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## **THE LESSON OF FINLAND'S DEPRESSION OF THE 1990'S: WHAT WENT WRONG IN FINANCIAL REFORM?<sup>1</sup>**

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### **ABSTRACT**

The role of economic policy in Finland's depression of the 1990's is analyzed with a simple model of an open economy, and the conditions for a successful financial reform derived: Let the system adjust after the removal of interest rate ceilings, and the domestic interest rate then be aligned with foreign rates before liberalizing international capital flows. In Finland, the financial system was liberalized simultaneously with international capital movements, with the domestic shadow interest rate initially considerably higher than the international market rates. A capital inflow the size of the monetary base followed, leading to the "crazy years" of 1987-89. With a large current account deficit, the Bank of Finland tightened money sharply, causing a banking crisis practically wiping out the savings bank sector. The GDP declined by 13 %. Several lesser policy measures aggravated the crisis.

JEL classification number E58, E65, O52

Key words: Financial reform, Finland's depression of the 1990's

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## 1. INTRODUCTION

During much of the 1990's, Finland was in the deepest depression in its history. In the words of Currie (1993), "The Finnish economy has gone through an economic cycle, with boom and bust, of unusual ferocity..." "... in almost no other country has the amplitude of the cycle been so large." Not only did its growth come to a halt, but the level of its GDP declined by 13 per cent and unemployment increased to 18–40 per cent depending on the definition. 21 % of the total number of firms failed and 23 % of households faced debt delinquencies. The country was plunged into a serious banking crisis. The savings bank sector, with a loan market share of 25 % in 1989, was all but wiped out, only a handful of banks with a share of 4 % surviving. The banking sector's nonperforming loans were transferred to a junk loan institution, the cost of bank support being 10 % of the GDP. This "unusual ferocity" makes the Finnish depression "unusually interesting", in offering potentially useful lessons to governments contemplating financial reforms.

Of earlier writings, the account by Bordes (1993) serves as a representative sample; the liberalization of the financial system disrupted the economy. This led to an extraordinarily high inflation in asset prices, especially of shares and real estate. The boom was financed mainly by the banking sector. The demand for goods and services expanded rapidly. Fiscal policy was not sufficiently stringent, and the only possibility open to monetary authorities would have been to revalue the Finnmark, as the liberalized capital movements prevented monetary tightening without revaluation.

On the whole, the deregulation was implemented in accordance with the general principles of finance, except that banking legislation was not sufficiently adapted to the new environment. Secondly, legislation prevented deregulation of tax-exempt accounts, whereas lending rates were freed. This led to an increase in the bank interest rate spread and acted as a spur to bank lending. In addition, there was a favorable terms of trade shock, but its contribution was negligible compared to the wealth effect resulting from the impact of liberalization.

The crisis erupted, as asset prices started their decline in early 1989 in response to the tightening of monetary conditions. The situation of the banking system deteriorated along with that of the private sector, mainly due to excessive exposure to interest rate risk and credit risk. The economy went into recession as households attempted to increase their saving. During the fall of 1990 the crisis hit the corporate sector, and was aggravated by the collapse of trade with the Soviet Union. The economy went into debt recession. (See also Drees et al. (1998), Honkapohja et al. (1999), Jonung et al. (1996), Kiander et al. (1996), Nyberg et al. (1994), Pazarbasioğlu (1997), Söderström (1993), and Vihriälä (1997).)

It is of course easy to agree with the broad lines of this account. The purpose of this paper is to extend it by asking “why”: First, not all liberalizations of the financial system lead to a “disruption of the economy” of this magnitude. Indeed, economic theory does not provide a reason why the liberalization of interest rates should lead to uncontrolled credit expansion. The credit expansion potential of the banking system is regulated by the central bank’s control over bank reserves, and the liberalization of interest rates has as such at most a marginal effect on these reserves if the interest rate at the discount window is also freed. The central bank can easily neutralize this effect. This notwithstanding, all the literature known to this author is based on the notion that liberalization leads to such an expansion. One of our objectives here is to provide an analysis of this process and determine the conditions for such an expansion and means of avoiding it. Secondly, monetary tightenings do not always lead to banking and economic crises. We will seek to identify the most important individual events, especially in view of the role economic policy played in them, so that the same mistakes could be avoided in future reforms. We may begin by examining a simple model of a small open economy and derive the conditions for a successful financial reform, and thereafter examine the Finnish events in the light of the model.

It will be shown that, contrary to the common view, a boom (and bust) is not an inevitable consequence of financial market reform. The expansionary

effect of the removal of interest rate ceilings has to be offset by contractionary policies. It is important to let the economy adjust and then align the domestic interest rate with foreign rates (plus the expected currency depreciation) by means of a change in the policy mix. Only thereafter is it safe to liberalize international capital flows. It follows that both markets can be liberalized simultaneously if there is initially no excess demand on the domestic credit market at the ceiling rate and provided that rate stands roughly on a par with the foreign rate plus the expected depreciation in the exchange rate.

With regard to the Finnish experience, two fatal policy moves stand out. Liberalization of domestic financial markets and international capital flows was implemented simultaneously, when the international interest rates were significantly below the domestic shadow rates. This is one of the deadly sins of economic reform and predictably caused a massive capital inflow, which doubled the monetary base in three years and led to uncontrolled credit expansion. The result was, in the words of the Central Bank Governor, the "crazy years", when housing and stock prices doubled and general inflation accelerated. This appreciation of the real exchange rate led to a sizeable current account deficit, which necessitated contractionary economic policies to slow down the growth of imports. However, this was effected by means of a sharp monetary tightening, causing the market rate to increase by 6 percentage points in three quarters, the rise in the final quarter of 1989 alone being 4 points. This second deadly sin predictably caused a banking crisis, which brought about the collapse of the savings bank sector, while the rest of the banking sector had to be rescued with massive infusions of state funds. When the country's economy was in a "free fall", fiscal and monetary policies were tightened even after the basic situation had been reversed with successful devaluations. This could not but deepen and extend the depression. However, this, as well as other changes, was of minor significance compared to the two deadly sins. In short, we cannot agree with the above assessment that deregulation was implemented by and large correctly.

In the following, in Part 2, the behavior of an open economy is studied under general interest rate ceilings and after liberalization. The section ends with a brief discussion of the key problems associated with the transition from the former regime to the latter. Part 3 is a discussion of the events in the light of the model presented in Part 2. Part 4 consists in the conclusions drawn.

## 2. THE THEORY

In the first half of the eighties, Finland's financial system was heavily regulated and bank-centered, and the money and securities markets were not well developed. Interest rates were kept low and stable by central bank regulation. This, together with the liberal deductibility of interest expenses and high marginal income tax rates, implied sharply negative real after-tax interest rates. There was a chronic excess demand for credit at the ceiling rate. The central bank controlled aggregate demand via its control over bank reserves, and banks then rationed out the excess demand for credit and thereby for goods. Interest rate regulation first took the form of loan and deposit rate ceilings. Later the ceilings applied to average loan rates capped by a usury ceiling. In addition there were quantitative lending restrictions. International capital flows were strictly controlled by means of licensing (see Drees et al. (1998)). Price competition not being possible, banks maximized profit by competing for the market share of deposits, which determined the bank's potential loan stock.

