of equations with four unknown parameters,  $R_I$ ,  $R_E$ ,  $A_1$  and  $A_2$ , and can be solved for numerically.

#### IV. Exchange-rate volatility as employment protection

We can now calculate the entry and exit thresholds for different values of the redundancy payments as well as the degree of exchange-rate uncertainty. We start by stating our benchmark values in Table 1.

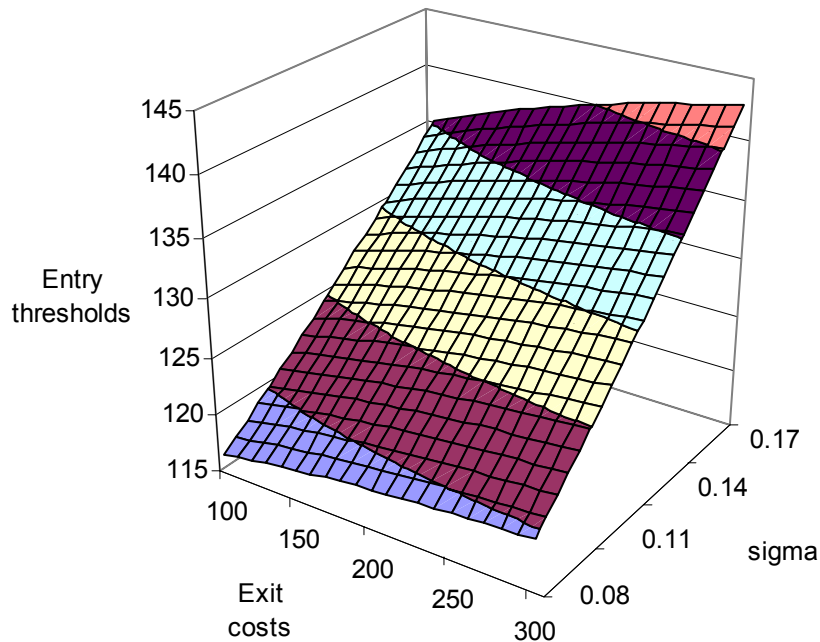
**Table 1.** Benchmark values

$\gamma$	0.7	$\mu$	0.08
$\eta_E$	0.0	$r$	0.05
$\sigma$	0.18	$I$	150
$\eta_Z$	0.03	$E$	100
$C$	75	$\lambda$	0.05

Figure 1 shows the entry thresholds for the exchange rate implied by equations (11)-(14) and Figure 2 the exit thresholds. The exchange rate has to exceed the entry threshold for a new firm to be set up and it has to become lower than the exit threshold for an existing firm to leave. We first turn to the former and note that the effective cost of hiring includes

the direct hiring- and training costs as well as the expected firing costs (or redundancy payments).

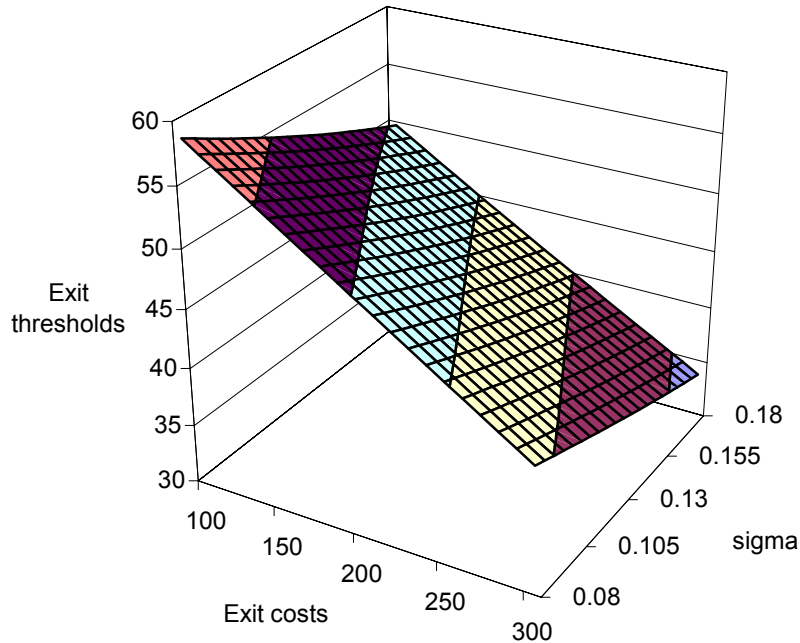
The entry threshold is strongly rising in the level of exchange-rate volatility. Intuitively, the greater is the level of uncertainty about the future value of the exchange rate, the more valuable is the option to enter, which – according to equation (11) – gets sacrificed when the firm is set up. The threshold is also rising in the level of the firing costs. However, note that firing costs only matter at high levels of volatility. When there is little uncertainty, the representative firm does not have to fear a future dismissal of those it is currently hiring. For this reason, the expected firing costs become less important. We thus find that both increased exchange-rate volatility as well as higher firing costs raise the exchange-rate threshold at which the representative firm starts to hire new workers. However, the effect of volatility is more robust because redundancy payments only affect the hiring decision in the presence of exchange-rate volatility.



