ETLA
ELINKEINOELÄMÄN TUTKIMUSLAITOS
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
Lönnrotinkatu 4 B 00120 Helsinki Finland Tel. 358-9-609 900
Telefax 358-9-601 753 World Wide Web: http://www.etla.fi/

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Kari E.O. Alho

THE FINNISH EMU BUFFERS AND THE LABOUR MARKET UNDER ASYMMETRIC SHOCKS*

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ABSTRACT: The Finnish EMU buffers consist of elements built into the unemployment insurance and employment pension systems, which aim to stabilise employer contributions and employment during economic fluctuations in the EMU age. The paper simulates the role of these buffers in a hypothetical recession caused by an adverse asymmetric shock. The results show that the buffers play only a modest role in stabilising employment, although their importance increases as the shocks to the economy become greater. On the other hand, the buffers are likely to entail behaviour of the moral hazard kind, as they reduce the need for real wage adjustment in the economy. The paper also addresses the policy problem of whether to manage a recession by cutting employers' indirect labour costs or by raising effective demand through increased social security benefits. A criterion for this policy choice is derived and tested using Finnish data.

Key words: EMU buffers, asymmetric shock, wage formation

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TIIVISTELMÄ: Suomen EMU-puskurit koostuvat työeläkejärjestelmään ja työttömyysvakuutusjärjestelmään kootuista puskureista. Niiden tavoite on pitää yritysten sosiaalivakuutusmaksut vakaina mahdollisissa taantumissa EMU-oloissa ja siten vakauttaa työllisyyskehitystä verrattuna jakojärjestelmään. Tämä paperi analysoi ensin puskureiden merkitystä työllisyyden vakauttajana kuvitelluissa taantumissa. Tulos on se, että puskureiden merkitys on suhteellisen vähäinen tässä suhteessa, mutta kuitenkin sitä merkittävämpi, mitä pahempi taantuma on. Toiseksi arvioidaan sitä, onko puskureilla ns. moraalikadon ominaisuus, koska ne voivat vähentää muuten toteutuvaa reaalipalkkasopeutumista työmarkkinoilla. Kolmanneksi tutkitaan sitä, minkälaista talouspolitiikkaa pitäisi noudattaa taantumassa, so. pitääkö karsia yritysten välillisiä työvoimakustannuksia vähentämällä työttömyysetuuksia vai ylläpitää kysyntää lisäämällä sosiaalietuuksia ja rahoittaa ne yritysten työttömyysvakuutusmaksuilla. Tämän politiikkavalinnan suhteen johdetaan kriteeri ja sen paikkansapitävyyttä analysoidaan empiirisesti Suomen aineistolla.

Asiasanat: EMU-puskurit, epäsymmetriset shokit, palkanmuodostus

1. Introduction

One essential fear in a country like Finland, which has had a long lasting tradition of sizeable and frequent devaluations to improve the weakened competitive situation of the export sector, has been the difficulty to live under the hard constraint of an irrevocably fixed exchange rate vis-à-vis the main export market, implied by the single currency in EMU. So, in the preparations of the EMU membership, and in studies on it carried out by the research community, the asymmetric shocks were raised as the main risk of joining the single currency. The deep recession in the early 1990s was a clear reminder of their existence. Accordingly, there were frequent voices by industry leaders that if and as Finland were to join EMU, there should be more flexibility in the labour market so that firms could manage to survive through possible recessionary periods in the new environment.

The trade unions considered these loud voices as a threat. Instead, they suggested and demanded that special funds be collected, so that the adjustment could be softened in case of a possible recession. The idea behind the funds was two-fold. First, the pressure put on firms to cut employment in bad times would be mitigated and, secondly, the pressure placed in such times on labour to adjust through wage cuts would be eliminated, or, at least, reduced. The central organisations of the social partners started to negotiate on the funds, which were called EMU buffer funds in publicity, and in November 1997 they reached a solution on them. The basic idea was to transform the social security system, i.e., the pension system and the unemployment insurance (UI) system, to include elements of a partially funded character, so that the former handicaps related to the features of the pay-as-you-go system could be avoided.[1]

The main aim of these buffers is to preserve the social security contribution rate by the employers as steady as possible and to prevent the perverse situation, which emerged in the recession of the early 1990s, when the UI contribution rate had to be raised ten-fold, as the revenues of the UI system dwindled and the outlays skyrocketed. This led to a vicious circle, as the rises in costs of the firms in part led to a weakening in employment, and again to a higher need to raise revenues, and so on.

Another possibility is to use the funds to actively stabilise the economy, i.e., lower the social security contributions in a recession and raise them again in a boom. This activist tone is not mentioned in the agreement by the social partners on the funds, but it is not excluded, either.[2] One problem with such an effort is - as in all countercyclical economic policies - that the measures do not necessarily have a proper timing. In case of deep recessions and depressions, the potential of the buffers will be exhausted and their size does not reach long. Their main role is to give time to plan and carry out more fundamental adjustment measures and to prevent the fact that the situation starts already from the outset to

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[1] The private work pension system has traditionally been partially funded and so the change in the system concerned only one component of it, the Equalisation Reserve. The social partners also discussed using intra-firm adjustment mechanisms, like personnel funds and profit sharing (see in general on them Alho, 1998), but without reaching a common solution in this respect, as the employers insist them to be internal affairs of the firms solely.

