Rafael Di Tella and Robert MacCulloch

Rational Institutions Yield
Hysteresis
Rational Institutions Yield Hysteresis

Rafael Di Tella*
Harvard Business School

and

Robert MacCulloch**
ZEI, University of Bonn

June 30, 2000

Abstract

We argue that labor market institutions are endogenous. Our analysis focuses on the government's decision to set unemployment benefits in response to an unemployment shock in a simple, reduced-form model of the labor market. It is found that the largest increases in benefits should occur in economies where the adverse incentive effects of benefits are largest. Adjustment costs of changing benefits can introduce hysteresis in benefit setting and unemployment. Both (very) bad and good temporary shocks (including monetary) can permanently reduce unemployment benefits and the unemployment rate. A desirable feature of the model is that the mechanism yielding hysteresis (which requires a concave utility function) ceases to operate when unemployment tends to one.

JEL Classification: J6
Keywords: Optimal unemployment benefits, hysteresis, natural rate of unemployment.

*Harvard Business School, Morgan Hall, Soldier Field Rd, Boston, MA 02163, USA. e-mail: rditella@hbs.edu. **STICERD, London School of Economics, 10 Furnival Street, London WC2A 2AE, United Kingdom. e-mail: robertmacculloch@compuserve.com. We thank Julio Rotemberg for helpful comments on an earlier draft.
I. Introduction

One of the biggest challenges in economics is to build a model that can explain European unemployment. The ideal model would explain two kinds of asymmetries. The first is an asymmetry over time: it should explain how unemployment could increase after a shock and then remain up for a very long period of time. The second is an asymmetry across countries: the theory should ideally also be able to explain why unemployment dropped in some countries once the shocks disappeared. The experience of the Europe and the US fit these descriptions. In this paper we aim to provide one such theory. It is based on the idea that labor market institutions (in particular unemployment benefits) are determined optimally.

The contrasting labor market performances of Europe and the US have been the subject of much research. The standard explanation is based on institutions. Generous unemployment benefits and strict employment protection rules drive up European unemployment.\footnote{See Bentolila and Bertola (1990), Lazear (1990), Alvarez and Veracierto (1999), \textit{inter alia}. See Gregg and Manning (1996) for a review.} Of course, this does not explain either of the two asymmetries. One of the first papers to focus on this problem was Blanchard and Summers (1986). They argued that when wages are set unilaterally by “insiders”, wage (rather than employment) gains will follow the withdrawal of a temporary shock. The “insider-outsider” model of wage determination (Lindbeck and Snower (1988)) used in these models has been criticized however as involving a set of very special features (e.g. Fehr (1990), Hall (1986), Lindbeck and Snower (1990) and Rotemberg (1999)). A large literature has focused on morale and skill decay following joblessness, particularly when it is not so severe as to induce withdrawal from the labor force (see Layard and Nickell (1987)). These \textit{duration effects} are a potential source of unemployment persistence, although rational choice models built on these assumptions do not yield strict hysteresis. Blanchard (1999), for example, has recently emphasized the way shocks and institutions interact to yield unemployment persistence (see also Bertola (1990)).
because the volume of unemployment has some inherent persistence” (p.783 Phelps and Zoega (1998)). A key feature of our model is its ability to evaluate the effect of a (very simple) increase in the level of risk in the economy on the optimal level of unemployment benefits. Since unemployment benefits are supposed to provide insurance, the level of risk is a key parameter in the formulation of the problem. A large literature in public economics examines the optimal provision of unemployment insurance. Important papers include Shavell and Weiss (1979) and Hopenhayn and Nicolini (1997) on how UI benefits ought to be paid over time, Feldstein (1974, 1976) on the effect of UI on layoff and quit behavior and Mortensen (1977) on the effect on job search. In general, however, this literature does not look at the problem of providing unemployment insurance when the level of risk in the environment changes. Changing these models to address these questions is not always feasible. For example, the problem studied by Hopenhayn and Nicolini (1997) is how to achieve a certain level of insurance at minimum cost, so that changing some risk parameters in the problem will not answer the questions we are after.\(^2\)

To our knowledge the first paper that could, in principle, be used to study the effect of risk on the determination of unemployment benefits is Wright (1986).\(^3\) One drawback of this paper is the fact that there are no incentive effects or, in other words, unemployment benefits do not affect the unemployment rate. This is also the case in Atkinson (1990) where the focus is on tax considerations. In a previous paper (Di Tella and MacCulloch (1995)) we analyze the determination of unemployment benefits in a simple model where incentive effects are present and show some evidence consistent with the idea that unemployment benefits tend to increase when there are positive changes in the unemployment rate. Saint Paul (1996) presents a good review, and discusses other institutions (such as job security provisions).

\(^2\) Hansen and Imrohoroglu (1992) present a model showing how costly it is to set the wrong (non-optimal) level of unemployment benefits in a general equilibrium model where there are liquidity constraints and moral hazard. We experimented with a (much) simpler version of that model to see if it could be used to study the determination of unemployment benefits at different levels of risk. The fundamental problem encountered is that the parameters that determine the unemployment rate and that could be used to capture the risk in the environment also affect the degree of risk aversion that individuals have. Thus, it is impossible to disentangle in that model what is happening because individuals have become more risk-averse and what occurs because the environment is more risky.

\(^3\) Although Wright (1986) is a positive model of unemployment benefit determination.
Recently, Blanchard and Katz (1997) have argued that if unemployment increases unemployment benefits, then we have a way to explain the high persistence of unemployment shocks. The argument seems to depend on the size of the incentive effects. Presumably, if benefits have very large adverse effects on the unemployment rate, one would be less inclined to increase benefits after a bad shock.\textsuperscript{4} This paper shows that the logic of rational labor market institutions is slightly more involved. Following a negative shock that increases unemployment, increases in benefits should be higher in countries where benefits interfere in the workings of the labor market the most. The intuition for this seemingly counter-intuitive result is provided by the notion that benefits are set optimally at all times, including the moment just before the shock occurs. Thus, countries where incentive effects of benefits are large have, optimally, lower initial levels of benefits so that increases in insurance have large positive marginal effects in the presence of an unemployment shock. If there exists an adjustment cost of changing the benefit level, an asymmetry may exist: in a large number of cases, benefits should be increased due to an adverse shock but after it disappears their level should remain unchanged. In contrast to previous models in the literature, the mechanism that yields hysteresis here is no longer relevant when unemployment becomes very large.

A natural implication of this (and other hysteresis) models is that good shocks (including monetary shocks) have permanent effects on unemployment. In other words, it is no longer possible to define the natural rate of unemployment independently of aggregate demand conditions and the current rate of unemployment (Friedman (1968), Phelps (1968, 1994)). The idea is that favorable aggregate demand conditions may produce a low rate of unemployment but that the equilibrium rate of unemployment is determined by the fundamentals of the system, particularly by its labor market institutions.\textsuperscript{5} The approach suggested here implies that this distinction is problematic. If

\textsuperscript{4} One could think of the incentive effects as the coefficient on unemployment benefits in an unemployment regression.

\textsuperscript{5} Friedman (1968) defines the natural rate as "the level which would be ground out by the Walrasian system of general equilibrium equations, provided that there is embedded in them the actual structural characteristics of the labor and commodity markets, including market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job vacancies and labor availabilities, the cost of mobility, and so on." See the symposium in the Journal of Economic Perspectives, (1997), 11(1).
unemployment shocks generate changes in the institutions, then it would not be feasible to define the natural rate independently of the current unemployment rate.

Figure 1 shows the variation of mean unemployment benefits in Spain as well as real commodity prices between 1969 and 1993. Benefits are measured using the parameters of the unemployment benefit system recently produced by the OECD.\textsuperscript{6} Benefits increased rapidly over the period 1973-75 during and after the first oil shock in 1973-74. After a subsequent period of no change, benefits experienced another, larger, increase over the period 1979-83 during and after the second oil shock in 1979-80. After commodity prices returned to their pre-shock values in the mid-1980s there was no corresponding decline in the generosity of benefits. Figure 2 shows the variation of unemployment benefits in the United States during 1969 to 1993. It reveals a different pattern. The largest increase in benefits in the US occurred over the periods 1975-77 and 1979-81, during and after the two oil shocks. However benefits later returned to their pre-shock levels (after the mid-1980s). Our model can help explain these different time series of benefits as optimal responses of governments that are maximizing social welfare functions.

Section II presents a simple model of optimal benefit setting in the economy and section III includes the effect of a adjustment cost of changing the benefit level. Section IV studies the consequences of good and (very) bad shocks and the implications for the definition of the natural rate of unemployment. Section VI concludes.

II. A Simple Model

Assume an economy populated with risk averse individuals with concave utility function defined over income, $U(.)$, with $U_i>0$ and $U_{ii}<0$ where subscripts denote derivatives with respect to variable $i$. Individuals cannot save or insure themselves in private insurance.

\textsuperscript{6} It is available every two years, for odd years. It is calculated as the pre-tax average of the unemployment benefit replacement ratios for two earnings levels, three family situations and three durations of unemployment (see the OECD Jobs Study (1994) for details).
markets. The unemployment benefit program pays $b$ to the unemployed and funds it with a tax equal to $T$ levied on employed individuals.

At any point in time we denote the unemployment rate, $u=f(b)+\varepsilon$. In other words, we assume that the economy is affected by a random aggregate shock, $\varepsilon \in \left[\varepsilon^l, \varepsilon^h\right]$, which has mean zero. Unemployment is also affected by the generosity of the unemployment benefit program, $b$, with $f_b > 0$. This is the equilibrium, for example, in the following simple model of an economy. Assume that firms pay workers the gross real wage, $W^g$, and competition ensures zero profits: $\pi(W^g, \varepsilon)=0$ (where $\pi_{W^g} < 0$, $\pi_{\varepsilon} < 0$). Assume workers can shirk on their job (in which case their work effort equals 0) but if caught, they are fired. The expected income from being fired equals the probability of staying unemployed ($=a(U)$ where $U$ is the unemployment rate and $a'(U) > 0$) multiplied by the level of benefits, plus the probability of finding a new job ($=1-a(U)$) multiplied by the wage net of taxes and effort costs. The “No-Shirking-Condition” equates the value from exerting effort on the job to the value of shirking: $s(W^g, b, U)=0$ (where $s_{W^g} > 0$, $s_b < 0$, $s_U > 0$). Equilibrium unemployment, $u$, can be expressed as a function of both the level of benefits and the shock ($u=u(b, \varepsilon)$ where $u_b > 0$, $u_{\varepsilon} > 0$) and the equilibrium gross wage can be expressed solely as a function of the shock ($w^g = w^g(\varepsilon)$ where $w^g_{\varepsilon} < 0$). A linear approximation yields the equilibrium unemployment condition: $u=f(b)+\varepsilon$.