**Figure 1.** The effect of exit costs on the entry thresholds with different values of  $\sigma$ . Other parameters:  $\gamma=0.7$ ,  $\eta_Z=0.02$ ,  $\eta_E=0.0$ ,  $\mu=0.08$ ,  $r=0.05$ ,  $I=150$ ,  $C=75$ ,  $\lambda=0.05$ .

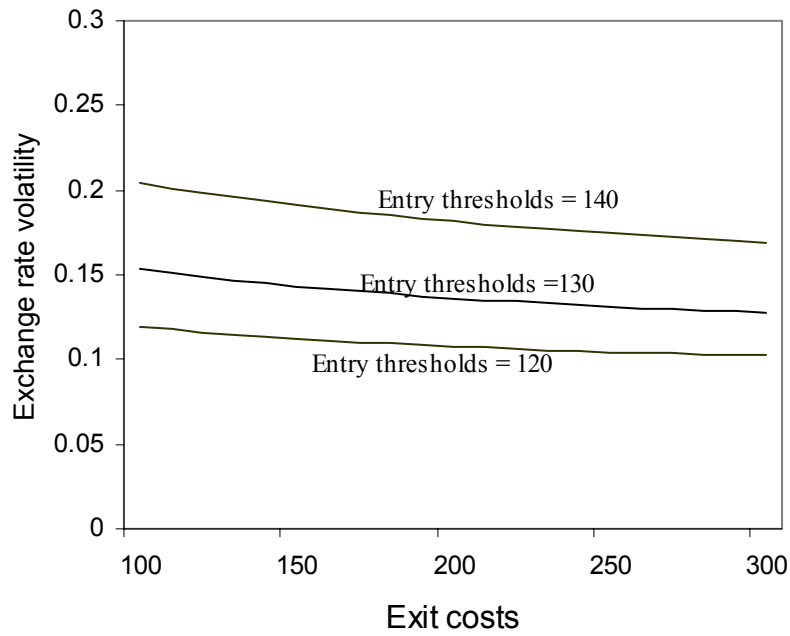
The firing threshold shows the critical level of the exchange rate at which firms start to fire. It is downward sloping in both the level of the firing costs and the level of uncertainty. This implies that if either assumes a higher value, the exchange rate has to

fall to a lower level for the marginal workers to be fired. The effect of the redundancy payments now no longer depends on the level of exchange-rate volatility. We thus find that both increased volatility as well as higher firing costs deter the firing of workers and that the effect of the latter no longer depends noticeably on the former.