[2] This lack of activism has been criticised by Calmfors (2000). See below our analysis in Section 4, where this activist stance is taken to be the goal of policy making in a recession.

develop into a perverse direction, as was the case in the early 1990s crisis. Such counter-cyclical changes have earlier been carried out in the work pension system in the recession in the late 1970s, when the work pension contribution rate by the employers was lowered by 2 percentage points in 1978, and again in the most recent crisis in 1992 by 1.5 percentage points. The contribution rate was restored almost to the pre-crisis level in 1996.

The greatest change in connection with establishment of the EMU buffers was made to the unemployment insurance (UI) system, see e.g. Holm and Mäkinen (1998). The goal was set to collect an Unemployment Insurance Fund, the capital of which reached at the end of 2003 EUR the level of 0.6 Billion, 1.5 per cent of the private sector annual wage sum. This is estimated to be a buffer, big enough to manage a ”normal” recession in the manner to be explained below. The Fund can also borrow to meet its obligations. Also within the work pension system, within the so-called Equalisation Reserve, a buffer which is 2.3 per cent of the annual wage sum, currently EUR 0.9 Billion, has been formed.[3,4] There has already been some reflation through these funds in the recent recession of 2001-03. So, the contribution rates by the employers and employees were both lowered by 0.2 percentage points in 2003 and the UI fund was in deficit by EUR 0.2 Billion.

The aim of this paper is to analyse the functioning of the labour market and the social security system under EMU from three angles. First, in Section 2 the working and performance of the buffer funds is evaluated under hypothetical recessions with respect to employment and compared to a pay-as-you-go system of social security. We conclude that the buffers are of limited value in stabilising the economy, but that there exist increasing returns in this respect in the sense that the larger the shock to employment, the more importance the buffer has as a stabiliser of employment. Secondly, in Section 3, the reaction of the labour unions with respect to wage adjustment is analysed and it is discussed, whether this reaction is influenced by the existence of the buffers. As an insurance system in general, the EMU buffers can also be expected to include a tendency toward moral hazard, which in this case would mean that the magnitude of real wage adjustment in the labour market is reduced by the creation of them. And thirdly in Section 4, the paper analyses what kind of policies should in general be pursued in the case of a recession in EMU, whether to cut the indirect labour costs of the employers in order to enhance their ability to employ, or to maintain social security benefits channelled to the unemployed and thereby ensure their ability to consume and maintain demand for the domestic production, even though the benefits are financed with contributions paid by the firms. We derive an explicit criterion for this policy choice and test using Finnish data, which of these two types of policies should be adopted in a recession in practice.

In this way, we try to present a comprehensive analysis of the adjustment of the economy in case of an asymmetric shock in EMU, one element of it being the EMU buffer funds, which have also raised international interest in other EU countries. Halko (2003) has pre-

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[3] These arrangements only concern the private sector, the public sector being outside of them.

[4] In the bill accepted by the Parliament in 1998, there is stipulated an upper boundary for the Unemployment Insurance Fund, which corresponds to annual unemployment benefit expenses, related to unemployment of the magnitude of 3.6 per cent, and a lower boundary as the opposite number of this. These figures correspond to the agreement on the size of the buffers by the social partners. When the capital of the Fund lies within these boundaries, the UI contribution is not raised in a recession, but the capital of the Fund is used to match the possible current deficit of the Fund. If the rate unemployment increases so that the lower boundary imposed on the capital of the Fund is threatened to be exceeded, the UI contribution will be raised so much that the Fund is not anymore in deficit. So, we can infer that the new UI system is in fact a limited cyclical buffer, see Section 2.

sented a thorough theoretical analysis of the functioning of the UI system and the EMU buffers. Our analysis here deals with the same topics as she did, but we take a more empirical and somewhat different approach to them, and so, in our mind, complement her insights.

2. The buffers from the point of view of employment in a hypothetical recession in the EMU age

From the point of view of the macro economy, the key importance of the buffers is that the path of the social security contribution rate is in principle more stable than if the current expenses and revenues have to be kept continuously in balance in the alternative, the PAYG system. Or, stated in another way, there is less pressure to cut social security benefits in a recession (see on this Section 4).

Holm and Mäkinen (1998) evaluated the change in the Finnish UI system after the EMU buffer agreement by the social partners and the operation of the new system in the EMU environment. No behavioural assumptions like those between the labour costs and social security contributions and those between wages and employment were included in their analysis, so that it was merely a technical, but, on the other hand, a very detailed calculation on how the system could work in a recession. The starting point is a hypothetical recession where the number of unemployed rises from the initial situation by 40 000 persons in a year, so that it is after two years 80 000 persons, around 3.5 percentage points, higher than without the shock. After this the rate of unemployment returns to its initial level at the same speed.