Each period the government observes the aggregate shock and then sets benefits to maximize the expected utility of a random individual, subject to the budget constraint and the possibility that higher benefits may cause higher unemployment. In other words, the shock is random but known when benefits are set. The problem is to:

---

7 On the role of private information in explaining the failure of private insurance markets, see Chiu and Karni (1998).
8 This can be derived from a variety of standard models of equilibrium unemployment, including an efficiency wage model, a union bargaining model or a search model. The fact that individuals are risk-averse makes it difficult to solve for explicit solutions, so a linear approximation must sometimes be used. For details, see Di Tella and MacCulloch (1995).
9 Implicit in this definition is the assumption that newly hired workers who have already been caught shirking once are not able to shirk again.
10 The assumption about the timing ensures that the level of unemployment at any point in time is the relevant measure of "risk" in the economy. Other timings would require us to look at the distribution of $\varepsilon$. In essence we are comparing across steady states. Kimball (1994) looks at labor market dynamics assuming benefits are exogenous.
\[ \text{Max}_s \quad S(b, \varepsilon) = (1-u)U(w^s(\varepsilon)-T) + uU(b) \] 

subject to \quad u = f(b) + \varepsilon \quad \text{Incentive Constraint} \quad (2)

and \quad T = \frac{ub}{1-u} \quad \text{Budget Constraint} \quad (3)

This formulation implies the simplest assumption regarding transitional dynamics, namely that each period the probability of being employed is \((1-u)\) regardless of previous employment history. The same is true for the unemployed.\(^{11}\) Let the net wage be \(w=w^s(\varepsilon)-T\).

The First Order Condition (FOC) is:

\[ (1-u)U_w \left[-\frac{u}{1-u} - \frac{bu}{(1-u)^2}\right] + u U_s(b) - u_s[U(w) - U(b)] = 0 \] 

where subscripts denote derivatives.

When the second order condition holds, the FOC implicitly defines optimal benefits as a function of the magnitude of the incentive effects, \(b=b(u_b)\). Clearly if there are no adverse incentive effects of benefits, marginal utility must be equalized across states and we simply have full insurance. Inspection of the FOC above suggests that incentive effects would sometimes tend to reduce the optimal level of benefits.

For simplicity, assume logarithmic utility and that the incentive effects are linear (we also discuss how the results are affected by assuming more general functional forms). At each point in time, unemployment is given by \(u=u'+\alpha b+\varepsilon (=u''+\varepsilon)\). This equals the sum of frictional unemployment, \(u'\) (which we assume to be small, less than 0.1) as well as unemployment arising from the incentive effects of the benefit system, \(\alpha b\), and from temporary shocks, \(\varepsilon\) (which we assume to be less than 0.2).\(^{12}\)

\(^{11}\) Alternatively, the same social welfare function (divided by the discount rate) is obtained if we consider the lifetime expected utility of employed and unemployed workers.

\(^{12}\) A sufficient condition for the Second Order Condition to hold is \(\alpha \leq u'\).
Proposition 1: The government should set benefits low when there are large adverse incentive effects.

Proof: Compute $db/d\alpha<0$, using the implicit function rule on the FOC (4). #

The intuition for this result is simple. At the optimum, the government balances insurance against tax costs to fund the program and the adverse incentive effects that UI introduces, which increase unemployment. When incentive effects are large, the government will try to restrict benefits because, for a given level of insurance, benefits now increase unemployment and the tax burden more. We can also study what happens to the optimal level of benefits when there is an exogenous shock to the unemployment rate.

Proposition 2:

a. When incentive effects are small, the government should reduce benefits following the occurrence of an adverse shock.

b. When incentive effects are large, the government should increase benefits following the occurrence of an adverse shock.

Proof: Let the function $F(.)$ be equal to the left-hand side of (4). Then we know that the $\text{sgn}(db/d\epsilon)=\text{sgn}(-F_e/F_b) = \text{sgn}(F_e)$, by the implicit function rule. Furthermore $\text{sgn}(F_e)$ is equal to:

$$\text{sgn}[u_e U_b + U_w (-u_e - \frac{\alpha b u_e}{(1-u)^2}) + U_{w u} (w^e - \frac{b u_e}{1-u})(-u - \frac{\alpha b}{1-u}) - \alpha U_w (w^e - \frac{b u_e}{1-u})]$$

(5)

Noting that $u_e=1$, $U_b/U_w=1/r$ where $r=b/w$ (the replacement rate) and $\sigma=-wU_{ww}/U_w=1$ (the Coefficient of Relative Risk Aversion) this expression can be simplified to:

$$\text{sgn}[\frac{1}{r} - 1 - (\frac{r}{(1-u)^2} - \frac{w^e}{w})(u + \frac{\alpha r w}{1-u}) - \alpha w^e]$$

(6)
Part a. As $\alpha \rightarrow 0$, the FOC implies $U_w \rightarrow U_b$ and hence $r \rightarrow 1$. Furthermore, $u \rightarrow u'$ and (6), which equals $\text{sgn}(db/de)$, becomes:

$$\text{sgn} \left[ -u' \left( \frac{1}{1-u'} \right)^2 - \frac{w_e}{w} \right]$$

which is negative (since $w_e < 0$). Hence $db/de < 0$. 

Part b. As $\alpha \rightarrow \infty$, benefits must initially be set low. As $r \rightarrow 0$, $\text{sgn}(db/de)$ becomes:

$$\text{sgn} \left[ \frac{1}{r} - 1 + w' \left( \frac{u}{w} - \alpha \right) \right]$$

which is positive. Hence $db/de > 0$.

If there are only small (or zero) incentive effects of benefits on unemployment, benefits should decrease due to exogenous adverse shocks to unemployment. The reason is that benefits should be initially set at relatively generous levels (the replacement ratio is close to 1) when $\alpha$ is small, and the main impact of the shock is then to raise taxes (via the budget constraint) and reduce the affordable level of benefits.

Perhaps the more interesting case is when incentive effects are large. Initially, unemployment insurance is set at relatively low levels and the optimal response to an adverse unemployment shock may be to increase, rather than reduce, the generosity of unemployment benefits. The easiest way to see this result is by looking at the social welfare function. For simplicity, let $w_e = 0$ (or be small). Before the shock has occurred, $S(b,0)=u^e \log b + (1-u^e) \log (w-u^e b/(1-u^e)) = \log w + u^e \log (b/w) + (1-u^e) \log ((1-u^e)(b/w)/(1-u^e))$.

When benefits are set low so that $b < w$, taxes are low and consequently $S(b,0)=\log w + u^e (\log (b/w) - b/w)$ (since $\log(1+x) = x$ for small $x$). In the presence of a shock, $S(b,\varepsilon)=S(b,0)+\varepsilon(\log (b/w) - b/w)$. The second term has a positive derivative with respect to $b$, equal to $\varepsilon(1/b - 1/w)$. Consequently if benefits were being set optimally before the shock occurred, well below the wage due to the large incentive effects, there now exists a
positive marginal welfare gain from more insurance. A fundamental aspect of this problem is the concavity of the effect of the shock on the objective function. The smaller is the initial level of benefits, the larger is the gain from adjusting.\footnote{Although in the present setup the reason why the initial level of benefits may be set low arises from the adverse effects of benefits on unemployment, there could be other reasons. For example, if the value of firms is included in the welfare function, higher benefits may lead to lower profits. Benefits may also be used by the government to change the distribution of income (see Boadway and Oswald (1983)).}

Not only does the first derivative of the social welfare function increase when benefits are initially set low, but as the next Proposition states, the concavity of the welfare function also increases.

**Proposition 3:** Assume that incentive effects are large. The concavity of the social welfare function increases in the presence of the adverse shock: \( S_{bb}(b, \varepsilon) < S_{bb}(b, 0) < 0 \) in the neighborhood of \( b^0 \), where \( b^0 = \arg\max_b S(b, 0) \).

**Proof:** The first derivative of \( S \) with respect to \( b \) is:

\[
S_b = \frac{u}{b} - \alpha \log \frac{w}{b} - \frac{u(1-u) + \alpha b}{w^s - u(b + w^s)}
\]  

The second derivative is:

\[
S_{bb} = -\frac{u}{b^2} + \frac{2\alpha}{b} + \frac{\alpha(u + \frac{\alpha b}{1-u})}{w^s - u(b + w^s)} - \frac{2\alpha(w^s - u(b + w^s)) + (u + \frac{\alpha b}{1-u})(u + \alpha(b + w^s))}{(1-u)(w^s - \frac{ub}{1-u})^2}
\]  

To see how \( S_{bb} \) changes in the presence of a shock, take the derivative of (10) with respect to \( \varepsilon \) to give \( S_{b\varepsilon} \). If incentive effects become large so benefits are set low (\( = b^0 \)) then \( S_{b\varepsilon} \) tends to \( -(1/b)^2 \) in the neighborhood of \( b^0 \). In other words, the concavity of the social welfare function increases in the presence of an adverse shock. #
An Example

Figure 3 shows how social welfare varies with benefits along the curve SS in the absence of a shock. The optimal level of benefits is set relatively low at \( b^0 \). Social welfare is \( S(b^0,0) \) at point A. This figure also shows the impact of a shock to unemployment, \( \varepsilon \). Social welfare now varies with benefits along the curve S’S’. The optimal level of benefits rises to \( b^e \) and social welfare equals \( S(b^e,\varepsilon) \) at point C. The concavity of the post-shock welfare function, S’S’, is greater than the concavity of the pre-shock function, SS.