Our model is in the extended Mundell-Fleming (EMF) tradition. It would of course be fashionable to use a model consistent with the New Classical Economics (NCE) tradition, based on intertemporal utility maximization to derive, inter alia, the consumption function. However, the absence of market failures in many versions of these models leads to the conclusion that external imbalances are of little concern for policy as long as the government budget is balanced. Moreover, the underlying assumptions often imply near-Ricardian equivalence, which undoes many of the potential effects of fiscal policy. Since considerations of fiscal and monetary policy measures are central to the events to be analyzed, models with such features are unsuitable for our

purposes. Not only was rationing prevalent, but some of the key events are grounded on the presumption that national savings and employment may differ from their socially optimal levels.

Of course, the NCE approach has recently been modified by imposing ad hoc market failures like credit constraints or Blanchard -type non-neutrality. Then, when the models are made to account correctly for the critical rigidities and imperfections in the economy, their predictions need not substantially differ from those of the EMF model, as Dornbusch (1990) has pointed out. Moreover, Buitier (1990) has argued that if the effects of wealth accumulation are included in a consumption function which is not forward-looking, results qualitatively similar to the Blanchard model are obtained. While the EMF-type model is not appropriate for all purposes, we feel that with the wealth effect and a supply side it serves as a useful frame of reference for an analysis of events during the present episode. Another reason is that the Bank of Finland, like most central banks, as well as the Finnish Treasury, uses it in its forecasting as an empirically satisfactorily performing model. (See also Krugman (1991), (1993).)

As to expectations, the initial conditions are those of a fixed exchange rate, a relatively rigid general interest rate ceiling, and tightly rationed international capital movements. After the liberalization, interest rate and exchange rate expectations consistent with least-squares learning had to be based on no or very few observations on the new regime up till 1989, when confidence in the sustainability of the exchange rate began to erode. The statements and behavior of business leaders and others nonetheless suggest that the agents believed the assurances of the Central Bank Governor that the exchange rate was being held stable, which is why the devaluation of 1991 caught them off guard. The focus of our interest being on a small number of discrete policy moves which caused a regime change, leading to the depression, static expectations can under the circumstances be regarded as a reasonable approximation under bounded rationality.

Secondly, postwar growth had been positive almost without exception, and housing prices had moved mainly upwards. It is thus reasonable to assume that agents expected recessions to be short and mild (reflected e.g. in the average debt-equity ratio of businesses of 4), housing prices to have an upward trend, and nominal interest rates to be stable (see Drees et al. (1998)). We will therefore use a static EMF model, supplemented by the wealth effect and the supply side, as a frame of reference (for an analysis in a dynamic EMF model with perfect foresight rational expectations, see e.g. Ahtiala (1998)). Of course, these expectations will also be assumed when the events in question are examined.

#### A. The system under general interest rate ceilings

The behavior of the system is illustrated in Figure 1, which is a standard IS-LM diagram supplemented with the supply side. In the top sector total output ( $Y$ ) is on the horizontal and the interest rate ( $r$ ) on the vertical axis. The declining curve is the IS curve, which depicts the locus of equilibrium points on the goods market. The rising curve is the LM curve, depicting that on the money market. We have left the balance of payments (BP) curve out of the figure for the sake of clarity. For the same reason we have not drawn the movements of the curves in the figure.

The lower sector represents the labor market, with employment ( $N$ ) on the horizontal and the nominal wage ( $W$ ) on the vertical axis. The declining curve is the labor demand curve (the value of the marginal product of labor ( $P^D Y_N$ )), and the rising curve the labor supply curve. The model is formally derived and analyzed in the Appendix.

In the absence of interest rate ceilings, the equilibrium point is at the intersection of the curves at income  $Y_1$  and interest rate  $r_1$ . The quantity of labor demanded would be  $N_1$ . We shall return shortly to the adjustment to this excess demand situation.



[Figure 1 about here]

Under general interest rate ceilings at  $\bar{r}$ , total notional demand is at the intersection of the  $\bar{r}$  curve with the IS curve at  $Y_2$ , while effective demand and output are at the intersection of the  $\bar{r}$  curve with the LM curve at  $Y_0$ , the amount  $Y_2 - Y_0$  being eliminated by credit rationing by banks -- this is thus that part of "credit rationing" which is due to the fact that the interest rate is rationed below its equilibrium level. Employment is  $N_0$  and the nominal wage rate  $W_0$ . The shadow interest rate is  $r_0$ . If the demand for (and supply of) money is a function of excess demand on the goods market (i.e.  $L_a < 0$ ; see the Appendix), there is a kink in the LM curve at its intersection with the IS curve, making the LM curve steeper from that point down. As suggested in Ahtiala (1977), the LM curve is normally rising mainly because rationed borrowers constitute only part of those demanding cash balances, so that  $L_a \geq L_r$ , a sufficient additional condition being  $E_Y + T_Y < 1$ , (see Eq. (14) in the Appendix). The demand for output is in this case at  $Y_3$ , implying the quantity of labor demanded of  $N_3$  instead of the equilibrium amount  $N_0$  producing  $Y_0$ . An excess demand for domestic output leads to an increase in  $P^D$ , which shifts the labor demand curve upwards (Eq. (7) in the Appendix). In the money wage model the supply of labor is a function of the nominal wage, so that the  $W^S$  curve remains as it stands. The new equilibrium is now roughly at  $Y_3$  and  $N_3$  (note that the rise in  $P^D$  causes the IS and LM curves to shift left: the latter if the income elasticity of the demand for money is less than unity; see the Appendix and note 12).

In the real wage model the supply of labor is a function of the real wage. The equilibrium is now at a lower output level and a higher  $P^D$ , since the rise in the domestic goods price  $P^D$  causes the  $W^S$  curve to shift up by  $bP^D$ , where  $b$  is the weight of domestic goods in the expenditure price index (see Eq. (8)),

the LM and IS curves shifting more to the left. It is worth noting, however, that in an open economy real wage model output does change in response to a change in effective demand if the supply of labor is specified as a function of the expenditure price, as is appropriate.

Fiscal expansion shifts the IS curve outwards. Notional demand increases to the intersection of the new IS curve and the  $\bar{r}$  curve. If the demand for money is unaffected by the excess demand and  $L_a = 0$ , output is unchanged at  $Y_0$ . If  $L_a < 0$ , the increased excess demand for goods reduces the quantity of money demanded and increases that supplied, and the kink in the LM curve moves to the intersection of the LM with the new IS curve. The steeper part of the LM curve now shifts outwards, intersecting with the  $\bar{r}$  curve at a higher output demand level. As the simultaneous adjustment of the demand and the supply side was discussed above, we need not revert to it here or in the following.