The detailed calculation by the authors gave the result that this kind of development leads to a need to raise the UI contribution rate by one percentage point in relation to the wage rate. This can be prevented with a funded UI system, where the capital is allowed to vary within a range of EUR 1 Billion. This would mean an annual reduction of 0.5 percentage points in the UI contribution rate in comparison to a PAYG UI system.[5]

Let us now take as our goal to compare the performance of the various social security systems, old and new, in a hypothetical asymmetric shock in EMU, allowing for the key behavioural relationships of the labour market. The situation is illustrated in Figure 1. Imagine that at time t_0 the economy and the social security system, by which is now basically meant the unemployment insurance (UI) system, are in balance so that the size R of the capital of the buffer fund is equal to its upper ceiling, denoted by R_Y, e.g., EUR 0.5 Billion. The unemployment insurance contribution rate is denoted by m and it is initially on a level, which maintains the fund at this level R_Y, i.e., the current expenses and receipts just balance each other.

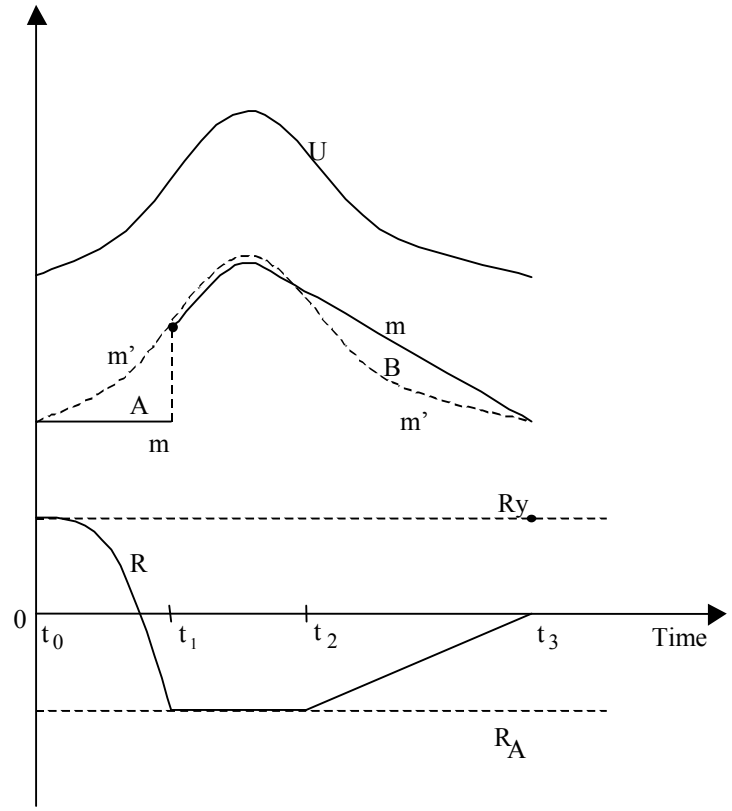
Let us further assume that at the same point in time, t_0, the economy, for some reason or another, slides into a recession and the rate of unemployment, denoted by U, starts to rise. Under the EMU buffer fund system the social security contribution rate m is not raised but maintained at the initial level. The rising unemployment leads to a loss of revenues and a rise in expenditure of the UI system so that the capital of the fund declines until at point t_1 it hits the lower boundary, which we denote by R_A (see footnote 4 above). The hypothetical recession is, however, so bad that unemployment rises further. But as the EMU buffer is a

[5] On the working of the buffers, see also Holm et al. (1999).

limited buffer, from this point t_1 in time onwards it has to be treated as a PAYG system. This means an upward jump in the contribution rate m at point t_1.

In Figure 1 we have also depicted that unemployment contribution rate, which would be collected, if the system were all the time operated as a PAYG system. Let us denote it by m'. At point t_1 and onwards the contribution rates in both these systems would be equal.[6] This holds up to the point in time when the rate of unemployment again starts to decline, which requires a decision, what to do with the buffer system before unemployment returns to its initial level.

Figure 1. The operation of the EMU buffer in a recession



In principle there are three alternatives in this respect. First, it is possible to aim at a rapid accumulation of the capital of the fund from its lower boundary, secondly, a slow rise in the capital, and thirdly, preserving it at the lower boundary before the rate of unemployment has returned back to its initial level. In this last case the capital of the fund would be raised only, if and when, there is a positive shock to employment after the return of the economy back to the initial situation. This alternative can be criticised from the angle that it is not certain whether the next shock is a boom or a new recession. In the latter case the buffer would give no help in the policy making and the UI contribution rate would all the time be in accordance with m'. In Figure 1 it is assumed that the second of the above alternatives is followed so that in point t_3 the level R = 0 is restored.

[6] In the figure, we have simplified the true situation so that the rate of unemployment is depicted in both alternatives to be same. This will be relaxed below in connection with the numerical simulation of the system. In the following, we have also simplified by discarding the interest expenses and revenues of the fund, because they are fairly small. This does not have any major bearing as to the results of the analysis.