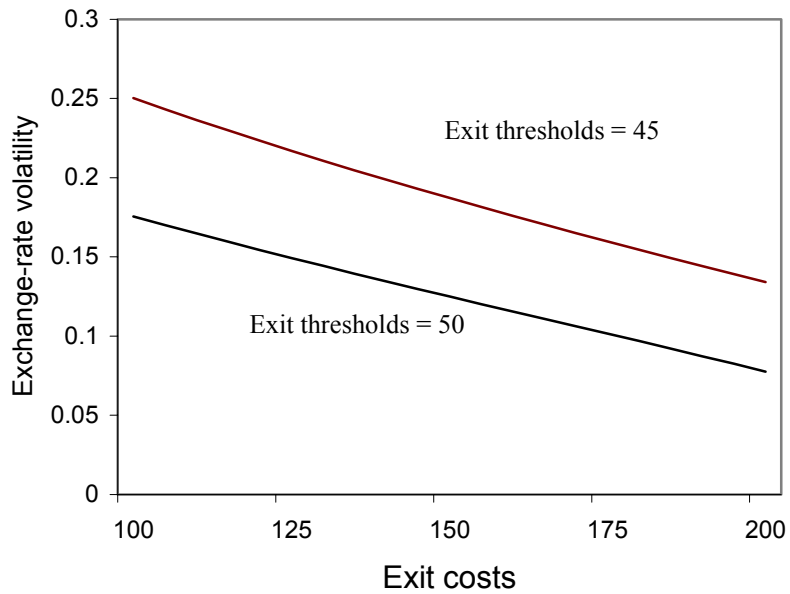


**Figure 2.** The effect of exit (firing) costs on the exit thresholds with different values of sigma,  $\sigma$ . Other parameters:  $\gamma=0.7$ ,  $\eta_Z=0.03$ ,  $\eta_E=0.0$ ,  $\mu=0.08$ ,  $r=0.05$ ,  $I=150$ ,  $C=75$ ,  $\lambda=0.05$ .

We can clarify the effect of exchange-rate uncertainty and firing costs on the entry- and exit thresholds further by plotting *iso-protection* curves that show all the combinations of volatility and firing costs that yield the same effect on the entry and exit decision respectively. Figure 3 below shows the iso-protection curves for the entry decision and Figure 4 the iso-protection curve for the exit decision. Note that the former are much flatter than the latter and that the iso-protection curves for the entry decision become steeper for higher levels of the entry threshold – that is the one that corresponds to higher combinations of exchange-rate uncertainty and firing costs.



**Figure 3.** Iso-protection curves for the entry decision. Other parameters:  $\gamma=0.7$ ,  $\eta_Z=0.03$ ,  $\eta_E=0.0$ ,  $\mu=0.08$ ,  $r=0.05$ ,  $I=150$ ,  $C=75$ ,  $\lambda=0.05$ .



**Figure 4.** Iso-protection curves for the exit decision. Other parameters:  $\gamma=0.7$ ,  $\eta_Z=0.03$ ,  $\eta_E=0.0$ ,  $\mu=0.08$ ,  $r=0.05$ ,  $I=150$ ,  $C=75$ ,  $\lambda=0.05$ .

## V. Industrial policies, volatility and firing costs

Suppose that the home government subsidises domestic firms by paying a subsidy ( $S$ ) to offset any competitive advantage of a foreign rival in terms of firing costs or exchange-rate volatility<sup>8</sup>. In particular, assume that both are fixed and given for the foreign country, and that the domestic government wants to make the exit threshold faced by domestic firms identical to that faced by its foreign rivals. We can now calculate the level of the required domestic subsidy as a function of the volatility and firing-cost differential between the two countries.

The value-matching condition for the exit decision in the case of the domestic firm becomes

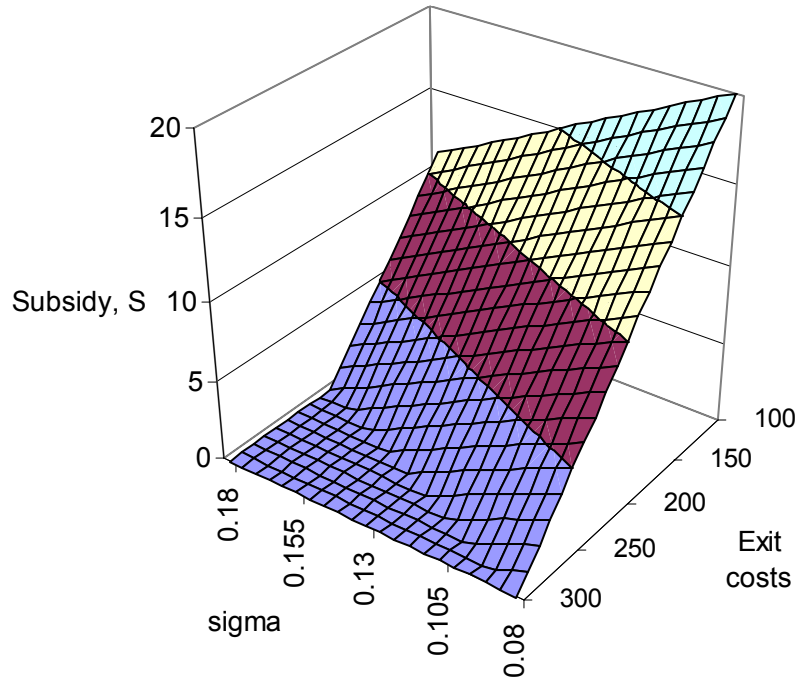
$$-\left(\frac{P_E}{\delta} - \frac{C-S}{r+\lambda}\right) + A_1 P_E^{\beta_1} = E + A_2 P_E^{\beta_2}. \quad (12')$$