The General Case

In problem (1), rather than assuming logarithmic utility and linear incentive effects, general functional forms were chosen for utility, \( U(x) \), and incentive effects, \( f(b) \). Proposition 2 applies just provided that one starts from a pre-shock equilibrium in which large incentive effects are associated with low benefit levels and taxes so that the marginal effect of increasing benefits after an adverse shock has first order effect of size, \( \varepsilon U_b(b) > 0 \). Similarly, Proposition 3 also applies just provided that one starts from a pre-shock equilibrium in which large incentive effects are associated with low benefit levels so that the change in concavity of the social welfare function after an adverse shock has first order effect of size, \( \varepsilon U_{bb}(b) < 0 \). The fundamental effect that drives the results in both Propositions 2 and 3 comes from the shock to unemployment adding the increasing, concave term, \( \varepsilon U(b) \), to the social welfare function.\(^{14}\)

III. Optimal Benefits with Adjustment Costs

Assume that there is now an adjustment cost, \( m \), of changing the level of the policy variable, unemployment benefits. This could be due to several factors, including not only

\(^{14}\) The effect of a shock on a social welfare function should be contrasted with the effect of a shock on a firm’s profit function. Blanchard and Fischer (1989) reviews the literature on how shocks lead to state-dependent rules for changing prices in the presence of menu costs (see pp 402-14). For example, let a firm maximize profits, \( \pi(P,\varepsilon) = PQ \) (where \( P \) is price and \( Q \) is quantity) subject to a demand function, \( Q = f(P) + \varepsilon \) (where \( \varepsilon \) represents a demand shock). The effect on profits of a positive shock to demand is given by \( \pi(P,\varepsilon) = \pi(P,0) + \varepsilon P \). In other words an increasing and linear term is added to the firm’s profit function (which is also the case if the profit function includes a quadratic cost term). By contrast, the results in Propositions 2 and 3 come from the addition of an increasing, but concave, term to the social welfare function. As the next section of the paper shows, this introduces the possibility of an asymmetry in the optimal benefit response to shocks in the presence of an adjustment cost of changing the benefit level.
administrative costs but perhaps more importantly the costs of legislative changes and the political or institution process that must be followed to initiate a change. Consequently, the government must pay this cost not only if benefits are increased in the presence of an adverse unemployment shock, but also if it wishes to cut benefits once the shock disappears. To study the optimal path of benefits assume that the government maximizes the discounted value of social welfare where its rate of time preference equals $\delta$. The problem is:

$$V_t(b_{t-1}) = \max_{b_t, b_{t+1}, \ldots} E_t \left\{ \sum_{t=0}^{\infty} \frac{S(b_t, \epsilon_t) - m_t}{(1 + \delta)^t} \right\}$$

subject to

$$u_t = f(b_t) + \epsilon_t$$

Incentive Constraint      (12)

$$T_t = \frac{u_t b_t}{1 - u_t}$$

Budget Constraint      (13)

$$m_t = \left\{ \begin{array}{ll} m \geq 0 & \text{if } |b_t - b_{t-1}| \neq 0 \\ 0 & \text{if } |b_t - b_{t-1}| = 0 \end{array} \right.$$

Adjustment Costs      (14)

where $S(b_t, \epsilon_t) = (1-u_t)U(w_T-T_t)+u_tU(b_t)$ and $V_t(b_{t-1})$ is the value function which is the present discounted value of expected welfare at the end of period $t-1$ evaluated along the optimal path. As in the previous section of the paper, the shock $(\epsilon_t)$ is random but known as of time $t$. Benefits are set at the beginning of each period. The solution to this problem satisfies the Bellman equation:

$$V_t(b_{t-1}) = \max_b E_t \left\{ S(b_t, \epsilon_t) - m_t + (1 + \delta)^{-1} E_t \{ V_{t+1}(b_{t+1}) \} \right\}$$

If adjustment costs are zero, the problem reduces to the one-period optimization problem that was studied in the previous section of the paper. In other words, benefits are set each period so as to maximize $S(b_t, \epsilon_t)$. If adjustment costs are very large so benefits must be set initially at a single level that cannot be changed in future periods, then the optimal level of benefits solves the problem: $\max_b E_t \{ \sum S(b_t, \epsilon_t)/(1+\delta)^t \}$. For intermediate levels of adjustment costs, hysteresis in benefit setting can arise.
Start from a position where $\varepsilon=0$ and benefits are being set to maximize social welfare in the current period, which equals $S(b^0,0)$. Consider the effect of a shock to unemployment of size, $\varepsilon$. Continue to assume logarithmic utility and linear incentive effects.

**Proposition 4 (Hysteresis):** Assume that the incentive effects of benefits are large.

a. If adjustment costs are sufficiently small then benefits should be increased in the presence of an adverse shock and reduced to their initial value once the shock disappears.

b. If adjustment costs satisfy $S(b^0,0)-S(b^\varepsilon,0)<m<S(b^\varepsilon,\varepsilon)-S(b^0,\varepsilon)$ and the rate of time preference is sufficiently high then benefits should be increased in the presence of the adverse shock but not reduced once the shock disappears.

**Proof:**

Part a. Start from the equilibrium in which adjustment costs are zero and benefits are set so that $b^0=\arg\max_b S(b,0)$. Social welfare equals $S(b^0,0)$. In the presence of an adverse shock benefits should be increased to $b^\varepsilon=\arg\max_b S(b,\varepsilon)$ (see Proposition 2). After the shock has gone the optimal level of benefits returns to $b^0$. #

Part b. It is simple, but not necessary, to let $\delta\rightarrow\infty$ so that only welfare in the current period is valued by the government. In the presence of an adverse shock benefits should be increased from $b^0$ to $b^\varepsilon$, provided that the corresponding increase in social welfare, $\Delta S^\varepsilon=S(b^\varepsilon,\varepsilon)-S(b^0,\varepsilon)$, exceeds the adjustment cost, $m$. After the shock has disappeared the gain from reducing benefits to their initial value is $\Delta S^0=S(b^0,0)-S(b^\varepsilon,0)$. Proposition 3 tells us that the concavity of the social welfare function increases in the presence of an adverse shock. As a result, $\Delta S^\varepsilon>\Delta S^0$, which can be shown by using second order Taylor approximations (see Appendix 1). Hence if the size of the adjustment cost satisfies $\Delta S^0<m<\Delta S^\varepsilon$, benefits should be increased in the presence of an adverse shock but not reduced once the shock disappears. #
Consequently, in the presence of an adjustment cost of changing the policy variable, there now exists the possibility of hysteresis in benefit setting. The asymmetry (we adjust upwards but not downwards), arises because the size (and source) of the welfare gain arising from an increase in benefits in the presence of an adverse shock is different from the size (and source) of the gain arising from a reduction in benefits once it has gone. Whereas a shock gives rise to a need for greater insurance because of greater risk in the economy (captured by the term, $\varepsilon U(b)$, in the social welfare function) once the shock has disappeared reductions in benefits increase welfare only to the extent that they reduce incentive problems and taxes.

Note that our results do not depend on $\delta \to \infty$. To see this, consider a shock that hits the economy whereby benefits are adjusted accordingly. Assume further that the shock disappears and we know that it will never return (i.e. $\varepsilon = 0$ for all $t$). Then the government may still want to keep benefits at $b^\varepsilon$. By not changing the government saves on adjustment costs today, but loses the social welfare gain of having the “correct” level of benefits in the future. Hence, there will be hysteresis if $m > \Delta S^0 / \{1 + (\delta(1 + \delta))^{-1}\}$.\textsuperscript{15}

When there exists hysteresis in benefit setting, there must also exist a corresponding hysteresis in unemployment. The reason is that if unemployment benefits are increased in the presence of a temporary shock but not subsequently reduced, then the unemployment rate will also increase but not subsequently return to its pre-shock level. The extent of the rise in unemployment will depend on the size of the incentive effects of benefits. The following example illustrates Proposition 4.

An Example
In Figure 3 benefits are set at the pre-shock level, $b^0$, where social welfare equals $S(b^0, 0)$ at point A. In the presence of an adverse shock to unemployment, $\varepsilon$, social welfare now varies with benefits along the curve $S'$. If benefits are kept at their pre-shock level then welfare drops to $S(b^0, \varepsilon)$ at point B. However if benefits are increased to $b^\varepsilon$, which maximizes $S(b, \varepsilon)$, then social welfare can be increased to $S(b^\varepsilon, \varepsilon)$ at point C. In other

\textsuperscript{15} Even when the government knows ex-ante that the shock will disappear after one period, it should increase unemployment insurance provided $\Delta S - m > \Delta S(\delta(1 + \delta))^{-1}$. 
words, social welfare increases by $\Delta S^e$. After the shock disappears, welfare equals $S(b^e, 0)$ at point D. The gain from reducing benefits from $b^e$ to their initial value, $b^0$, equals $\Delta S^0$. The welfare gain from increasing benefits in the presence of the shock, $\Delta S^e$, is significantly larger than the size of the welfare gain from reducing benefits after it has gone, $\Delta S^0$. If adjustment costs are zero (or small) then along the optimal path benefits should be increased from $b^0$ to $b^e$ and then subsequently reduced back to $b^0$.

Now assume that adjustment costs are larger, satisfying $\Delta S^0 < m < \Delta S^e$, and the government’s rate of time preference is high so that it only values current period welfare. In such a case, it is worthwhile for the government to raise benefits in the period that the shock occurs to $b^e$ but not to reduce them once $\varepsilon=0$. In the absence of further shocks, welfare remains at point D. The unemployment rate also does not return to its initial value, due to the higher level of benefits ($b^e > b^0$).

Discussion

An empirical prediction of the model is that, other things equal, differences in the government’s rate of time preference should explain changes in the unemployment insurance system. A possible way of capturing differences in impatience is to focus on political color, as it is sometimes argued that left-wing parties discount the future more than right-wing parties. It is also possible that the length of the electoral cycle influences the government’s discount rate. Then we may expect to see less evidence of benefit hysteresis in those countries that have longer periods between elections.