Monetary expansion shifts the LM curve outwards, which expands output demand to the intersection of the new LM curve and the  $\bar{r}$  curve. It is thus particularly effective, expanding output demand in proportion to monetary expansion: there is no crowding out by the interest rate, which is fixed by the statutory ceiling.

An increase in the ceiling rate causes the  $\bar{r}$  curve to rise, causing its intersection with the LM curve to move up along that curve, increasing output, as the quantity of money demanded declines and the quantity of money supplied increases ( $-L_r$ ). In addition, the money supply also increases if capital flows are free ( $K_r$ ). An increase in the interest rate also reduces the notional demand for goods so that the excess demand for goods declines. If  $L_a < 0$ , this increases the quantity of money demanded. In this case, the new equilibrium is found at the intersection of the steeper part of the LM curve with

the new  $\bar{r}$  curve. A rise in the ceiling rate is thus expansionary also in this case.

#### B. The system after financial market liberalization

After liberalization of the financial market,  $r$  is a free price so that equilibrium lies at the intersection of the IS and LM curves. The effects of fiscal and monetary expansion (outward shift of the IS curve and the LM curve, respectively) are standard: a rise in income and a trade balance deficit, the interest rate rising in response to fiscal, and declining in response to monetary expansion. Monetary expansion also leads to a balance of payments deficit, while fiscal expansion does likewise if the reduced-form LM curve is flatter than the BP curve (not shown) and vice versa (see the expression for  $d\Delta R/dG$  in the Appendix). As these effects are well known, a brief discussion may suffice.

It is shown in the Appendix that only the trade balance response to devaluation is unambiguously positive. In the real wage model, domestic prices increase proportionately to the exchange rate so that price competitiveness cannot be improved by devaluation. Therefore devaluation normally has a contractionary effect on output by reason of a decline in the real value of nominal assets caused by a rise in the price level. The improvement in the trade balance is then based on the decline in income. In the money wage model income normally increases due to the expenditure-switching effect of devaluation -- an additional condition for an unambiguous response being that the income elasticity of the demand for money is at least unity. The overall balance of payments improves in this model.

#### C. The transition

It is not enough to have a working system in the equilibrium before and after the reform; the system also has to work during the transition. Assuming that the interest rate ceiling is a binding constraint, its liberalization has an

expansionary effect on output, as shown. Secondly, liberalization of capital movements implies that  $K_r$  rises from zero to its generic value, which makes the LM curve flatter, and strengthens the output effect of the increase in interest rate.

A number of prerequisites need to be met for the efficient working of the economy. In the Post-Washington Consensus, these are basically the assumptions behind the free market model, and concern macrostability, and liberalization of the labor, goods, and financial markets, and international capital movements (for the Washington Consensus, see e.g. McKinnon (1973), Shaw (1973), Williamson (1990), and World Bank (1991)). For example, firms need to be made transparent by imposing accounting and auditing standards so that market participants who initially do not have access to much information are more on a par with insiders. Antitrust issues need to be addressed as part of goods market liberalization so that the private rates of return on investment projects reflect their social rates of return rather than e.g. monopoly power. For financial institutions, an adequate framework of supervision and regulation is needed to deal with various aspects of moral hazard and adverse selection.

Players in the economy need time to adjust to goods market liberalization. Too fast a liberalization brings about resource reallocation via bankruptcies rather than an orderly restructuring in the declining sectors. This is costly in that it leads to destruction of organizational and informational capital, and can put banks under pressure when the failing companies' loans "turn sour".

We may pass now to the financial markets. In terms of our model, the Post-Washington Consensus handbook procedure can be described as follows. Assuming that the initial output level  $Y_0$  was optimal, one first liberalizes the domestic credit market and neutralizes its effect on output by fiscal, monetary and/or exchange rate policies so as to remain at  $Y_0$ , then allows the economy to adjust. Firms need time to adjust their portfolios of stocks and flows. Especially banks which have their lending at the old ceiling rate find their

deposit and open market rates rising to the higher equilibrium level (unless the entire neutralization was accomplished by fiscal contraction), while interest earnings rise only as outstanding loans are repaid and new loans are granted. Government bond dealers, who have traditionally financed 99 % of their portfolios with debt, are also particularly vulnerable to sudden increases in interest rates. It thus generally takes time to establish what the equilibrium market rate is, let alone adjust to it. In short, interest rates must not rise much faster than the “norm” to which agents have been accustomed.

Next one begins preparations for the liberalization of capital flows. The uncovered interest arbitrage condition requires that  $(r - r_F - \dot{\epsilon}^e)$  in the capital flow function (where  $r_F$  is the foreign market interest rate and  $\dot{\epsilon}^e$  the expected depreciation of the currency) be adequately small in absolute value in order for large disequilibrating capital inflows or outflows to be avoided (see Eqs. (2) and (3) in the Appendix). This is done by changing the policy mix. For example, if  $(r - r_F - \dot{\epsilon}^e)$  is positive, one tightens fiscal policy (or revalues or devalues the exchange rate, whichever is contractionary; see the Appendix), and relaxes monetary policy to bring the market interest rate close enough to international rates (plus expected depreciation), i.e. to make the IS and LM curves intersect at level  $Y_0$ ,  $(r_F + \dot{\epsilon}^e)$ . (Chronologically this can of course in principle be coterminous with the repeal of the interest rate ceilings.) Thereafter one can liberalize capital movements to the extent found desirable.

The handbook rule has been to let the economy adjust to the liberalization of the financial system before proceeding to the liberalization of capital flows. We now see when one can liberalize both markets simultaneously: the economy must be in an initial equilibrium where a) there is no (or not much) excess demand for credit and b) the equilibrium interest rate approximately equals the foreign rate plus the expected depreciation in the exchange rate. This may be a key reason why some countries, e.g. New Zealand, have got away with liberalizing both markets simultaneously contrary to the handbook rule (see e.g. Evans et al. (1996)).

If these conditions are not fulfilled, the penalty can be severe: If  $r > r_F + \dot{e}^\varepsilon$  (plus the risk premium on the exchange rate), borrowers borrow from abroad, causing domestic credit expansion (see Eqs. (2) and (3), and Table 1). If  $r < r_F + \dot{e}^\varepsilon$ , depositors switch their deposits abroad, causing credit contraction.

It is easy to see that liberalizing capital flows before the domestic financial system may also lead to credit expansion or contraction: The rationed borrower borrows from abroad if  $r_S > r_F + \dot{e}^\varepsilon$  (plus the risk premium), where  $r_S$  is the shadow interest rate. The non-rationed borrower does likewise if  $\bar{r} > r_F + \dot{e}^\varepsilon$ . The depositor moves his deposits abroad if  $r_F + \dot{e}^\varepsilon > \bar{r}$ . In the first two cases a credit expansion follows, and in the third case a credit contraction. If the first and third conditions hold simultaneously, part of the intermediation between domestic savers and investors moves to foreign banks. This appears to be what happened in the United States in the late 'sixties in consequence of tight money in combination with Federal Reserve Regulation Q and interest rate ceilings on deposits in thrift institutions, and it was partly responsible for the strong expansion of the eurodollar market.