The EMU buffer initially produces a lower indirect labour cost to the firms than the PAYG system (as m < m') and is thereby better with regard to employment. This is depicted by area A in the Figure. With respect to area B, which is created by the new accumulation phase of the fund, the situation is the reverse. The net overall gain in unemployment now depends on the relative sizes of the two areas and on the fact that there is a difference between their timing, i.e., B is realised only after A. Area A does not depend on, what kind of policies are subsequently pursued to collect the capital of the fund, which has only an impact on area B. Area B is the bigger, to the higher level the capital R of the fund is raised in point t_3.

Let us now carry out a numerical simulation of this comparison.[7] As was the case in Figure 1, we assume that the UI fund is at its maximum level when the hypothetical shock hits the economy. We compare three alternative systems:

1) A fully funded (FF) system, where there is no lower boundary defined, or effectively met, in the recession as to the capital of the fund. In this case the UI contribution rate of the employers is maintained at the initial level throughout the recession.

2) A PAYG system, where the contribution rate is determined so that the current benefits and receipts are kept in balance each year.

3) An EMU buffer fund system, which includes elements of both types, i.e., it is like a FF system, when the capital of the fund is within the upper and lower boundaries, and as a PAYG system when these boundaries would be exceeded.

The simulation is calibrated to the actual current situation as follows. The current UI contribution rate (that of the employer and of the employee together) was on average 2.5 per cent of the private sector wage sum in 2003. The current rate of unemployment is 9 per cent. The replacement rate (i.e. unemployment benefit in relation to the wage rate) is set to 51 per cent, see Alho (2002) and the estimates there. This level of the replacement rate is kept fixed throughout in the following. Initial balance in the UI fund is then reached if we assume that the average wage level of the unemployed is half of that of the employed.

The hypothetical recession is then of the following kind. The initial level of unemployment is 9 per cent, and then the economy faces a recessionary shock, which raises the rate of unemployment in the two following years, under a FF system, first to 9+0.5a per cent and then to 9+a per cent. After that the economy starts to adjust back towards the initial equilibrium so that the rate of unemployment declines first to 9+0.5a and then back to the initial level of 9 per cent. The parameter a is allowed to vary between 0.5 and 5 percentage points.

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[7] In the actual process of the ongoing accumulation of the EMU buffers, it has been notably recognised and agreed that they have been collected in such a way that the rise in total labour costs is what the employers can afford, i.e., which maintains the profitability of the firms. So, in effect the wage earners have been satisfied with a smaller wage hikes during the accumulation phase of the fund. Can this be the case also when operating the EMU buffer funds in the future? This looks, however, quite unrealistic. Namely, if this just stated case would always apply, then the buffer fund would operate identically as a PAYG system with respect to the total labour costs by the employers, because the path of total labour cost (wages added by the indirect labour costs) were the same in the two systems. So, we must separate the past stage of accumulation of the funds and the possible use of them. If and when this degree of compensation is not complete, the labour cost by the employers differs between these two systems, the EMU buffer and the PAYG system, which also implies that the evolution of the employment situation is not the same in the two systems. In that case, where the rise in total labour costs is smaller, the change in employment is also better. We can infer that the more flexibly employment depends on the change in the labour cost and the less the wages move in the opposite direction after the change in the social security contributions, the better the EMU buffer system performs with respect to employment in comparison to the PAYG system.

When making this simulation, we have to take into account two relationships. First, the UI contribution borne by the employers differs between the alternative systems, which leads to a different path of labour cost and unemployment. The different path of unemployment creates a different need to collect UI revenues, which again, through the UI contribution rate, has an effect on unemployment. The simultaneous equilibrium of these two relations determines the rate of unemployment and the UI contribution rate in the different social security systems, outlined above. In the EMU buffer system, there is still a third relationship, which has an effect on the outcome and which was mentioned above in connection with Fig. 1. The outcome of the system also depends on the decisions concerning the capital of the UI fund to be made when its capacity to manoeuvre has been exhausted in a recession and it is time to decide, how to restore its capital to face possible new shocks.

So, we need two key parameters for the simulation exercise. The first of them is the effect of a change in the labour cost on unemployment. Here we have used the estimation result by Alho (2002), according to which a one per cent rise in the real labour cost per hour leads in the first year to a rise in the rate of unemployment by 0.2 percentage points. The other parameter describes how the change in the indirect labour cost of the firms is reflected as a change in the opposite direction in the wage setting behaviour of the unions. Quite diverse estimates of this have been reached in the various econometric wage equations in Finland, the effect ranging from one extreme, no compensation, to the other of full compensation. In the following, we have fixed this parameter to the middle point, a half. So, it means that when the social security cost of the employers rises so that the total labour cost rises by 1 per cent, the wage rate will decline by 0.5 per cent.[8]