More importantly, the model suggests that countries may want to develop ways to reduce or avoid the legislative and political adjustment costs of changing the level of unemployment insurance. One way to do this would be to specify explicitly in advance a rule or formula of how benefits are going to be adjusted in the presence of a shock. Several countries actually do this: Canada, Japan and the U.S. have laws stating that benefits depend on aggregate unemployment conditions. In the U.S., the Federal/State Extended Compensation Act of 1970 established a second layer of benefits for claimants who exhaust their regular entitlement during periods of relatively high unemployment in a State. This program provides for up to 13 extra weeks of benefits at the claimant's usual weekly benefit amount. The benefits are triggered on "if the State's insured
unemployment rate for the past 13-week period is 20 percent higher than the rate for the corresponding period in the past two years and the rate is at least 5 percent.” Hence in the U.S. adverse shocks that increase the unemployment rate also increase benefit generosity, by law. If this type of legislation lowers the adjustment costs of changing benefits we may expect the result in Proposition 4(a) to be more likely to apply. In other words, benefits should be increased in the presence of an adverse shock but returned to their initial value once the shock has gone. In fact, the U.S. Federal/State Extended Compensation Act does specify that “extended benefits cease to become available when the insured unemployment rate does not meet either the 20 percent requirement or the 5 percent requirement”. Figures 1 and 2 illustrate the different paths of unemployment insurance after the oil shocks for both Spain and the US.

IV. Good Shocks, (Very) Bad Shocks and the Natural Rate

In this section, we contrast the predictions of our model with those from previous hysteresis models. A standard prediction in previous models is that if good shocks can permanently reduce unemployment, then the discretionary use of monetary policy can be justified. The same is true in our model, although for somewhat different reasons. In the present model, the key positive effect of a good shock is to reduce the optimal level of unemployment benefits by lowering the level of risk in the economy. In the period that this occurs, there is less demand for insurance and a relatively large welfare gain to be captured by cutting benefits (which further reduces the level of unemployment).16 Appendix 2 shows more formally how this effect works and is illustrated by the following example:

An Example
In Figure 4 benefits are initially set equal to $b^0$ at point A. Assume that the government’s rate of time preference is high and that adjustment costs, $m=\Delta S^g+c<\Delta S^e$ (where $c$ is a small cost). After the economy has been hit by an adverse shock to unemployment, the Labour government of Great Britain has recently announced plans for reducing unemployment benefits. The unemployment rate is at record low.

16 The Labour government of Great Britain has recently announced plans for reducing unemployment benefits. The unemployment rate is at record low.
benefits are increased to $b^e$ and social welfare equals $S(b^e, e)$ at point C. In the absence of further shocks benefits remain at $b^e$ and social welfare equals $S(b^e, 0)$ at point D. Now consider the effect of a good shock that lowers the rate of unemployment by $p$. The direct effect of the shock is to increase social welfare to $S(b^e, -p)$ at point E on the curve, $S''S''$. If benefits remained at $b^e$ and the cost of inflation is sufficiently high so that $S(b^e, -p) - C(p > 0) - [S(b^e, 0) - C(p = 0)] < 0$, then the government should not inflate.

However when benefits are cut to $b^p$ at point F social welfare can be increased further by $\Delta S^p$ by paying the adjustment cost, $m$. Since $\Delta S^p > m$ it is now worthwhile to reduce benefits in the presence of the good shock. After it has disappeared (and in the absence of further shocks) social welfare falls to $S(b^p, 0)$ on the curve SS. The level of benefits remains low and consequently the unemployment rate is also lower in future periods in the aftermath of the shock.

A different implication of the model from the previous literature concerns the effect of a succession of bad (or adverse) shocks. In a standard hysteresis model, unemployment should increase monotonically with the occurrence of negative shocks. This does not occur in the present model. Two cases are worth analyzing. In the first case, insurance effects of the shocks continue to dominate benefit setting, whereas in the second case tax effects begin to dominate. The first case is illustrated with an example:

An Example
In Figure 5 benefits are initially set equal to $b^0$ at point A. Let the rate of time preference be high and adjustment costs, $m = \Delta S^0 + c < \min(\Delta S^e1, \Delta S^e2)$ (where $c$ is a small cost and $\min(x, y)$ is the minimum value of the two arguments, $x$ and $y$). After the economy has been hit by an adverse shock, benefits are increased to $b^{e1}$ and social welfare equals $S(b^{e1}, e1)$ at point C. In the absence of further shocks benefits remain at $b^{e1}$ and social welfare equals $S(b^{e1}, 0)$ at point D. Now consider the effect in a future period of another, but larger, bad shock, $e2 > e1$. Social welfare drops to $S(b^{e1}, e2)$ at point E. If benefits are increased to $b^{e2}$ then social welfare can be increased by $\Delta S^{e2} - m$ by moving to point F. Once the shock disappears, if benefits remain at $b^{e2}$ then social welfare increases to
\( S(b^{e2},0) \) at point G on curve SS. However since \( S(b^0,0)-S(b^{e2},0)>m \) it now becomes worthwhile to cut benefits back to \( b^0 \) where welfare is maximized at point A.

A second case concerns bad shocks of such large magnitude that tax effects, rather than insurance effects, begin to dominate the government’s benefit setting problem (e.g. \( \varepsilon>0.2 \)). First, assume that a bad shock has driven up optimal benefits and, because of institutional adjustment costs, it is optimal not to reduce them once the shock disappears. Now assume that a further bad shock hits the economy that leaves unemployed a large proportion of the labor force. If the size of the shock is sufficiently large then benefits must be directly reduced by the government due to tax considerations. This effect is not related to concavity per se, but rather to the budget constraint that mandates that benefits must be paid out of taxes on wages.

\textbf{The Natural Rate of Unemployment} \\
Work on the natural rate of unemployment drew a distinction between the short run, when variations in unemployment could affect inflation, and the long run, when unemployment could not vary. In particular, Friedman separated the demand management choices of policy makers from the constraints on those choices. Those constraints included the set of labor market institutions.

Work on hysteresis models mentioned in the introduction (e.g. Blanchard and Summers (1986)) has pointed out that this distinction may be overstated. Even if one rejects the behavioral assumptions in which those models stand, the difficulty in defining the natural rate remains once the generosity of the unemployment benefit system is endogenized. It is only possible for the special case in which benefits are set exogenously to define a natural rate of unemployment, \( u^* \), independently of the temporary, random shocks affecting the economy:

\[
 u_t = f(b_t) + \varepsilon_t \quad \Rightarrow \quad u^* = \mathbb{E}(u_t) = f(b_t)
\]  

(16)
assuming $E(\varepsilon_t)=0$. On the other hand, if benefits are set to maximize a social welfare function, then the “natural rate” depends on the history of shocks to the actual unemployment rate, via the effect of these shocks on the level of benefits:

$$u^* = E(u_t) = f(b(\varepsilon_t, \varepsilon_{t-1}, \varepsilon_{t-2}, \ldots))$$

(17)

In other words, and recalling Friedman’s definition of the natural rate of unemployment, the previous results suggest that this definition may no longer yield a unique value once the structural characteristics of the labor market over which the social planner has control, are themselves set optimally.\textsuperscript{17}

V. Conclusions

The hypothesis of exogenous labor market institutions is untenable. The case of unemployment benefits is, perhaps, the most telling. The time path of unemployment benefits in the US and Spain shows them increasing sharply in the years immediately after 1973 and 1979 (see Figures 1 and 2). A similar pattern is present in the data for other OECD countries. Those who believe in exogenous institutions must also believe that these countries were incredibly unlucky. The alternative is to develop a theory where institutions are rational. In such a theory, for example, the level of unemployment benefits should be set to balance insurance considerations with tax costs and adverse incentive effects (that may increase unemployment). This is the objective of this paper.

We present a model of rational institutions that can explain hysteresis in the labor market. The government is assumed to set unemployment benefits to maximize social welfare in response to a shock to unemployment. The set up is extremely simple: there is equilibrium unemployment, unemployment benefits introduce incentive effects (increase unemployment), there is a balanced budget rule and the government can observe the shock before setting benefits. Unlike previous models of hysteresis, our model does not require any special assumptions regarding "insiders", nor that the unemployment

\textsuperscript{17}He states that it is “the level which would be ground out by the Walrasian system of general equilibrium equations, provided that there is embedded in them the actual structural characteristics of the labor and commodity markets, including market imperfections, …”. 
experience affects workers in any particular way. The key assumption is that the individual utility function is concave and that there are "adjustment" costs to changing institutions.

The following results can be established.

1. In the absence of incentive effects, whereby higher unemployment benefits increase the unemployment rate, there should be full insurance. Unemployment benefits, on the other hand, should be set lowest (high) when the adverse incentive effects of benefits are largest (smallest).

2. In response to a shock that increases unemployment, benefits should be increased the most where the adverse incentive effects are more severe. The intuition for this result stems from the fact that benefits are set optimally at all times, including the moment just before the shock occurs. Thus, large incentive effects imply a low initial level of benefits. This means that there are large welfare gains derived from better insurance provision in the presence of an unemployment shock.

3. In the presence of an adjustment cost of changing the level of benefits there may now exist hysteresis in benefit setting and unemployment. In other words, the levels of these variables may rise in the presence of an adverse shock but after the shock disappears they may remain higher than their initial values. The reason for the asymmetry is that a shock adds a concave term to the objective function (social welfare). In other words, the value of adjusting changes with the level of benefits. This suggests that the key assumption behind hysteresis is the concavity of the utility function.

4. Temporary good shocks (including monetary) may now have permanent effects on unemployment. The reason is that lower unemployment may make lower benefits optimal. Unlike previous models in the literature, a succession of negative shocks does not reinforce the mechanism yielding hysteresis. In other words, unemployment is bounded above.