### 3. THE EVENTS IN FINLAND: AN INTERPRETATION

#### A. The "crazy years" and the collapse

Finland's price competitiveness eroded throughout the first half of the 1980's due to substantial wage increases. It soon became evident that the country had problems with the current account of its balance of payments; in 1985, at the best point of its current account cycle, it barely attained equilibrium (Table 1, Columns 4 and 5).

[Table 1 about here]

A fatal error was made at the turn of 1986-87, when the Bank of Finland liberalized the domestic credit market without the preparatory measures discussed above. Namely, it simultaneously also liberalized international capital movements, starting with long-term foreign borrowing by manufacturing and shipping companies, and all borrowing through commercial banks. International interest rates ( $r_F$ ) were of the same order of magnitude as the repealed loan rate ceiling of 7 %, with  $\dot{e}^\varepsilon$  still close to zero. The Finnish shadow rate was, however, much higher, even the free Interbank overnight rate, the predecessor of the Helibor being 11.9 % at the end of 1986 (Table 1, Column 7). The result was a massive capital inflow, leading to uncontrolled credit expansion. In 1987 alone, net capital imports grew by FIM27,5 billion, or by more than the entire monetary base ( $M_{-1}$ ). The change in the central bank's foreign exchange reserves ( $\Delta R$ ), which has the same effect as a change in its domestic bond portfolio ( $\Delta D$ ) in Table 2 (see Eqs. (2) and (3) in the Appendix), was FIM15,7 billion, or 87 % of the monetary base. As a result, the Interbank overnight rate initially declined by 4 percentage points to 8 %, the annual average being one point higher (Table 1, Column 7). In the years 1987-89, the monetary base increased by 114 % in nominal terms (82 % in real terms),  $M_1$  by 28 % (9 %),  $M_2$  by 49 % (27 %),  $M_3$  by 60 % (36 %), and domestic credit by 74 % (48 %). (Source: Bank of Finland Monthly Bulletin.) This meant that bank loans, almost the only debt instruments available, increased from 55 % of the GDP in 1985 to 98 % in 1990 (Drees et al. (1998)). Needless to say, an expansion of this size had to take place at the expense of credit quality. However, bankers' risk assessment appears to have been affected by their past experience, when credit losses had been small: under interest rate ceilings they could choose the best risks.

In terms of Figure 1, capital movements made the LM curve roughly horizontal at  $\bar{r}$  from point  $Y_0$  on, individuals now being able to finance their notional expenditures. Aggregate demand increased not to  $Y_1$  but to  $Y_2$ , which in turn sparked off a wage-price spiral. In consequence, stock prices and housing

prices almost doubled (Table 1, Columns 8,9). The higher asset prices increased the real net worth of households ( $V/P^D$ ), which increased expenditures and shifted the IS curve outwards, further fuelling the expansion, and financing was no longer an obstacle. The price increases caused expectations of further price rises, which reduced the real user cost of capital and fuelled further price rises. In 1987-1989, unemployment decreased from the 5 % level to 3.5 %, wage inflation accelerated from 6½ % to 9.6 % per annum, and price competitiveness deteriorated by 10 % (Table 1, Columns 3,5,6,10). This reduced the market shares of export (and import competing) industries by 10 % (Eq. (3)).<sup>4</sup> The current account deficit increased to 6.2 % of the GDP in 1989 (Table 1, Column 4).<sup>1</sup>

The authorities were preoccupied with the expansionary effects of the terms of trade improvement (some 10 %): the oil price declined and the export prices of pulp and paper products increased. While the terms of trade (Table 1, Column 11) may give the impression that all was well, examination of the market share of Finnish exports shows that the improvement was accompanied by losses of market share in export markets; much of the increase in export prices was due to cost increases and thus loss of competitiveness rather than foreign demand increase. Thus even if the terms of trade improvement had an expansionary effect, it was likely to be minor. (See also Bordes (1993), who finds the above expansionary effects of the terms of trade improvement unimportant.)

The literature has, in our view, failed to appreciate the significance of capital flows, possibly because the percentage of foreign loans out of total credit was “only” in the teens (see e.g. Bordes et al. (1993)). It is important to note, however, that the appropriate yardstick is the monetary base, in which foreign loans cause an increase, all else being equal (see Eqs. (2) and (3)). Thus their quantitatively most substantial effect is likely to be the amount of domestic loans they make possible, given the excess demand for credit at a 7 % interest rate. Thus while we agree with Bordes that the problem was on the supply side of the credit market, we submit that the main reason was capital



flows rather than the widening spread between the loan and deposit rates. Secondly, the literature has placed considerable emphasis on the factors causing the demand for credit to increase especially due to expectations of housing and stock price rises. This is, of course, likely to be true, but the initial situation was not equilibrium. In our view, most of the action was on the supply side of the credit market, whose binding constraint was relaxed. When the "floodgates opened" there was a great deal of potential demand to be satisfied".

After repeated warnings, the authorities realized in the spring of 1989 that the balance of payments was out of control and that even its financing might encounter difficulties in the near future; the current account deficit had risen to more than 6 per cent of the GDP, and unit labor costs were more than 12 per cent above the OECD average (Table 1, Columns 4,5). Imports had thus to be reduced. Parliamentary elections were approaching, which made politicians unwilling to contract fiscal policy. The main thrust therefore fell on monetary policy. The Bank of Finland tightened this sharply and revalued the currency by 4 %. The tightening led to a greater rise in interest rates than if fiscal and exchange rate policies had been used relatively more. Indeed, the nominal Helibor rate increased by 6 percentage points to 16 % during three quarters, the rise during the last quarter alone being 4 points, and it persisted high for three years -- although this does not show in the annual averages or year-end values due to a strong seasonal (Table 1, Column 7). For many a debtor this meant a loan rate of 20 %. Thus initially mainly only the LM curve shifted inwards, the IS curve shifting only marginally, until the wealth effect began to take hold. (The LM curve had become steeper due to the fact that there was now a risk premium associated with capital imports, which reduced  $K_r$ . In addition,  $\dot{e}^\varepsilon$  began to rise.)