The results are presented in Figure 2, where we have calculated the performance of the buffer over a hypothetical cycle, the amplitude of which varies in terms of the rate of unemployment (see above). If the rate of unemployment rises at most by 4 percentage points, the EMU buffer works like a fully funded system, as was planned by the legislation, see footnote 4 above. But if the adverse shock is bigger than this, the lower boundary of the capital (level R_A in Figure 1) will be hit and the fund turns thereafter to operate as a PAYG fund. This is the case from period 3 onwards when the parameter a gets the value 5. In this case the capital of the UI fund remains at its lower level R_A for the remaining years. The case where the capital of the fund is restored back to zero in year 5, through a rise in the contribution rate, is denoted by a = 5* in Figure 2. As is intuitively clear, this factor limits the gain from the fund in terms of stabilizing employment. For each system a discounted and per period calculated average unemployment rate (using a discount rate of 5 per cent p.a.) is calculated and the gain of the EMU buffer over a PAYG system is depicted in Figure 2. Overall, with respect to the rate of unemployment there are only quite small differences between the buffer and the PAYG system. The EMU buffer is better than the PAYG only by at most 0.1 percentage point per year over the cycle. However, there are increasing returns to the funds in the sense that their importance from the stabilization point of view is the bigger, the bigger is the shock hitting the economy. In the number of unemployed persons this size of a difference means a couple of thousand persons per year on average. The biggest gain of the EMU buffer is also small, only some 6 000 persons in years 4 and 5, as compared to the PAYG system.

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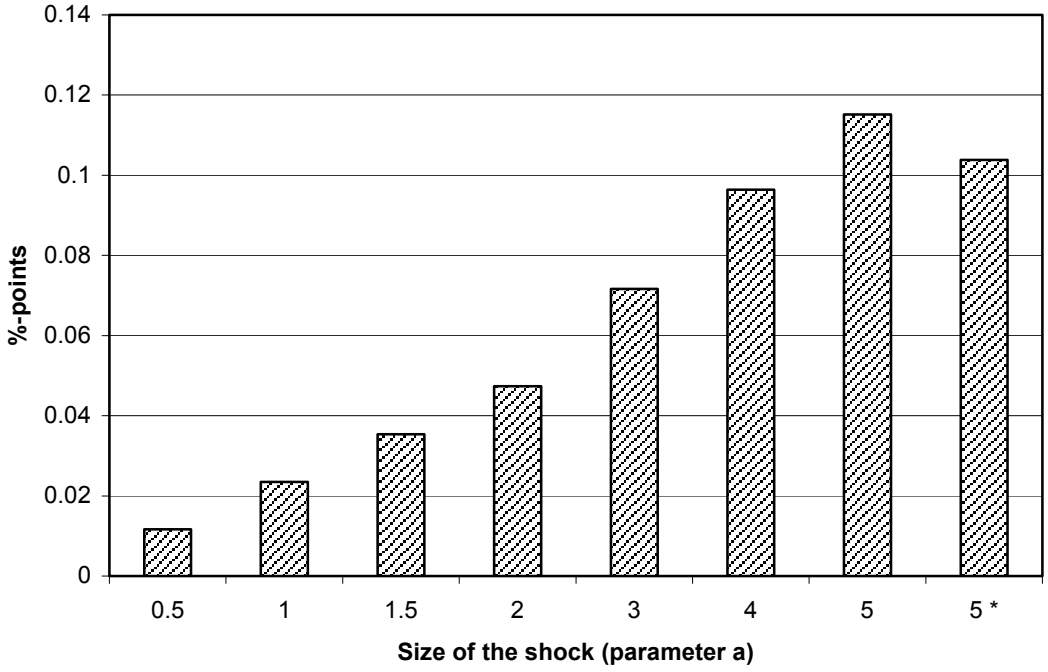
[8] See the theoretical analysis on this issue by Halko (2003), Chapter 3.

Figure 2. The gain as to the stability of employment produced by an EMU buffer system in relation to a PAYG system over the cycle, i.e. difference in the average of the present value of the unemployment rate per year. The size of the shock, i.e. parameter a in the text, is the gap between the maximum rate of unemployment during the cycle over the initial level, per cent. a = 5 is the case where the buffer has to be limited from running a deficit from period 3 onwards and a = 5* the case where the capital of the fund is restored back to zero at the end of period 5, see the text.



In contrast, the difference between the UI contribution rates is quite sizeable. The difference in favour of the buffer system is at its biggest 1.5 percentage points, which is a marked gain for the firms.

We have also illustrated the size of the UI fund, the UI contribution rate (contribution in relation to the wage rate) and the rate of unemployment in Table 1 in the case of a cycle where the unemployment rate rises by 2 percentage points as a result of a shock. In this kind of a cycle, the EMU buffer fund works as a fully funded system.