As in previous models of hysteresis, the natural rate of unemployment may no longer be able to be defined independently of the current unemployment rate. The approach
suggested here implies that unemployment shocks can generate permanent changes in the optimal design of institutions.
Figure 1: Spain’s Unemployment Benefits and Real Commodity Prices from 1969 to 1993.
Figure 2: The United State’s Unemployment Benefits and Real Commodity Prices from 1969 to 1993.
Figure 3: Social Welfare versus the Generosity of Unemployment Benefits Before a Shock (SS) and After an Adverse Shock to Unemployment (S'‘S’).
Figure 4: Social Welfare versus Unemployment Benefits Before a Shock (SS), After an Adverse Shock (S’S”) and After a Positive Shock that Reduces Unemployment (S’’S’’).
Figure 5: Social Welfare versus Unemployment Benefits Before a Shock (SS), After an Adverse Shock (S'NS) and After a Larger Adverse Shock that reduces Unemployment (S''S'').
We wish to show that $\Delta S^e > \Delta S^0$, where $S_b(b^0,0)=S_b(b^e,0)=0$ and $S_{bb}(b,e)<S_{bb}(b,0)<0$. Using Second Order Taylor Approximations:

\[
\Delta S^e = S_b(b^e,\varepsilon)(b^e - b^0) + \frac{S_{bb}(b^0,\varepsilon)(b^e - b^0)^2}{2!}
\]

and

\[
\Delta S^0 = \left[-S_b(b^0,0)(b^e - b^0) + \frac{S_{bb}(b^0,0)(b^e - b^0)^2}{2!}\right] = -\frac{S_{bb}(b^0,0)(b^e - b^0)^2}{2}
\]

since $S_{bb}(b^0,0)=0$. Furthermore:

\[
b^e - b^0 \approx -\frac{S_b(b^0,\varepsilon)}{S_{bb}(b^0,\varepsilon)}
\]

and consequently:

\[
\Delta S^e - \Delta S^0 = -\frac{S_b(b^0,\varepsilon)^2}{2S_{bb}(b^0,\varepsilon)} + \frac{S_b(b^e,\varepsilon)^2}{2S_{bb}(b^e,\varepsilon)} + \frac{S_{bb}(b^0,0)S_b(b^0,\varepsilon)^2}{2S_{bb}(b^0,\varepsilon)^2}
\]

\[
= -\frac{S_b(b^0,\varepsilon)^2}{2S_{bb}(b^0,\varepsilon)} \left[1 - \frac{S_{bb}(b^0,0)}{S_{bb}(b^0,\varepsilon)}\right] > 0
\]

since $S_{bb}(b^0,0)<S_{bb}(b^0,0)<0$.

Hence:

\[
\Delta S^e > \Delta S^0
\]

#
Appendix 2: The Effect of a Good Shock

Our model suggests that benefits may be cut following a good shock, so there may be a role for monetary policy: to make benefit cuts optimal. Again, it is simple, but not necessary, to let $\delta \to 0^+$, so that only welfare in the current period is valued by the government.

Assume that monetary policy (equated here to inflation) can achieve temporary reductions in unemployment. Hence when the government attempts to set benefits to maximize social welfare (see problem (11)) it now faces an unemployment rate given by:

$$u_t = f(b_t) + \varepsilon_t - \phi(\pi_t - E_{t-1}(\pi_t)) \quad (A6)$$

where $E_{t-1}(\pi_t)$ is the rational expectation in period $t-1$ of inflation in period $t$. Social welfare in the current period can now be expressed as a function of benefits, the sum of the two shock terms and the cost of inflation: $S(b_t, \varepsilon_t) - \phi(\pi_t - E_{t-1}(\pi_t)) - C(\pi_t)$, where $C_{\pi} > 0$. If benefits are assumed to be exogenous, then the government can only achieve temporary reductions in the unemployment rate, according to equation (A6), at the price of higher inflation. Consider the effect of a shock that causes unemployment to decrease in the current period by $-p = \phi(\varepsilon_t - E_{t-1}(\pi_t))$. If unemployment benefits are exogenous and the cost of inflation is sufficiently high so that $S(b^e, -p) - C(\pi > 0) - [S(b^e, 0) - C(\pi = 0)] = \mu$, where $\mu$ is a small negative number, the government will not want to inflate. However this result may no longer hold once labor market institutions are set to maximize social welfare.

**Proposition 5 (Non-Neutral Money):** When benefits are set to maximize social welfare, temporary monetary shocks can have permanent effects on the level of benefits (and the unemployment rate).

**Proof:** Assume Proposition 4(b) applies so that benefits are increased from $b^0$ to $b^e$ in the presence of an adverse shock, $\varepsilon$, but not reduced to their initial value once the shock has disappeared. In the absence of further shocks, social welfare would equal $S(b^e, 0) - C(\pi = 0)$ in all future periods. Now consider the effect of a temporary monetary shock that causes unemployment to decrease in the current period by $-p$ and let $b^p = \arg\max_b S(b, -p)$.

The direct effect of this shock is to reduce social welfare by $\mu = S(b^e, -p) - C(\pi > 0) - [S(b^e, 0) - C(\pi = 0)]$ because the cost of inflation exceeds the benefits from reducing unemployment. However $b^e$ is not the level of benefits that maximizes $S(b, -p)$. When benefits are cut to $b^p$, social welfare can be increased further by $\Delta S^p = S(b^p, -p) - C(\pi > 0) - [S(b^p, 0) - C(\pi = 0)]$ by paying the adjustment cost, $m$. If $\Delta S^p > m$ then it becomes worthwhile to reduce benefits in the presence of the shock. After it has disappeared (and in the absence of more shocks to unemployment) the level of benefits remains at the lower level, $b^p$, provided $m > S(b^0, 0) - S(b^p, 0)$. Since benefits are lower, the unemployment rate is also lower in future periods in the aftermath of the shock. As $\delta$ falls, the level of benefits chosen by the government after the monetary shock will tend to $b^0$. 

The intuition for this result is that a positive monetary shock temporarily lowers unemployment risk in the economy. In the period that this occurs, there is less demand...
for insurance and a relatively large welfare gain to be captured by cutting benefits. Provided this gain now exceeds the adjustment cost of changing benefits, the government can increase social welfare by reducing benefits and keeping them low in future periods (in the absence of further shocks).
Appendix 3: A Numerical Simulation

Let $w^g = 1$, $u^f = 0.04$, $\alpha = 0.2$ and the government’s rate of time preference be high so that it only values current period welfare. The optimal level of benefits, $b^0$, equals 0.13, and the unemployment rate equals 0.07. Social welfare, $S(b^0, 0)$, equals −0.14. Consider the effect of an adverse unemployment shock, $\varepsilon$, of size 0.04. For simplicity, assume that the gross wage is not affected by the shock. If benefits are kept at their pre-shock level then welfare drops to $S(b^0, \varepsilon) = -0.23$. However in the absence of an adjustment cost if benefits are increased to $b^* = 0.32$, which maximizes $S(b, \varepsilon)$, then social welfare rises to $S(b^*, \varepsilon) = -0.21$. In other words, social welfare can be increased by $\Delta S^\varepsilon = S(b^*, \varepsilon) - S(b^0, \varepsilon) = 0.02$. After the shock has disappeared, the gain from reducing benefits from $b^*$ to their initial value, $b^0$, equals $\Delta S^0 = S(b^0, 0) - S(b^*, 0) = 0.01$. Consequently, the welfare gain from increasing benefits in the presence of the shock is twice the size of the welfare gain from reducing benefits after it has gone. When adjustment costs are zero (or small) then along the optimal path benefits should be increased from 0.13 to 0.32 and then subsequently reduced back to 0.13.

**Optimal Benefits with Adjustment Costs**

Now assume that adjustment costs satisfy $0.01 < m < 0.02$. In such a case, it is worthwhile for the government to raise benefits in the period that the temporary shock occurs but not to reduce them once $\varepsilon = 0$. If the adjustment cost equals 0.015 then in the period of the shock, social welfare can be increased by 0.005 ($\Delta S^\varepsilon - m = 0.02 - 0.015$) by increasing benefits from $b^0 = 0.13$ to $b^* = 0.32$. In the period that the shock disappears, benefits should not be cut since this policy would result in a welfare loss equal to $-0.005$ ($\Delta S^0 - m = 0.01 - 0.015$). The unemployment rate also does not return to its initial value, due to the higher level of benefits. After the shock has disappeared, the unemployment rate equals 0.10, which is 0.03 higher than its initial (pre-shock) value.

**Good Shocks**

Start from the position in which benefits have been optimally increased to $b^* = 0.32$ following the adverse shock of size, $\varepsilon = 0.04$, and not subsequently reduced once the shock has disappeared due to the adjustment cost, $m = 0.015$. Social welfare, $S(b^0, 0) = -0.15$. Now consider the effect of a good (monetary) shock that temporarily reduces unemployment by $-p = -0.02$. Social welfare rises by 0.02 as a direct consequence ($= S(b^*, -p) - S(b^*, 0) = -0.13 - (-0.15)$) not taking account the costs of the associated higher inflation. By cutting benefits to $b^p = 0.07$ in the period of the shock, social welfare can be further increased by 0.01 ($= \Delta S^p - m = S(b^p, -p) - S(b^*, -p) - m = -0.105 - (-0.13) - 0.015$). In the absence of further shocks to unemployment, benefits will permanently remain at this lower level. Unemployment will also remain low, equal to 0.05, compared to its pre-shock value of 0.10.