The only difference between the domestic and the foreign firm is – apart from the subsidy – the differential exit costs or firing costs and the differential risk (due to a different exchange-rate regime). As shown in Figure 5, the higher is the level of foreign firing costs relative to domestic firing costs, and the greater is the volatility of the foreign currency relative to the volatility of the domestic currency, the higher is the government subsidy that is needed to achieve the same exit threshold at home. Note that an increase in the relative volatility  $\sigma$  of the domestic exchange rate will lower the domestic subsidies a lot.<sup>9</sup>

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<sup>8</sup> Note that if the foreign firm is located in the country importing our output, its exchange-rate uncertainty is equal to zero because it is producing for its home market.

<sup>9</sup> For example, if the risk effect is the same and the exit costs are £100million only, the domestic government needs to pay up to £20million ( $= (r+\lambda)\Delta E = 0.1 \times £200m$ ) to keep the local factory alive. However, if  $\sigma=0.40$ , the subsidies are down to £14.59million.



**Figure 5.** The effect of domestic firing costs ( $E$ ) and volatility ( $\sigma$ ) on the required subsidy. Note that for the foreign country,  $\sigma^*=0.08$  and  $E^*=300$ . For other parameters, see Figure 1.

These results demonstrate that the volatility of floating exchange rates may save domestic branches from being closed. A floating exchange-rate regime thus has an effect on the decisions of firms contemplating exiting the home country that is similar to the effect of direct employment protection in the form of firing costs. However, this same volatility will prevent other firms from being set up due to the higher level of the entry threshold.

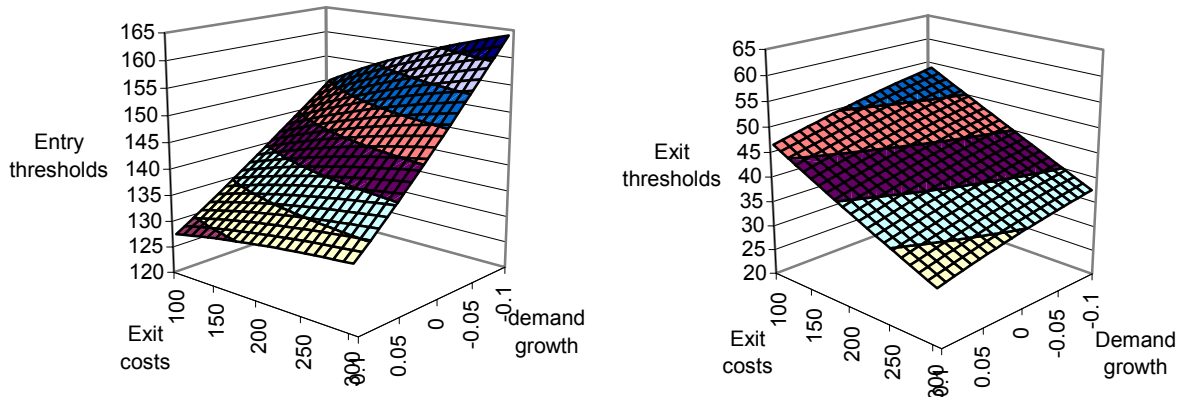
## VI. Comparing volatility and firing costs

We have shown that the labour market can be made more flexible through both liberalisation – the dismantling of employment-protection legislation and the lowering of firing costs – and by an emphasis on exchange-rate stability – which we have taken to be synonymous to the adoption of a single currency. What remains is to look at the effect of these two measures in specific situations.

Assume that we would like to protect employment in a declining industry. Is it then better to impose explicit firing costs or do we opt for increased exchange-rate volatility?