Table 1. Simulation of the different UI systems in a hypothetical recession, the case where a = 2

Year	Fully funded EMU buffer			PAYG		
	Unemployment, %	UI contribution rate, %	Fund, Bill. EUR	Unemployment, %	UI contribution rate, %	Fund, Bill. EUR
0	9	2.5	0.5	9	2.5	0.5
1	10	2.5	0.389	10	2.8	0.5
2	11	2.5	0.169	11.04	3.13	0.5
3	10	2.5	0.058	10.10	2.84	0.5
4	9	2.5	0.058	9.14	2.54	0.5

3. Is there a moral hazard in the buffer system?

It was stated in the introduction that the trade unions were the active partner behind the EMU buffer funds and that their intention was in this way to mitigate the pressure towards both labour shedding and downward nominal wage adjustment in EMU.

If the necessity by the firms to immediately reduce employment in a recession is reduced through establishment of the buffers in the above sense, it is likely that there is a smaller incentive by the unions to contribute to the task of maintaining employment in a recession through wage cuts, which would then be a substitute for the loss of national sovereignty in monetary policy. Accordingly, it has also been argued that the EMU buffers may lull the unions and the employers into a "careless" behaviour of the kind of a moral hazard, as they are aware that there is no big immediate need to start the painful process of wage adjustment immediately when the shock hits. Let us now make a brief analysis of this.

Let the union have an instantaneous preference function V,

$$V = (WL + bWU)/P,$$

where W is the wage rate, L is the number of employed and U is the number of unemployed and L + U = N, the fixed labour force, b is the replacement rate, i.e., the ratio of the unemployment benefit to the wage rate, and P the price level. The aggregate profit Π of the firms is

$$\Pi = PAF(L) - W(1+m)L = PAF(L) - WL - (bWU - S),$$

where F is the production function, A is total factor productivity, and S is the deficit in the social security system. The price level P is fixed to unity in the sequel in the small open economy. Consider a one-shot game of wage negotiation. The timing of events is such that first an adverse asymmetric shock hits the economy, $dA < 0$, and the government decides on the size of the possible deficit in the social security system, $S > 0$. The single monopoly union and the firms then engage in a Nash bargaining game negotiating over the wage rate with powers θ and $1-\theta$, respectively. Thereby $(V-V_0)^{\theta}(\Pi-\Pi_0)^{1-\theta}$, where V_0 and Π_0 are fall-back levels of utilities of the parties, is maximised with respect to the wage rate W, under the condition that the firms then select the level of employment.

It has been earlier proved by Dowrick (1989), i.a., that in this kind of bargaining framework (allowing for market power by the firms), the equilibrium wage is an increasing function of the profits of the firms in excess of the firms' fall-back profits, i.e., the profits they would reach in case of no agreement with the unions. In our case there is a shift upward in the firms' profits, if the deficit S in the social security system is allowed to rise. So, we can infer that now the wage rate is increasing when the deficit in the social security system rises.

In a similar way we may conclude that wage rate reacts negatively to the productivity shock $dA < 0$, as this change reduces the profits of the firms and this leads to a lower wage rate as an outcome of the negotiations. So, we can infer that the labour market reacts in the right way to an adverse shock, but, however, the magnitude of the real wage adjustment is reduced through the possibility to run a deficit in the social security system. There is in-

deed an element of the moral hazard in the EMU buffer system, as is also intuitively quite evident. Halko (2003), Chapter 3, has presented an enlarged analysis of wage formation, where she also takes into account the budget constraint of the UI fund. In thus case the total effect on wages of a shock depends on the elasticity of substitution between capital and labour, whether it is bigger or smaller than unity.

In fact, we should instead consider the above bargaining as a dynamic game, where the shock is a permanent one so that, in a two-period case, $A_2 = A_1$, and the initial deficit in the social security system has to be reversed over time, so that $S_1 + S_2 = 0$. It is now evident that the above result will be mitigated. The perverse reaction in wages due to the deficit in the social security system would be clearly smaller than above, the magnitude of which depending on how myopic or far-sighted the unions and the employers are. In addition to this post-shock analysis, we could also envisage an ex ante situation on what happens in wage negotiations before a shock. Similarly, as above, we can infer that the existence of the buffers leads to more aggressive wage demands and acceptance of them, because the partners know that the adjustment is for some time taken care by the buffers. More quantitative analysis is needed on this point.

4. Should the social security benefits be raised or lowered in a recession?

Let us now consider what kind of policies should be pursued with respect to the social security benefits and contributions in a possible recession in EMU. Should the social security benefits be raised or lowered? There are two conflicting views, which were also both heard during in the deep crisis in the Finnish economy in the early 1990s. The social security benefits are a cost to the firms, which they cannot shift on to their prices in a depressed economy with a big slack. But the benefits are simultaneously a component of the disposable income of the unemployed and those eligible to the benefits and thereby the benefits maintain the purchasing power and consumer demand for domestic production, but are, on the other hand, financed by contributions paid by the firm and thereby raise their non-wage costs. This issue is again topical in the current European recession.

We now impose that the criterion to decide between these two conflicting policies is to maintain employment as high as possible, i.e. fixed irrespective of the recession. We assume that there is an ample supply of resources, notably workers who could be employed at a constant wage level, if there would be more demand for them. There are neither other effective constraints hampering this process of recovery, like excessive foreign indebtedness.