---

18 The optimal replacement rate rises from 0.13 (pre-shock) to 0.33 (post-shock).
A Succession of Bad Shocks

Start from the position in which benefits have been optimally increased from $b^0 = 0.13$ to $b^{e_1} = 0.32$ following the first adverse shock of size, $e_1 = 0.04$, and not subsequently reduced once the shock has disappeared due to the adjustment cost, $m = 0.015$. Social welfare, $S(b^{e_1}, 0) = -0.15$. Now consider the effect of another bad, but larger, shock to unemployment of size, $e_2 = 0.16$. If benefits are not changed then social welfare drops to $S(b^{e_1}, e_2) = -0.45$. However if benefits are increased further to $b^{e_2} = 0.46$, which maximizes $S(b, e_2)$, then social welfare can be increased by 0.005 ($= \Delta S^{e_2} - m = S(b^{e_2}, e_2) - S(b^{e_1}, e_2) - m = -0.43 - (-0.45) - 0.015$). In the period that the second shock disappears, it becomes worthwhile to cut benefits back to their initial level, $b^0 = 0.13$, since the gain from doing so, even after paying the adjustment cost, is positive. It equals 0.015 ($= S(b^0, 0) - S(b^{e_2}, 0) - m = -0.14 - (-0.17) - 0.015 = 0.015$). Unemployment also returns to its initial level, equal to 0.07.
References


2008
B01-08 Euro-Diplomatie durch gemeinsame „Wirtschaftsregierung“  Martin Seidel

2007
B03-07 Löhne und Steuern im Systemwettbewerb der Mitgliedstaaten der Europäischen Union  Martin Seidel
B02-07 Konsolidierung und Reform der Europäischen Union  Martin Seidel
B01-07 The Ratification of European Treaties - Legal and Constitutional Basis of a European Referendum.  Martin Seidel

2006
B03-06 Financial Frictions, Capital Reallocation, and Aggregate Fluctuations  Jürgen von Hagen, Haiping Zhang
B02-06 Financial Openness and Macroeconomic Volatility  Jürgen von Hagen, Haiping Zhang
B01-06 A Welfare Analysis of Capital Account Liberalization  Jürgen von Hagen, Haiping Zhang

2005
B11-05 Das Kompetenz- und Entscheidungssystem des Vertrages von Rom im Wandel seiner Funktion und Verfassung  Martin Seidel
B10-05 Die Schutzklauseln der Beitrittsverträge  Stefan Lutz
B09-05 Measuring Tax Burdens in Europe  Guntram B. Wolff
B08-05 Remittances as Investment in the Absence of Altruism  Gabriel González-König
B07-05 Economic Integration in a Multicone World?  Christian Volpe Martincus, Jennifer Pédussel Wu

2004
B06-05 Banking Sector (Under?)Development in Central and Eastern Europe  Jürgen von Hagen, Valeriya Dinger
B05-05 Regulatory Standards Can Lead to Predation  Stefan Lutz
B04-05 Währungspolitik als Sozialpolitik  Martin Seidel
B03-05 Public Education in an Integrated Europe: Studying to Migrate and Teaching to Stay?  Panu Poutvaara
B02-05 Voice of the Diaspora: An Analysis of Migrant Voting Behavior  Jan Fidrmuc, Orla Doyle
B01-05 Macroeconomic Adjustment in the New EU Member States  Jürgen von Hagen, Iulia Traistaru

2004
B33-04 The Effects of Transition and Political Instability On Foreign Direct Investment Inflows: Central Europe and the Balkans  Josef C. Brada, Ali M. Kutan, Taner M. Yigit
B32-04 The Choice of Exchange Rate Regimes in Developing Countries: A Multinominal Panel Analysis  Jürgen von Hagen, Jizhong Zhou
B31-04 Fear of Floating and Fear of Pegging: An Empirical Anaysis of De Facto Exchange Rate Regimes in Developing Countries  Jürgen von Hagen, Jizhong Zhou
B30-04 Der Vollzug von Gemeinschaftsrecht über die Mitgliedstaaten und seine Rolle für die EU und den Beitrittsprozess  Martin Seidel
B29-04 Deutschlands Wirtschaft, seine Schulden und die Unzulänglichkeiten der einheitlichen Geldpolitik im Eurosystem  Dieter Spethmann, Otto Steiger
B28-04 Fiscal Crises in U.S. Cities: Structural and Non-structural Causes  Guntram B. Wolff
B27-04 Firm Performance and Privatization in Ukraine  Galyna Grygorenko, Stefan Lutz
B26-04 Analyzing Trade Opening in Ukraine: Effects of a Customs Union with the EU  Oksana Harbuzyuk, Stefan Lutz
B25-04 Exchange Rate Risk and Convergence to the Euro  Lucjan T. Orlowski
B24-04 The Endogeneity of Money and the Eurosystem  Otto Steiger
B23-04 Which Lender of Last Resort for the Eurosystem?  Otto Steiger
B21-04 The Effectiveness of Subsidies Revisited: Accounting for Wage and Employment Effects in Business R+D  Volker Reinthaler, Guntram B. Wolff
B20-04 Money Market Pressure and the Determinants of Banking Crises  Jürgen von Hagen, Tai-kuang Ho
B19-04 Die Stellung der Europäischen Zentralbank nach dem Verfassungsvertrag  Martin Seidel
Transmission Channels of Business Cycles Synchronization in an Enlarged EMU
Iulia Traistaru

Foreign Exchange Regime, the Real Exchange Rate and Current Account Sustainability: The Case of Turkey
Sübidey Togan, Hasan Ersel

Harry P. Bowen, Jennifer Pédussel Wu

Do Economic Integration and Fiscal Competition Help to Explain Local Patterns?
Christian Volpe Martincus

Euro Adoption and Maastricht Criteria: Rules or Discretion?
Jiri Jonas

The Role of Electoral and Party Systems in the Development of Fiscal Institutions in the Central and Eastern European Countries
Sami Yläöutinen

Measuring and Explaining Levels of Regional Economic Integration
Jennifer Pédussel Wu

Economic Integration and Location of Manufacturing Activities: Evidence from MERCOSUR
Pablo Sanguinetti, Iulia Traistaru, Christian Volpe Martincus

Economic Integration and Industry Location in Transition Countries
Laura Resmini

Testing Creditor Moral Hazard in Sovereign Bond Markets: A Unified Theoretical Approach and Empirical Evidence
Ayse Y. Evrensel, Ali M. Kutan

European Integration, Productivity Growth and Real Convergence
Taner M. Yigit, Ali M. Kutan

The Contribution of Income, Social Capital, and Institutions to Human Well-being in Africa
Mina Baliamoune-Lutz, Stefan H. Lutz

Rural Urban Inequality in Africa: A Panel Study of the Effects of Trade Liberalization and Financial Deepening
Mina Baliamoune-Lutz, Stefan H. Lutz

Money Rules for the Eurozone Candidate Countries
Lucjan T. Orlowski

Who is in Favor of Enlargement? Determinants of Support for EU Membership in the Candidate Countries' Referenda
Orla Doyle, Jan Fidrmuc

Over- and Underbidding in Central Bank Open Market Operations Conducted as Fixed Rate Tender
Ulrich Bindseil

Total Factor Productivity and Economic Freedom Implications for EU Enlargement
Ronald L. Moomaw, Euy Seok Yang

Die neuen Schutzklauseln der Artikel 38 und 39 des Beitrittvertrages: Schutz der alten Mitgliedstaaten vor Störungen durch die neuen Mitgliedstaaten
Martin Seidel

Macroeconomic Implications of Low Inflation in the Euro Area
Jürgen von Hagen, Boris Hofmann

The Effects of Transition and Political Instability on Foreign Direct Investment: Central Europe and the Balkans
Josef C. Brada, Ali M. Kutan, Taner M. Yigit

The Performance of the Euribor Futures Market: Efficiency and the Impact of ECB Policy Announcements (Electronic Version of International Finance)
Kerstin Bernoth, Juergen von Hagen

How Flexible are Wages in EU Accession Countries?
Anna Iara, Iulia Traistaru

Monetary Policy Reaction Functions: ECB versus Bundesbank
Bernd Hayo, Boris Hofmann

Economic Integration and Manufacturing Concentration Patterns: Evidence from Mercosur
Iulia Traistaru, Christian Volpe Martincus

Reformzwänge innerhalb der EU angesichts der Osterweiterung
Martin Seidel

Reputation Flows: Contractual Disputes and the Channels for Inter-Firm Communication
William Pyle

Urban Primacy, Gigantism, and International Trade: Evidence from Asia and the Americas
Ronald L. Moomaw, Mohammed A. Alwosabi