As suggested above, so drastic a tightening would probably have inflicted serious damage in the financial system even without the "crazy years", during which banks had expanded loans by increased risk-taking; the bank loan/deposit ratio increased from 1.3 to 1.8 between 1985 and 1990. As has

been known for a long time, extreme caution should be exercised if interest rates are to be increased by much more than the “norm”. The latter was in this case determined by the fact that nominal interest rates had normally moved only by one percentage point up or down, the real rate being negative much of the time at least on an after-tax basis. Especially banks that had much of their lending at the old ceiling rate of 7 % found their deposit and open market rates suddenly rising to a much higher level. As a result, Finland had its SKOPbank and Savings banks debacle in the early 1990’s. The Savings bank sector, with 150 institutions and a loan market share of 25 % in 1990, shrank to 40 institutions with 4 % of the market in 1995, their nonperforming loans being transferred to the Government Guarantee Fund. Most of the rest of the banking sector was also approaching insolvency, and all the banks had to resort to state support, as will be elaborated below (see Drees et al. (1998)). It seems that this second deadly sin would alone have sufficed to bring the banking sector to its knees and lead to a banking crisis.

The interest rate surprise was also shared by bank customers, who had borrowed heavily and had a vulnerable financial structure in terms not only of the quantity of debt but also of its uncovered interest rate and exchange rate exposure. In the meantime, the Bank of Finland had allowed the linking of loan rates to market rates, and banks had shifted the interest rate risk to their customers on certain types of loans. It was thus not only new borrowing but also outstanding loans which became more costly with the rise in market rates, and customers were clearly not prepared for this. They thus experienced a sharp unexpected rise in financing costs, while their cash flow shrank due to the demand effects of the tightening. Many businesses and households faced a financial crisis, this often leading to forced sales of collateral, and bankruptcies – in 1990-98 over 45 000 firms, or 21 % of the total collapsed (see Statistics Finland). Bankruptcies moreover are very costly, observing that much of a firm’s value consists in organizational and informational capital -- a network of individuals with implicit contracts between them, together with accumulated firm-specific know-how. The distress sales depressed market prices, which led to new collateral problems and further forced realizations. As a result, housing and stock prices collapsed to a half of

their 1989 level, or to a level preceding the “crazy years” (Table 1, Columns 8,9). Sales of new dwellings, of course, came to a standstill, which was fatal for construction companies; with one exception, all the large companies either failed outright or had to be reorganized.

Nor were households prepared. Their gross interest payments increased from 5.5 % of disposable income in 1987 to almost 10 % in 1992 (see Drees et al. (1998)). The collapse of house prices added to their problems. Houses had hitherto been safe investments whose prices had moved mainly upwards, and a new house was bought before the old one was sold. Under interest rate ceilings, households would take out all the loans available at the then-prevailing negative real loan rates, the bank loan officer acting as a brake on all expenditures. Now that financing was available, houses had been purchased with highly leveraged financing in the expectation that the value of the collateral would increase. However, beginning in 1989, the real loan rate was no longer negative. When the housing market collapsed, many households were caught in a two-house trap, with loans quickly exceeding the joint market value of the houses. The decline in asset prices led to a considerable decline in household real net worth, and 23 % of households ran into debt delinquencies. As a result, households reduced consumption, which further fuelled the downward spiral: the more loans they repaid the more they owed.<sup>2</sup>

The GDP declined by 14 %, or 20 % below its potential level and remained at a depressed level for two years. Unemployment increased rapidly, its open variety hitting a peak of 18.4 % in 1994 (Table 1, Columns 1,3). Government finances deteriorated as tax revenues declined, unemployment benefits increased and, later, the cost of bank support, currently evaluated at 10 % of the GDP, increased (the mere fiscal cost being 7.5 %; see Nyberg and Vihriälä (1994)). This led the government to *increase* taxes! So deep a depression made the subsequent recovery slower, since organizations had been destroyed in bankruptcies, and capacity had to be built with normal growth subject to all financial and other constraints. In a recession, in

contrast, only the capacity utilization rate declines, and production can then be increased much faster. Thus in the former case the NAIRU rises.

For the banks debt defaults were a severe blow, and they were already in serious difficulties by reason of steeply higher deposit and free market rates. For example, nonperforming loans in 1992 constituted 9.3 % of bank exposure after 3.7 % had been written off as loan and guarantee losses; some 50 % of banks' real estate and construction exposure was either written off or nonperforming (Drees et al. (1998)). A banking crisis ensued. The financial crisis had followed the classical textbook pattern - rise in interest rates - decline in asset values - deterioration of banks' balance sheets - increase in uncertainty - increasing moral hazard and adverse selection problems - balance of payments crisis - the decline in the GDP, which accentuates the above problems, leading to its further decline (see e.g. Mishkin (2001)).<sup>3</sup>

A bank panic was averted when the authorities first gave oral guarantees and established a Government Guarantee Fund, which injected capital resources into banks in the form of subordinated loans. All the banks took advantage of the offer. Finally, in February 1993, Parliament passed a resolution guaranteeing bank deposits "under all circumstances". This would have sufficed to avert a bank panic in credibly satisfying the depositor that deposits were safe. However, the Fund also passed a resolution to the effect that bank share prices would not be allowed to fall to zero. This price guarantee amounted to a potentially considerable wealth transfer to the shareholders of banks, although the subsequent increase in bank share prices (partly due to the guarantee) made the guarantee redundant. No other measures were taken in the financial system, which made possible the continuation of activities motivated by moral hazard and adverse selection and increased the cost of the crisis.<sup>4</sup>

A financial crisis generally leads to debt deflation if an unexpected decline in price level takes place - asset prices had already declined. A price level

decline increases the real interest rate and induces agents to reduce their consumption and investment in order to service their debts, especially given the fact that the market value of their net worth had declined. This further depresses economic activity and perpetuates the vicious circle. Indeed, producer prices in manufacturing declined by 0.6 percent in 1991, rising by 2 per cent in 1992. This needs to be examined in the light of the fact that price indices, in not taking into account improvement in the quality of goods, exaggerate price inflation by 0.8-1.6 % per year, as argued by the Boskin Commission (1996) (see Table 1, Column 2). The government's policy of fiscal correction, initiated after the 1991 election, made matters worse by further reducing the private sector's cash flow, although this was at first necessary because of the balance of payments crisis. The behavior and statements of executives in the private sector referred to classical debt deflation behavior in the early 1990's: the emphasis was on correcting the financial ratios of the balance sheet.

In addition, there were signs of a credit crunch when banks tightened their collateral requirements, though the empirical evidence is mixed (see Vihriälä (1997) and Pazarbasioğlu (1997)). It appears that, in leaving the country hovering on the brink of debt deflation for years, the authorities failed to adequately appreciate the danger of, and the potential damage caused by, debt deflation. The attempt at a deflationary solution in the fall of 1991 strengthens this impression. We will return to this issue shortly.

Bordes (1993) regards the excessive exposure of banks and their customers to interest rate and credit risks as a key reason for the depression. This was indubitably the case, given the size of the interest rate rise. We would submit, however, that the reason for the exposure lay in expectations, which should be treated as given in policy design. This turns the issue to the converse; given the expectations of relatively stable nominal interest rates, stable growth, and mainly rising housing prices which agents must have entertained, based on their experience, the reason was the suddenness and size of the

interest rate rise, which was far beyond anything they had experienced in the past.