Define consumption expenditure C, or more broadly aggregate demand, i.e. consumption, investment and exports together, to consist of that by the employed and unemployed and that made out of capital income (profits),

(1) $C = c_L WL + c_U(bW)U + c_\Pi \Pi,$

where as new symbols c_L (c_U) is the propensity to consume by the employed out of wages (unemployed out of the unemployment benefits), c_Π is the propensity to consume out of real profits Π, and W is now the real product wage. The national income is split into profits and labour income,

(2) $Q = W(1+m)L + \Pi,$

where m is the rate of indirect labour cost, i.e., the social security contribution rate by the employers. The national income accounting identity is,

(3) $Q = D + C + (X - hQ)$,

where Q is production (GDP), D is autonomous domestic demand (public expenditure), X is exports, and $M = hQ$ is imports, where h is the propensity to import. The size N of the labour force is fixed,

(4) $L + U = N$.

The demand for labour depends on the volume of production and the real labour cost. Let us first define this as a standard logarithmic function, derived from a constant returns to scale production function,

(5) $\log(L) = b + \log(Q) - \sigma \log(W(1+m))$,

where σ is the elasticity of substitution between capital and labour, $\sigma > 0$.

The social security system is based on contributions, collected from the wage sum. So we have,

(6) $mWL = bWU - S,$

where S is the again deficit in this system in a recession and b is the replacement rate. It is self evident that if the deficit S could be made as large as possible without any limits, this is the best policy to be followed, because raising benefits and cutting employer costs are both expansionary policies in the short run. That is why we carry out the following analysis keeping the deficit as fixed, $dS = 0$.

Let us further assume that in a depression the real wage rate does not adjust but that it is completely rigid, as was the case in the Finnish depression in the 1990s to a large degree. The labour cost was assumed in Section 2 to change in an opposite direction when the social security contribution rate m is changed. Halko (2003) has theoretically analysed, how the wage claim of the union reacts to a change in the contribution rate by the firms. In our case enlarging the analysis to include also this kind of reaction is more complicated, as we would have to consider also the reaction of wages to a change in the replacement rate and to a change in aggregate demand, in addition to the change in the contribution rate. Let us now assume, for simplicity, that there is no such wage adjustment. Let us next differentiate the above model with respect to employment and the replacement rate (or, equivalently,

the UI contribution rate) taking into account the behavioural constraints and the accounting identity of the social security system (6) (with dS = 0). In order to do so, let us rewrite the logarithmic labour demand function into the following arithmetic form,

(5)' $dL = (L/Q)dQ - (\sigma L/W(1+m))d(W(1+m))$.

As the real wage rate is constant, the differential of the wage rate is $d(W(1+m)) = W(dm)$. Insert now dQ from (3) into the labour demand equation (5)', after first inserting into (3) expressions (1) and (2). Now we reach the following result concerning the two policies outlined above related to the social security system in a recession.

Proposition. In order to enhance employment in a recession it is worth while to increase social benefits and finance them by additional social security contributions of the employers, if

$$(7) \qquad \delta = \frac{c_U - c_\Pi}{1 - c_\Pi + h}\left(\frac{WL}{Q}\right) - \sigma \frac{1}{1+m} > 0 .$$

If $\delta < 0$, it pays to cut the social security contributions and consequently the benefits in a recession.

The interpretation of the result (7) is straightforward. When the benefits of the unemployed are raised, the increase in their consumption, as depicted by the parameter c_U, leads to an increase in employment, but at the same time the consequent rise in their income and the rise in the labour cost leads to a cut in profits, which lowers the expenditure (the term $-c_\Pi$). The net effect of these has to be multiplied by the Keynesian multiplier related to the capital income, which is $1/(1-c_\Pi+h)$, and this will be weighed by the share of the labour income in national income. This expansionary demand impact through the goods market is contrasted to the substitution effect on employment caused by the consequent rise in the labour cost. Note interestingly that the parameter c_L does not have an effect on the criterion.

In equation (1), the effect of the capital income on total demand and thereby on output is described using the consumption equation, but as well, taking a broader perspective, we can think the parameters c_U, c_L and c_Π to depict the influence of these income items on total demand, in addition to consumption, through investment (the profitability channel) and exports (the competitiveness channel). This enlargement does not bring any change to the criterion (7) and will be allowed for in the empirical estimation below.

Immediately we can infer from (7) that if the marginal propensity to consume (or in general demand) out of profits and the unemployment benefits is the same, it will always pay, from an employment point of view, to cut social security benefits and thereby to lower the social security contributions of the employers. However, as it is normally considered that the marginal propensity to consume by the unemployed is higher than that out of the capital income, it cannot be a priori stated, which is the best policy to proceed in order to maintain employment. The result depends on what is the relationship between these and other relevant parameters of the model and is thereby an empirical issue.