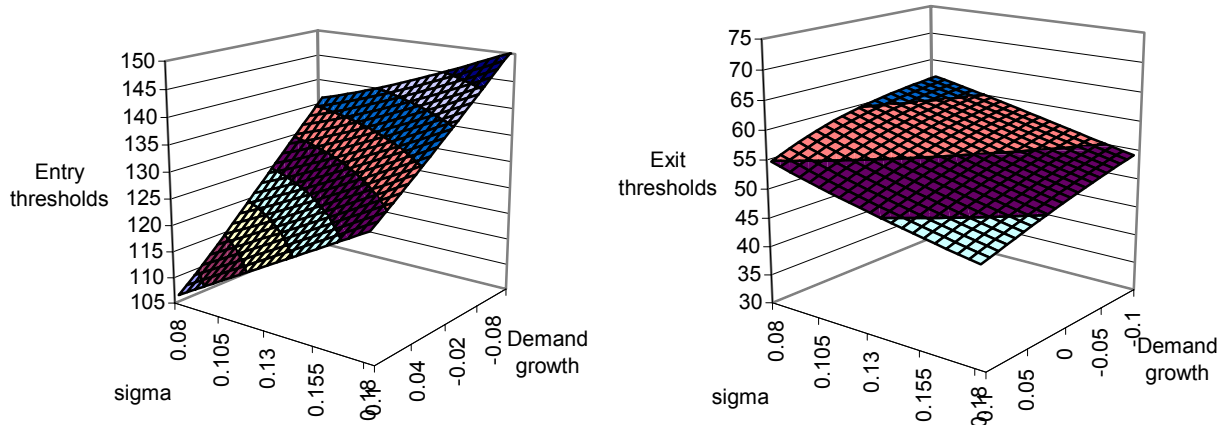
Do the two measures have a different effect on the entry of firms in any expanding industry? An important question is whether volatility or firing costs fares better when it comes to not discouraging entrepreneurs too much from setting up promising new companies.

Let's start by assuming that we want to reduce the rate of job loss in a domestic industry that faces declining demand. We would expect that increasing labour-market flexibility by reducing firing costs would accelerate the decline. The question arises whether joining a single currency would also have the same effect. Figures 6 and 7 confirm this presumption. However, when comparing the left-hand-side panels we see that volatility would have a particularly bad effect on the entry of promising – high-growth – industries. While, in the case of firing costs, the entry threshold is significantly steeper for industries with a negative growth rate compared to those with a positive growth rate, the difference is much smaller in the case of volatility. The effect of exchange-rate volatility is thus to deter the entry of promising high-growth industries and to slow down the dismantling of declining ones. We conclude on this count that firing costs may be preferable because they accomplish the latter without causing the former to the same extent.



**Figure 6.** The effect of exit costs on the entry/exit thresholds with different values of demand growth rate  $\eta_Z$ . Other parameters:  $\gamma=0.7$ ,  $\sigma=0.18$ ,  $\eta_E=0.0$ ,  $\mu=0.08$ ,  $r=0.05$ ,  $I=150$ ,  $C=60$ ,  $\lambda=0.05$ .





**Figure 7.** The effect of sigma  $\sigma$  on the entry/exit thresholds with different values of demand growth rate  $\eta_Z$ . Other parameters:  $\gamma=0.7$ ,  $\sigma = 0.18$ ,  $\eta_E = 0.0$ ,  $\mu=0.08$ ,  $r = 0.05$ ,  $E = 100$ ,  $I = 150$ ,  $C = 75$ ,  $\lambda = 0.05$ .

## VII. Conclusions

We can summarise our conclusions as follows.

- Exchange-rate volatility raises both the costs of setting up a new firm as well as discontinuing the operations of existing ones in a way similar to employment-protection legislation in the form of firing costs.
- In comparison to firing costs, exchange-rate volatility is more damaging to entry and equally beneficial for exit. In particular, exchange-rate volatility as a form of employment protection is particularly bad for the entry of promising new industries.
- The negative effect of firing costs on firm entry and the hiring of new workers is declining in the stability of exchange rates. Thus firing costs affect primarily the firing decision, and not the hiring decision, in a stable macroeconomic environment.

We conclude that given the choice between these two forms of employment protection, direct legislation in the form of state-mandated redundancy payments is preferable to a floating and volatile exchange rate. Moreover, the reduction of volatility – for example following the adoption of a single currency – will reduce any adverse effects of firing costs.

These results cast light on the current debate in the United Kingdom. Those who go under the label Eurosceptics tend to prefer the liberalisation of labour markets but not the adoption of the European single currency. If the only concern is labour-market flexibility, the two views appear to be contradictory in light of our analysis. Both employment-protection legislation as well as a floating exchange rate regime – with the accompanying exchange-rate volatility – deter both the entry and exit of firms with the adverse effects on entry being greater in the case of exchange-rate volatility.

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