An Empirical Analysis of Competing Explanations of Urban Primacy Evidence from Asia and the Americas
Ronald L. Moomaw, Mohammed A. Alwosabi
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>B18-03</td>
<td>The Effects of Regional and Industry-Wide FDI Spillovers on Export of Ukrainian Firms</td>
<td>Stefan H. Lutz, Oleksandr Talavera, Sang-Min Park</td>
</tr>
<tr>
<td>B17-03</td>
<td>Determinants of Inter-Regional Migration in the Baltic States</td>
<td>Mihails Hazans</td>
</tr>
<tr>
<td>B16-03</td>
<td>South-East Europe: Economic Performance, Perspectives, and Policy Challenges</td>
<td>Iulia Traistaru, Jürgen von Hagen</td>
</tr>
<tr>
<td>B15-03</td>
<td>Employed and Unemployed Search: The Marginal Willingness to Pay for Attributes in Lithuania, the US and the Netherlands</td>
<td>Jos van Ommeren, Mihails Hazans</td>
</tr>
<tr>
<td>B14-03</td>
<td>FCIs and Economic Activity: Some International Evidence</td>
<td>Charles Goodhart, Boris Hofmann</td>
</tr>
<tr>
<td>B13-03</td>
<td>The IS Curve and the Transmission of Monetary Policy: Is there a Puzzle?</td>
<td>Charles Goodhart, Boris Hofmann</td>
</tr>
<tr>
<td>B12-03</td>
<td>What Makes Regions in Eastern Europe Catching Up? The Role of Foreign Investment, Human Resources, and Geography</td>
<td>Gabriele Tondl, Goran Vuksic</td>
</tr>
<tr>
<td>B11-03</td>
<td>Die Weisungs- und Herrschaftsmacht der Europäischen Zentralbank im europäischen System der Zentralbanken - eine rechtliche Analyse</td>
<td>Martin Seidel</td>
</tr>
<tr>
<td>B10-03</td>
<td>Foreign Direct Investment and Perceptions of Vulnerability to Foreign Exchange Crises: Evidence from Transition Economies</td>
<td>Josef C. Brada, Vladimír Tomsik</td>
</tr>
<tr>
<td>B09-03</td>
<td>The European Central Bank and the Eurosystem: An Analysis of the Missing Central Monetary Institution in European Monetary Union</td>
<td>Gunnar Heinsohn, Otto Steiger</td>
</tr>
<tr>
<td>B08-03</td>
<td>The Determination of Capital Controls: Which Role Do Exchange Rate Regimes Play?</td>
<td>Jürgen von Hagen, Jizhong Zhou</td>
</tr>
<tr>
<td>B07-03</td>
<td>Nach Nizza und Stockholm: Stand des Binnenmarktes und Prioritäten für die Zukunft</td>
<td>Martin Seidel</td>
</tr>
<tr>
<td>B06-03</td>
<td>Fiscal Discipline and Growth in Euroland. Experiences with the Stability and Growth Pact</td>
<td>Jürgen von Hagen</td>
</tr>
<tr>
<td>B05-03</td>
<td>Reconsidering the Evidence: Are Eurozone Business Cycles Converging?</td>
<td>Michael Massmann, James Mitchell</td>
</tr>
<tr>
<td>B04-03</td>
<td>Do Ukrainian Firms Benefit from FDI?</td>
<td>Stefan H. Lutz, Oleksandr Talavera</td>
</tr>
<tr>
<td>B03-03</td>
<td>Europäische Steuerkoordination und die Schweiz</td>
<td>Stefan H. Lutz</td>
</tr>
<tr>
<td>B02-03</td>
<td>Commuting in the Baltic States: Patterns, Determinants, and Gains</td>
<td>Mihails Hazans</td>
</tr>
<tr>
<td>B01-03</td>
<td>Die Wirtschafts- und Währungsunion im rechtlichen und politischen Gefüge der Europäischen Union</td>
<td>Martin Seidel</td>
</tr>
<tr>
<td>2002</td>
<td>An Adverse Selection Model of Optimal Unemployment Assurance</td>
<td>Marcus Hagedorn, Ashok Kaul, Tim Mennel</td>
</tr>
<tr>
<td>B29B-02</td>
<td>Trade Agreements as Self-protection</td>
<td>Jennifer Pédussel Wu</td>
</tr>
<tr>
<td>B29A-02</td>
<td>Growth and Business Cycles with Imperfect Credit Markets</td>
<td>Debajyoti Chakrabarty</td>
</tr>
<tr>
<td>B28-02</td>
<td>Inequality, Politics and Economic Growth</td>
<td>Debajyoti Chakrabarty</td>
</tr>
<tr>
<td>B27-02</td>
<td>Poverty Traps and Growth in a Model of Endogenous Time Preference</td>
<td>Debajyoti Chakrabarty</td>
</tr>
<tr>
<td>B26-02</td>
<td>Monetary Convergence and Risk Premiums in the EU Candidate Countries</td>
<td>Lucjan T. Orlowski</td>
</tr>
<tr>
<td>B24-02</td>
<td>The Effects of Quotas on Vertical Intra-industry Trade</td>
<td>Stefan Lutz</td>
</tr>
<tr>
<td>B23-02</td>
<td>Legal Aspects of European Economic and Monetary Union</td>
<td>Martin Seidel</td>
</tr>
<tr>
<td>B22-02</td>
<td>Der Staat als Lender of Last Resort - oder: Die Achillesverse des Eurosystems</td>
<td>Otto Steiger</td>
</tr>
<tr>
<td>B21-02</td>
<td>Nominal and Real Stochastic Convergence Within the Transition Economies and to the European Union: Evidence from Panel Data</td>
<td>Ali M. Kutan, Taner M. Yigit</td>
</tr>
</tbody>
</table>
B19-02 East Germany: Transition with Unification, Experiments and Experiences
Jürgen von Hagen, Rolf R. Strauch, Guntram B. Wolff

B18-02 Regional Specialization and Employment Dynamics in Transition Countries
Iulia Traistaru, Guntram B. Wolff

B17-02 Specialization and Growth Patterns in Border Regions of Accession Countries
Laura Resmini

B16-02 Regional Specialization and Concentration of Industrial Activity in Accession Countries
Iulia Traistaru, Peter Nijkamp, Simonetta Longhi

B15-02 Does Broad Money Matter for Interest Rate Policy?
Matthias Brückner, Andreas Schaber

B14-02 The Long and Short of It: Global Liberalization, Poverty and Inequality
Christian E. Weller, Adam Hersch

B13-02 De Facto and Official Exchange Rate Regimes in Transition Economies
Jürgen von Hagen, Jizhong Zhou

B12-02 Argentina: The Anatomy of A Crisis
Jiri Jonas

B11-02 The Eurosystem and the Art of Central Banking
Gunmar Heinsohn, Otto Steiger

Martin Seidel

B09-02 Monetary Policy in the Euro Area - Lessons from the First Years
Volker Clausen, Bernd Hayo

B08-02 Has the Link Between the Spot and Forward Exchange Rates Broken Down? Evidence From Rolling Cointegration Tests
Ali M. Kutan, Su Zhou

B07-02 Perspektiven der Erweiterung der Europäischen Union
Martin Seidel

B06-02 Is There Asymmetry in Forward Exchange Rate Bias? Multi-Country Evidence
Su Zhou, Ali M. Kutan

B05-02 Real and Monetary Convergence Within the European Union and Between the European Union and Candidate Countries: A Rolling Cointegration Approach
Josef C. Brada, Ali M. Kutan, Su Zhou

B04-02 Asymmetric Monetary Policy Effects in EMU
Volker Clausen, Bernd Hayo

B03-02 The Choice of Exchange Rate Regimes: An Empirical Analysis for Transition Economies
Jürgen von Hagen, Jizhong Zhou

B02-02 The Euro System and the Federal Reserve System Compared: Facts and Challenges
Karlheinz Ruckriegel, Franz Seitz

B01-02 Does Inflation Targeting Matter?
Manfred J. M. Neumann, Jürgen von Hagen

2001

B29-01 Is Kazakhstan Vulnerable to the Dutch Disease?
Karlygash Kuralbayeva, Ali M. Kutan, Michael L. Wyzan

B28-01 Political Economy of the Nice Treaty: Rebalancing the EU Council. The Future of European Agricultural Policies
Deutsch-Französisches Wirtschaftspolitisches Forum

B27-01 Investor Panic, IMF Actions, and Emerging Stock Market Returns and Volatility: A Panel Investigation
Bernd Hayo, Ali M. Kutan

B26-01 Regional Effects of Terrorism on Tourism: Evidence from Three Mediterranean Countries
Konstantinos Drakos, Ali M. Kutan

B25-01 Monetary Convergence of the EU Candidates to the Euro: A Theoretical Framework and Policy Implications
Lucjan T. Orlowski

B24-01 Disintegration and Trade
Jarko and Jan Fidrmuc

B23-01 Migration and Adjustment to Shocks in Transition Economies
Jan Fidrmuc

B22-01 Strategic Delegation and International Capital Taxation
Matthias Brückner

B21-01 Balkan and Mediterranean Candidates for European Union Membership: The Convergence of Their Monetary Policy With That of the Europäen Central Bank
Josef C. Brada, Ali M. Kutan

B20-01 An Empirical Inquiry of the Efficiency of Intergovernmental Transfers for Water Projects Based on the WRDA Data
Anna Rubinchik-Pessach

B19-01 Detrending and the Money-Output Link: International Evidence
R.W. Hafer, Ali M. Kutan
B18-01 Monetary Policy in Unknown Territory. The European Central Bank in the Early Years
Jürgen von Hagen, Matthias Brückner

B17-01 Executive Authority, the Personal Vote, and Budget Discipline in Latin American and Carribean Countries
Mark Hallerberg, Patrick Marier

B16-01 Sources of Inflation and Output Fluctuations in Poland and Hungary: Implications for Full Membership in the European Union
Selahattin Dibooglu, Ali M. Kutan

B15-01 Programs Without Alternative: Public Pensions in the OECD
Christian E. Weller

B14-01 Formal Fiscal Restraints and Budget Processes As Solutions to a Deficit and Spending Bias in Public Finances - U.S. Experience and Possible Lessons for EMU
Rolf R. Strauch, Jürgen von Hagen

B13-01 German Public Finances: Recent Experiences and Future Challenges
Jürgen von Hagen, Rolf R. Strauch

B12-01 The Impact of Eastern Enlargement On EU-Labour Markets. Pensions Reform Between Economic and Political Problems
Deutsch-Französisches Wirtschaftspolitisches Forum

B11-01 Inflationary Performance in a Monetary Union With Large Wage Setters
Lilia Cavallar

B10-01 Integration of the Baltic States into the EU and Institutions of Fiscal Convergence: A Critical Evaluation of Key Issues and Empirical Evidence
Ali M. Kutan, Niina Pautola-Mol

B09-01 Democracy in Transition Economies: Grease or Sand in the Wheels of Growth?
Jan Fidrmuc

B08-01 The Functioning of Economic Policy Coordination
Jürgen von Hagen, Susanne Mundschken

B07-01 The Convergence of Monetary Policy Between Candidate Countries and the European Union
Josef C. Brada, Ali M. Kutan

B06-01 Opposites Attract: The Case of Greek and Turkish Financial Markets
Konstantinos Drakos, Ali M. Kutan

B05-01 Trade Rules and Global Governance: A Long Term Agenda. The Future of Banking.
Deutsch-Französisches Wirtschaftspolitisches Forum

B04-01 The Determination of Unemployment Benefits
Rafael di Tella, Robert J. MacCulloch

B03-01 Preferences Over Inflation and Unemployment: Evidence from Surveys of Happiness
Rafael di Tella, Robert J. MacCulloch, Andrew J. Oswald

B02-01 The Konstanz Seminar on Monetary Theory and Policy at Thirty
Michele Fratianni, Jürgen von Hagen

B01-01 Divided Boards: Partisanship Through Delegated Monetary Policy
Etienne Farvaque, Gael Lagadec

2000

B20-00 Breakin-up a Nation, From the Inside
Etienne Farvaque

B19-00 Income Dynamics and Stability in the Transition Process, general Reflections applied to the Czech Republic
Jens Hölscher

B18-00 Budget Processes: Theory and Experimental Evidence
Karl-Martin Ehrhart, Roy Gardner, Jürgen von Hagen, Claudia Keser, Martin Seidel

B17-00 Rückführung der Landwirtschaftspolitik in die Verantwortung der Mitgliedstaaten? - Rechts- und Verfassungsfragen des Gemeinschaftsrechts
Christa Randzio-Plath, Tomasso Padoa-Schioppa

B15-00 Regional Risk Sharing and Redistribution in the German Federation
Jürgen von Hagen, Ralf Hepp

B14-00 Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary
Selahattin Dibooglu, Ali M. Kutan