The authorities pointed to the collapse of the Soviet Union as the main factor responsible for the depression. However, Finnish exports there had been declining since 1982, and this trend continued during the “crazy years”. After the collapse in 1991, Finnish exports there declined by 6 % of total exports in each of two consecutive years. Together they amounted to 2 % of Finland’s GDP. (See Bordes (1993).) The “Western recession” has been mentioned as another culprit. However, rate of the growth in industrial production in Finland’s Western export partners was zero or marginally below zero for two years, and after the devaluations Finland’s exports grew briskly. In our view, it would not have been difficult for Finland to manage disturbances this magnitude in its normal condition. (This view is shared by Bordes, Currie, and Söderström (1993).)

It is worth adding that in 1990-93 exports had an expansionary effect on the GDP, except in 1991, when it was -1.5 %. Public sector demand was expansionary in 1990-91 and contractionary in 1992-93. The major contractionary demand component was private demand (mainly due to fiscal and monetary policies), whose effect was in the range of -1.5 % to -6.1 %. (See Kiander and Vartia (1996)). Of this, the contribution of private investment was -5.5 % in 1991 (see Jonung et al. 1996).

## B. Devaluation

Late in 1991, the Bank of Finland still maintained the parity to which the currency had been revalued in 1989. It had resisted demands to devalue the currency in connection with the linking of the mark to the ECU in June. This position was in our view, however, well taken. The trade unions, namely, then demanded that real wages must not be reduced, i.e. the country was still in a real wage model, where price competitiveness cannot be improved by devaluation (except possibly temporarily), as shown in the Appendix.

In November, faced with a deteriorating unemployment situation, the unions talked only of (nominal) wages. This implies that  $\rho = 0$  and the country was in a money wage model, where  $E_e = 0$  and  $T_e = T_P D_{/e}$ , i.e. devaluation improved price competitiveness and was expansionary (at least if  $\eta_{L,Y} \geq 1$ ; see the Appendix), improving the trade balance by expenditure switching rather than expenditure reduction. At the end of the month, a last-ditch attempt was made to effect an “internal devaluation” by a negotiated settlement where nominal wages were to be cut by 5 per cent. Fortunately this failed, since it might have pushed the country (deeper) into debt deflation. Shortly thereafter, market forces obliged the central bank to float the currency (and fix it at a 12 % lower level the following day) with almost ideal timing – only the Metalworkers’ Union elections a month later caused some inconvenience. Without devaluation the combination of an overvalued currency and high interest rates would most likely have inflicted serious additional damage.

A new floating of the same order of magnitude took place in September 1992. Thereafter the Bank of Finland kept the interest rate at almost 18 %, responding to demands for relaxation with the argument that this would lead to further depreciation of the currency. As is well known, however, this would happen only if capital flows were perfectly elastic to the interest rate ( $K_r \rightarrow \infty$ ) and the expected depreciation of the mark ( $\dot{e}^\varepsilon$ ) had remained unaffected by the depreciation which had already taken place.<sup>5</sup> When the Central Bank was publicly apprised of these conditions, it quickly relaxed monetary policy, and the Helibor declined by 5 percentage points (Table 1, Column 7). Of course, there was no pressure on the exchange rate.

These devaluations caused many borrowers unexpected problems. About a half of corporate borrowing from Finnish banks in the late 1980’s was denominated in foreign currency, and the banks financed this with foreign borrowing as explained above (see Drees et al. (1998)). Almost a half of this borrowing was by the closed sector, which believed the Central Bank Governor’s assurances that the exchange rate would be held unchanged. It

typically had no cover for its foreign exchange exposure. Faced with declining credit ratings, the banks found refinancing of their foreign debt ever more difficult, and had to resort to ever shorter maturities. Early in 1993, the banks forced their customers to convert their foreign currency-linked loans into domestic currency loans at the worst possible moment after the second devaluation. This all but maximized their cost, as the mark was at its nadir, whence it subsequently appreciated. Many customers had evaluated the cost of the foreign currency-denominated loans by distributing the cost of a possible devaluation over the entire maturity, when the possible exchange rate loss would have been in reasonable relation to the interest rate spread. Of course, many customers' exchange risks turned into their banks' credit risks, as many of these loans turned sour in the banks' portfolios. (For a theoretical treatment, see Aghion et al. (2001).)

On the real side, the fundamental situation had now altered especially as the collective wage agreements made in connection with the exchange rate adjustments were moderate, reflecting the money wage model. It would, however, take a few quarters before the newly-won competitiveness showed in foreign trade, output and employment. In the meantime, if policy-makers had sought to minimize the damage caused by bankruptcies, they would have tried to stimulate, rather than contract the depressed economy within the limits determined by the financing possibilities of the current account deficit and by refinancing maturing debt.<sup>6</sup>

Unfortunately, the opposite took place. As seen from Table 1, Column 12, discretionary fiscal policy, as expressed by the Blanchard measure, tightened considerably during and after 1991 and remained relatively tight thereafter, with no consistent pattern (see Honkapohja et al. (1999), and Alesina and Perotti (1995)). Reduction of the fiscal deficit by fiscal contraction was the supreme target of fiscal policy during the early 1990's, and it fuelled the downward spiral. As the deficit increased due to deteriorating business conditions, the government increased taxes and reduced expenditure, causing business conditions to deteriorate further, this in turn increasing



unemployment and unemployment benefits, and bankruptcies (Table 1, Column 3). The latter led to debt defaults, which led to new defaults, thereby further aggravating the banking crisis. It is possible that during the depression, tax increases, in contracting economic activity, led to an increase in the level of the fiscal deficit in addition to the damage it caused in the economy. In any case, they were likely to increase the public debt-GDP ratio (see Ahtiala (2000)).<sup>7</sup>

All in all, it is difficult to see how the effect could have been worth the cost, especially as it should have been evident that a substantial improvement in the trade balance, and thus economic activity, was under way thanks to the exchange rate adjustments. It is worth adding that the central government debt, and Finland's net foreign liabilities, peaked at less than 65 % of the GDP. (However, see Giavazzi and Pagano (1990), (1995), Karras (1994), Bertola et al. (1993), and Ahtiala (1998).)<sup>8</sup>

It is in general less painful to carry out contractionary structural adjustments such as fiscal correction by first "putting the house in order". This would make it possible to avoid the unnecessary bankruptcies of firms strong enough to survive the adverse effects of either the adjustment or the depression but not both. Now monetary policy remained tight until late 1995 (Table 1, Column 7). Up to 1993 the tightness could be defended first in view of the current account situation (since the objective was to contract aggregate demand and thereby imports, and soften the unions to the money wage model in preparation for devaluation) and then calm foreign creditors. Since late 1993 it cannot, in our view, be defended on these grounds. In fact, interest rates were increased in the fall of 1995, when they were at the 6 per cent level. A small increase was appropriate as a message to the trade unions negotiating a new collective wage agreement, but in our view the initial level was too high, given the unemployment situation, the number of bankruptcies and the fiscal policy stance. The tightening appears to have been responsible for the subsequent slowdown of economic growth.