We estimated equations (1) and (5) and the import equation, in the following dynamic form, see their specification in (8), using annual Finnish data of the period 1960-99. In (8) Δ is backward difference. In the estimation, the profit variable is lagged by a year and a time trend added to equation (5) to represent the trend growth in productivity. The results concerning the key parameters of the model and the test concerning the sign of δ are collected in Table 2.

$$\frac{\Delta M}{Y_{-1}} = a_0 + h\frac{\Delta Y}{Y_{-1}}$$

(8) $$\Delta\frac{d}{y} = c_0 + c_U\Delta\frac{bWU}{y} + c_L\Delta\frac{WL}{y} + c_\Pi\Delta\frac{\Pi_{-1}}{y_{-1}} + c_1\frac{d_{-1}}{y_{-1}}$$

$$\log L = b_0 + 0.5\log Q + 0.5\log Q_{-1} - \sigma\log W - b_3 t + b_2\log L_{-1}$$

Here d in (8) is either total private demand or private consumption expenditure.

Table 2. Estimation results of the key parameters, in parentheses the standard errors of the estimates, estimation method FIML

Parameter	Consumption as dependent variable in (1)	Total demand as dependent variable in (1)*
c_L	0.460 (0.118)	–0.459 (0.203)
c_U	1.459 (0.660)	–1.321 (0.761)
c_Π	0.015 (0.166)	–0.108 (0.252)
h	0.344 (0.075)	0.302 (0.056)
σ	0.462 (0.044)	0.474 (0.038)
δ, short run [1]	0.093	–0. 893
P(δ = 0), short run	0.720	0.002
δ, long run [2]	4.520	–7.001
P(δ = 0), long run	0.203	0.434

* Sum of private consumption, private investment and exports.

[1] Defined on the basis of Eq. (7) as $(WL/Q)(c_U - c_\Pi)/(1 - c_\Pi + h) - \sigma/(1+m)$.

[2] The long-run version of Eq. (7), i.e. $(WL/Q)(c_U - c_\Pi)/(c_1(1 - c_\Pi + h)) - \sigma/((1 - b_2)(1+m))$.

We clearly see that the results crucially depend on, whether we have private consumption or total demand (private consumption plus private investment and exports) as the variable to be explained in equation (1). In the former specification, the propensity to consume out of unemployment benefits is very high, markedly bigger than unity, while that related to capital income is zero. This pattern is, however, quite different, when we go over to having the total demand as the dependent variable in (1). The aggregate demand equation is not

satisfactory when estimated by FIML, but makes more sense when estimated by OLS (not reported here) so that c_Π gets a clearly positive value, while c_L and c_U are negative but, however, not significant. The labour demand equation is very stable and satisfactory.

We then test, whether the δ parameter in condition (7) deviates from zero. The test is statistically inconclusive in the consumption specification (i.e. d = c in (8)) both in the short and long run. In the wider total demand specification of equation (1), which is more general and relevant from the policy point of view, the negative value of the parameter δ quite clearly suggests that, in a recession, it would be better in the short run to cut the social security contributions by the firms, irrespective of the fact that this policy leads to a cut in the social security benefits and thereby in consumption. However, this result is statistically significant only in the short run, but not in the long run. This latter outcome for the most part depends on the very uncertain value of the c_U parameter in this case (and also for a smaller part on the uncertainty of the multiplier). More empirical evidence, utilising a more elaborated structural model is needed to get clear evidence on this point.

Above we assumed that the deficit of the social security system is given. If the deficit can be expanded so that $dS > 0$, it is worth while either to lower the indirect labour costs or to raise the unemployment benefits, according to whether δ in (7) is negative or positive, but to operate only on one side of the system, not on both, except the case where (7) holds as an equality.

5. Concluding remarks

Here we have tried to give some basic insights for the discussion concerning the functioning of the social security system in a recession in the new environment imposed by EMU. As a conclusion, it can be inferred that it may be the case that too high hopes are directed towards the EMU buffers as a tool of stabilization policies. They can be seen as a step into the right direction, but their capacity to act as a buffer for employment is anyway quite limited, if the adverse shock is a big one, as was assumed above. The buffers can also lull the labour market participants to postpone the necessary actions eventually needed in such a situation. Finally it was evaluated, what kind of expansionary policies should be pursued if the goal is to maintain employment in a recession. The preliminary results point towards the importance of cutting the indirect labour cots, even at the cost of social security benefits, although more evidence on this point is needed.

In a recent questionnaire directed to both employers and representatives of three employee groups (shop stewards and the like) in Finland, see Alho et al. (2003) and Pekkarinen and Alho (2004), the views of the respondents about the role of wage adjustment in EMU were also asked. The question was formulated analogously as that by Campbell and Kamlani (1997) concerning adjustment options related to employment and wages in a hypothetical recession, but we also asked separately about the desired and expected role of wage adjustment in a recession. The general conclusion was that some sort of wage adjustment should take place, but that, realistically, in a recession the actors expect that the adjustment by firms would mainly take place through labour shedding. We also asked about the importance of the EMU buffer funds in this respect. The general result was that on average the employers estimate their value to be smaller than the employees do, who give fairly much value to the buffer funds in terms of restoring employment. We have in this paper tried to give a quantitative evaluation of some aspects of this property.

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