B13-00 Back to the Future: The Growth Prospects of Transition Economies Reconsidered
Nauro F. Campos
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B12-00</td>
<td>Rechtsetzung und Rechtsangleichung als Folge der Einheitlichen Europäischen Währung</td>
<td>Martin Seidel</td>
</tr>
<tr>
<td>B11-00</td>
<td>A Dynamic Approach to Inflation Targeting in Transition Economies</td>
<td>Lucjan T. Orlowski</td>
</tr>
<tr>
<td>B10-00</td>
<td>The Importance of Domestic Political Institutions: Why and How Belgium Qualified for EMU</td>
<td>Marc Hallerberg</td>
</tr>
<tr>
<td>B09-00</td>
<td>Rational Institutions Yield Hysteresis</td>
<td>Rafael Di Tella, Robert MacCulloch</td>
</tr>
<tr>
<td>B08-00</td>
<td>The Effectiveness of Self-Protection Policies for Safeguarding Emerging Market Economies from Crises</td>
<td>Kenneth Kletzer</td>
</tr>
<tr>
<td>B07-00</td>
<td>Financial Supervision and Policy Coordination in The EMU</td>
<td>Deutsch-Französisches Wirtschaftspolitisches Forum</td>
</tr>
<tr>
<td>B06-00</td>
<td>The Demand for Money in Austria</td>
<td>Bernd Hayo</td>
</tr>
<tr>
<td>B05-00</td>
<td>Liberalization, Democracy and Economic Performance during Transition</td>
<td>Jan Fidrmuc</td>
</tr>
<tr>
<td>B04-00</td>
<td>A New Political Culture in The EU - Democratic Accountability of the ECB</td>
<td>Christa Randzio-Plath</td>
</tr>
<tr>
<td>B03-00</td>
<td>Integration, Disintegration and Trade in Europe: Evolution of Trade Relations during the 1990's</td>
<td>Jarko Fidrmuc, Jan Fidrmuc</td>
</tr>
<tr>
<td>B02-00</td>
<td>Inflation Bias and Productivity Shocks in Transition Economies: The Case of the Czech Republic</td>
<td>Josef C. Brada, Arthur E. King, Ali M. Kutan</td>
</tr>
<tr>
<td>B01-00</td>
<td>Monetary Union and Fiscal Federalism</td>
<td>Kenneth Kletzer, Jürgen von Hagen</td>
</tr>
</tbody>
</table>

1999

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B25-99</td>
<td>Micro and Macro Determinants of Public Support for Market Reforms in Eastern Europe</td>
<td>Bernd Hayo</td>
</tr>
<tr>
<td>B23-99</td>
<td>Informal Family Insurance and the Design of the Welfare State</td>
<td>Rafael Di Tella, Robert MacCulloch</td>
</tr>
<tr>
<td>B22-99</td>
<td>Partisan Social Happiness</td>
<td>Rafael Di Tella, Robert MacCulloch</td>
</tr>
<tr>
<td>B20-99</td>
<td>Subnational Government Bailouts in Germany</td>
<td>Helmut Seitz</td>
</tr>
<tr>
<td>B19-99</td>
<td>The Evolution of Monetary Policy in Transition Economies</td>
<td>Ali M. Kutan, Josef C. Brada</td>
</tr>
<tr>
<td>B18-99</td>
<td>Why are Eastern Europe’s Banks not failing when everybody else’s are?</td>
<td>Christian E. Weller, Bernard Morzuch</td>
</tr>
<tr>
<td>B17-99</td>
<td>Stability of Monetary Unions: Lessons from the Break-Up of Czechoslovakia</td>
<td>Jan Fidrmuc, Julius Horvath and Jarko Fidrmuc</td>
</tr>
<tr>
<td>B16-99</td>
<td>Multinational Banks and Development Finance</td>
<td>Christian E. Weller and Mark J. Scher</td>
</tr>
<tr>
<td>B15-99</td>
<td>Financial Crises after Financial Liberalization: Exceptional Circumstances or Structural Weakness?</td>
<td>Christian E. Weller and Birgit Uhlenbrock</td>
</tr>
<tr>
<td>B14-99</td>
<td>Industry Effects of Monetary Policy in Germany</td>
<td>Bernd Hayo and Birgit Uhlenbrock</td>
</tr>
<tr>
<td>B13-99</td>
<td>Financial Fragility or What Went Right and What Could Go Wrong in Central European Banking?</td>
<td>Jürgen von Hagen</td>
</tr>
<tr>
<td>B12 -99</td>
<td>Size Distortions of Tests of the Null Hypothesis of Stationarity: Evidence and Implications for Applied Work</td>
<td>Mehmet Caner and Lutz Kilian</td>
</tr>
<tr>
<td>B11-99</td>
<td>Financial Supervision and Policy Coordination in the EMU</td>
<td>Deutsch-Französisches Wirtschaftspolitisches Forum</td>
</tr>
<tr>
<td>B10-99</td>
<td>Financial Liberalization, Multinational Banks and Credit Supply: The Case of Poland</td>
<td>Christian Weller</td>
</tr>
<tr>
<td>B09-99</td>
<td>Monetary Policy, Parameter Uncertainty and Optimal Learning</td>
<td>Volker Wieland</td>
</tr>
<tr>
<td>B08-99</td>
<td>The Connection between more Multinational Banks and less Real Credit in Transition Economies</td>
<td>Christian Weller</td>
</tr>
<tr>
<td>Year</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1999</td>
<td>Comovement and Catch-up in Productivity across Sectors: Evidence from the OECD</td>
<td>Christopher M. Cornwell and Jens-Uwe Wächter</td>
</tr>
<tr>
<td></td>
<td>Productivity Convergence and Economic Growth: A Frontier Production Function Approach</td>
<td>Christopher M. Cornwell and Jens-Uwe Wächter</td>
</tr>
<tr>
<td></td>
<td>Tumbling Giant: Germany's Experience with the Maastricht Fiscal Criteria</td>
<td>Jürgen von Hagen and Rolf Strauch</td>
</tr>
<tr>
<td></td>
<td>The Finance-Investment Link in a Transition Economy: Evidence for Poland from Panel Data</td>
<td>Christian Weller</td>
</tr>
<tr>
<td></td>
<td>The Macroeconomics of Happiness</td>
<td>Christian Weller</td>
</tr>
<tr>
<td></td>
<td>The Consequences of Labour Market Flexibility: Panel Evidence Based on Survey Data</td>
<td>Rafael Di Tella, Robert MacCulloch and Andrew J. Oswald</td>
</tr>
<tr>
<td></td>
<td>The Excess Volatility of Foreign Exchange Rates: Statistical Puzzle or Theoretical Artifact?</td>
<td>Robert B.H. Hauswald</td>
</tr>
<tr>
<td>1998</td>
<td>Labour Market + Tax Policy in the EMU</td>
<td>Deutsch-Französisches Wirtschaftspolitisches Forum</td>
</tr>
<tr>
<td></td>
<td>Can Taxing Foreign Competition Harm the Domestic Industry?</td>
<td>Stefan Lutz</td>
</tr>
<tr>
<td></td>
<td>Free Trade and Arms Races: Some Thoughts Regarding EU-Russian Trade</td>
<td>Rafael Reuveny and John Maxwell</td>
</tr>
<tr>
<td></td>
<td>Fiscal Policy and Intranational Risk-Sharing</td>
<td>Jürgen von Hagen</td>
</tr>
<tr>
<td></td>
<td>Price Stability and Monetary Policy Effectiveness when Nominal Interest Rates are Bounded at Zero</td>
<td>Athanasios Orphanides and Volker Wieland</td>
</tr>
<tr>
<td></td>
<td>Die Bewertung der &quot;dauerhaft tragbaren öffentlichen Finanzlage&quot; der EU Mitgliedstaaten beim Übergang zur dritten Stufe der EWWU</td>
<td>Rolf Strauch</td>
</tr>
<tr>
<td></td>
<td>Exchange Rate Regimes in the Transition Economies: Case Study of the Czech Republic: 1990-1997</td>
<td>Julius Horvath and Jiri Jonas</td>
</tr>
<tr>
<td></td>
<td>Der Wettbewerb der Rechts- und politischen Systeme in der Europäischen Union</td>
<td>Martin Seidel</td>
</tr>
<tr>
<td></td>
<td>U.S. Monetary Policy and Monetary Policy and the ESCB</td>
<td>Robert L. Hetzel</td>
</tr>
<tr>
<td></td>
<td>Money-Output Granger Causality Revisited: An Empirical Analysis of EU Countries (überarbeitete Version zum Herunterladen)</td>
<td>Bernd Hayo</td>
</tr>
<tr>
<td></td>
<td>Designing Voluntary Environmental Agreements in Europe: Some Lessons from the U.S. EPA’s 33/50 Program</td>
<td>John W. Maxwell</td>
</tr>
<tr>
<td></td>
<td>Monetary Union, Asymmetric Productivity Shocks and Fiscal Insurance: An Analytical Discussion of Welfare Issues</td>
<td>Kenneth Kletzer</td>
</tr>
<tr>
<td></td>
<td>Estimating a European Demand for Money (überarbeitete Version zum Herunterladen)</td>
<td>Bernd Hayo</td>
</tr>
<tr>
<td></td>
<td>The EMU’s Exchange Rate Policy</td>
<td>Deutsch-Französisches Wirtschaftspolitisches Forum</td>
</tr>
<tr>
<td></td>
<td>Central Bank Policy in a More Perfect Financial System</td>
<td>Jürgen von Hagen</td>
</tr>
<tr>
<td></td>
<td>Trade with Low-Wage Countries and Wage Inequality</td>
<td>Jaleel Ahmad</td>
</tr>
<tr>
<td></td>
<td>Budgeting Institutions for Aggregate Fiscal Discipline</td>
<td>Jürgen von Hagen</td>
</tr>
<tr>
<td>1997</td>
<td>Macroeconomic Stabilization with a Common Currency: Does European Monetary Unification Create a Need for Fiscal Insurance or Federalism?</td>
<td>Kenneth Kletzer</td>
</tr>
<tr>
<td></td>
<td>Employment and EMU</td>
<td>Deutsch-Französisches Wirtschaftspolitisches Forum</td>
</tr>
<tr>
<td></td>
<td>A Stability Pact for Europe</td>
<td>(a Forum organized by ZEI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>