The Bank of Finland answered the above criticism by saying that it was interested only in inflation, which of course is an important – and fashionable – target especially with an eye to price competitiveness. However, this should not be the only target in the presence of supply shocks and mass unemployment: In a broad class of models besides this, optimal policy consists in perfectly offsetting demand shocks and perfectly accommodating shocks to potential output (see e.g. Clarida et al. (1999)). After all, price stability is a means to stable output growth, not an independent end. Besides, the more acute threat was then deflation, especially given the above bias in price indices. If tight money was an investment in the central bank's credibility as an inflation-fighter, it was a costly one with unfortunate timing. In 1996, interest rates were cut to the 3 per cent level, though longer rates remained higher, and no acceleration of inflation followed.<sup>9</sup>

#### 4. CONCLUDING COMMENTS

We have derived the theoretical conditions for a successful financial reform with a simple open economy model, and then examined the Finnish reform in the light of our results. We emphasized the importance of giving the economy enough time to adjust after the removal of interest rate ceilings. Thereafter the domestic interest rate should be aligned with foreign rates by changing the policy mix, and finally, international capital flows can be liberalized. The two markets can be liberalized simultaneously if there is initially no excess demand for credit and the domestic interest rate is roughly equal to the foreign rate plus the expected depreciation of the currency.

The experience of Finland shows how serious the consequences of a badly executed reform can be. The matter can be summarized as follows. In 1986-87, the general interest rate ceilings were abolished simultaneously with the liberalization of international capital flows, when the domestic shadow interest rate was considerably higher than international rates. The reform was, moreover, carried out without appropriate preparations with respect to the reform of accounting and auditing standards and a framework of supervision

and regulation of financial institutions. The liberalization caused the monetary base and the stock of domestic credit almost to double in three years due to the ensuing capital inflows. The outcome was the “crazy years”, during which housing and stock prices roughly doubled and general inflation accelerated, causing a serious erosion of price competitiveness.

In 1989, it was realized that the current account was out of control. Instead of a coordinated tightening of fiscal and monetary policies, the Bank of Finland sharply tightened monetary policy, the short-term interest rate increasing by 6 percentage points to 16 % in three quarters, the rise during the last quarter alone being 4 points. It seems that such a measure would have sufficed to cause severe damage not only in the banking sector but also in the real sector even without the “crazy years”, which had left banks’ customers vulnerable with a weak financial structure. When the economy was in a “free fall” as a result, fiscal policy was tightened (2-3 years too late), which, combined with tight money and an overvalued exchange rate, deepened the decline. Various other fiscal and monetary policy measures had a similar effect.

In 1991 and 1992 price competitiveness was restored with devaluations combined with moderate collective wage agreements. Even after these had been executed, domestic policies were kept unduly tight. This continued the decline despite the fact that the fundamental situation had been corrected and its effect would be felt in a matter of a few quarters.

Was anything done right? There were in our view three successful operations. The inevitable devaluations, combined with the collective wage agreements made in connection with them, can be regarded as successful. The same can be said of the failure to devalue in June 1991, when the country was still in the real wage model. Finally, the decision to guarantee bank deposits was instrumental in averting a bank panic.

The basic lesson to be learnt from this sequence of events should be clear: economic policy especially in connection with economic reform is difficult, and carrying one out without mastering it can inflict serious damage on the

economy. A great deal of work remains to be done in Finland's (and in many other countries') reform, and there are dangerous pitfalls also in its future stages. Individual measures should not be carried out without regard to processes ongoing in the rest of the economy.

Another lesson is that the micro level rules of thumb, such as that on a "healthy" debt-equity ratio, are a function of economic conditions in the long run. If the country has had a long period of sustained rapid growth, and stable nominal interest rates, often implying negative real after-tax rates and mainly rising housing prices, an adverse deviation from these conditions, greater than the "norm" can activate non-linearities and have more serious consequences than econometric models based on the old regime would predict. Under these conditions, the policy-maker has to underwrite the trusting behavior of the private sector if he is to avoid the serious consequences of a suddenly deteriorating macroeconomic performance. This point, well understood by the Federal Reserve Board (as witnessed by the "Greenspan put"), appears to be of relevance to the crisis in East Asia.

What lessons would these findings offer for China today? China has implemented reform fairly well according to the handbook. Nonetheless there are risks. The reform of accounting, prudential and regulatory standards has only just begun, and practical bankers are learning the principles of risk analysis and modern bank management. If liberalization of the credit markets is carried out without considerable progress in these issues, banks are likely to find themselves in serious difficulties. (Bank loan rates have already been freed, but a large proportion of investment spending is subject to strict selective credit controls.) Specifically, the banks' problem loan portfolios, still estimated at a quarter of the total, need to be cleaned up. Up till now, banks have received over 260 billion dollars in terms of direct handouts and unloading of bad loans to state-backed companies. The WTO rules call for China to open its banking market from the end of 2006. This is a challenging deadline.

Schemes to create consumer finance companies bring to the market loan applicants who have previously had no access to credit. This is likely to reduce precautionary saving, whereas the partial "privatization" of health, pension, and education expenses works in the opposite direction. If the former dominates, the IS curve shifts outwards. This may put the central bank's ability to control bank lending under pressure – consumer loans already constitute a quarter of all new lending. Finally, there have been suggestions that international capital movements be liberalized now, i.e. before the domestic credit market liberalization has been completed and market rates aligned. It is easy to see where this would lead, especially given the expectations of an appreciation of the yuan.

#### APPENDIX: THE MODEL

We will analyze a small open economy, with exogenous foreign goods prices and foreign interest rate. The foreign demand curve for domestically produced goods is negatively sloped. As we are interested in the intermediate-term effects of economic policy, we can carry out the analysis in a comparative-static flow equilibrium framework. We have:

$$Y = E * \left( \underset{+}{Y}, \underset{-}{r}, \underset{+}{V/P^D} \right) + T * \left( \underset{-}{E^*}, \underset{-}{P^D/e} \right) + G - A = E \left( \underset{+}{Y}, \underset{-}{r}, \underset{(-)}{e} \right) + T \left( \underset{-}{Y}, \underset{+}{e} \right) + G - A \quad (1)$$

$$M \equiv M_{-1} + \Delta D + \Delta R = L * \left( \underset{+}{P^D Y/P}, \underset{-}{r}, \underset{-}{a} \right) P = L \left( \underset{+}{Y}, \underset{-}{r}, \underset{-}{a}, \underset{+}{e} \right) \quad (2)$$

$$\Delta R = T * \left( \underset{-}{E^*}, \underset{-}{P^D/e} \right) P^D + K \left( \underset{+}{r} - \underset{+}{r_F} - \dot{e}^\varepsilon \right) = T \left( \underset{-}{Y}, \underset{+}{e} \right) P^D + K \left( \underset{+}{r} - \underset{+}{r_F} - \dot{e}^\varepsilon \right) \quad (3)$$

$$P \equiv bP^D + (1-b)e \quad (4)$$

$$a = a \left( \underset{+}{A} \right) \quad (5)$$

$$Y = Y \left( \underset{+}{C}, \underset{+}{N} \right) \quad (6)$$

$$W^D = Y_N P^D \quad (7)$$

$$W^S = W(N, P) \quad (8)$$

$$W^S = W^D \quad (9)$$

Equation (1) represents aggregate demand for the domestic good and is the sum of private expenditures ( $E^*$ ), the trade balance ( $T^*$ ), and government expenditures ( $G$ ), minus the amount of total demand eliminated by credit rationing ( $A$ ), all in terms of the domestic good, and equal to total output ( $Y$ ). Expenditures are a function of income, the domestic interest rate ( $r$ ) and real wealth ( $V/P^D$ , where  $V$  is nominal wealth and  $P^D$  the domestic good price). The trade balance is specified as a function of expenditures, imports being functionally part of total expenditure. This deviates from the conventional specification with only income as argument. This specification implies that all of an expenditure change, induced by a change in the interest rate or real wealth, falls on domestic goods, whereas that caused by an income change falls on both domestic and imported goods. The other argument in the trade balance function is the real exchange rate, where ( $e$ ) is the price of foreign currency in terms of domestic currency. Foreign goods prices are fixed at unity. The signs below the arguments refer to the assumed signs of the partials. As to  $A$ , when the interest rate ceiling is effective,  $A$  is the excess demand for goods at the ceiling rate, and it is rationed out by credit rationing by banks. The  $A$  is thus the part of “credit rationing” due to the fact that the interest rate is rationed below its equilibrium value. When the interest rate is at its market-clearing level, notional demand equals effective demand and  $A$  is zero. We will later return to the quasi-reduced forms on the right.

Eq. (2) is the money market equation. The nominal money supply  $M$  equals its value at the end of the previous period  $M_{-1}$  plus the change in the central bank’s foreign exchange reserves ( $\Delta R$ ) and in its bond portfolio ( $\Delta D$ ). Since

cash is held to buy both domestic and imported goods, but not exported goods, real balances ( $M/P$ ) have to be defined in terms of the expenditure price ( $P$ ), as is widely accepted. However, income in the money demand function ( $L^*$ ) has then to be in terms of the same goods, since otherwise velocity would not be a pure number, as first proposed in Ahtiala (1984). The other arguments are the interest rate  $r$ , and  $a$ . The  $a$  is the difference between the equilibrium interest rate and the ceiling rate  $\bar{r}$  under general interest rate ceilings and it is thus the interest rate equivalent of the excess demand for credit, as expressed in Eq. (5). The  $L_a$  (the partial of  $L$  with respect to  $a$ ) is smaller than  $L_r$  in absolute value, because rationed borrowers constitute only part of those demanding cash balances. Note that we have incorporated bank portfolio optimization and the credit expansion multiplier in the  $L$  function, so that the interpretation of  $M$  is the monetary base, and  $L_r$  and  $L_a$  also include the partials (except capital flows  $K$ ) of the money supply function with respect to  $r$  and  $a$ , respectively.

Equation (3) states that the balance of payments is the sum of the nominal trade balance and capital flows ( $K$ ), where the latter are a function of the difference between the domestic interest rate and the sum of the exogenous foreign interest rate and the expected depreciation of the exchange rate ( $\dot{e}^e$ ).

In Eq. (4), the expenditure price is a weighted average of domestic and foreign goods prices.

On the supply side, Eq. (6) is the production function, where output is a function of the given capital stock ( $C$ ) and employment ( $N$ ). In Eq. (7) the demand wage  $W^D$  equals the value of the marginal product of labor,  $Y_N$  being the partial of  $Y$  with respect to  $N$ . The supply wage  $W^S$  in Eq. (8) is a function of employment and the expenditure price: rational labor is concerned with its real wage in terms of the goods it buys, not of those it produces. Eq. (9) is the equilibrium condition for the labor market. We will refrain from treating unemployment explicitly in order to limit the number of cases and to keep the

discussion brief. Of course, if the equilibrium wage is below the actual wage, there is unemployment and the output at the equilibrium wage is not achieved. We get from Eqs. (4), and (6) through (9), by total differentiation and substitution:

$$dP^D = \theta dY_+ + \rho d e_{(+)} , \quad (10)$$

$$\text{where } \theta \equiv \left( \frac{W_{+N} - Y_{-NN}}{Y_{+N}} \right) / \left( \frac{Y_{+N} - b W_{+P}^S}{Y_{+N}} \right);$$

$$\rho \equiv (1-b)W_P^S / (Y_{+N} - b W_{+P}^S) = \begin{cases} 1 & \text{in real wage model} \\ 0 & \text{in money wage model} \end{cases}$$

and  $Y_{NN}$  is the second derivative of  $Y$  with respect to  $N$ . Diminishing returns make it negative.

In the multipliers of Eq. (10), the value of  $W_P^S$ , i.e. the supply side specification, has a key role. Examine the real wage model, where the supply of labor is a function of the real wage. Equation (8) obtains the form:  $W^S = W(N) \cdot P$  so that we get from Eqs.(7) through (9):

$$W_P^S = W(N) = Y_N \quad (11)$$

It will be seen that the denominators in Eq. (10) are strictly positive, keeping  $\theta$  positive and finite both in this and in the money wage model, with  $W_P^S = 0$ . This produces the often neglected fact that the classical dichotomy breaks down in an open economy, making the model simultaneous, with a rising aggregate supply curve. It is also worth noting that in the real wage model  $\rho = 1$ : price competitiveness cannot be improved by devaluation.



The initial values of  $e$ ,  $P^D$  and thereby  $P$  are set at unity by an appropriate choice of units. Since the period in question was basically one of fixed exchange rates, this regime is examined.

Substituting Eqs. (4) and (10) into Eqs. (1), (2), and (3) yields their quasi-reduced forms, shown on the right, in  $Y$ ,  $r$  or  $A$ ,  $\Delta R$ , and exogenous variables. There, we have simplified the trade balance equation by ignoring the effects of  $r$  on  $T$  through expenditures. This leaves the qualitative conclusions unaffected.

Most of the new partials are unambiguous, as can be seen from footnotes 10, 11 and 12, where the partials have been derived and interpreted.  $E_Y$  in Equation (1) is assumed to remain positive and smaller than one partly because of the wealth effect. The  $E_e$  is negative in the real wage model and zero in the money wage model.<sup>10</sup>  $T_Y$  is negative.  $T_e$ ,  $L_Y$  and  $L_e$  are positive.<sup>11, 12</sup>

During the period under study Finland had two policy regimes. Until 1986, the country had general interest ceilings with capital flows subject to licensing. In this regime, the ceiling interest rate is a policy variable and  $A$  endogenous. Effective demand at that interest rate is notional demand, minus the amount  $A$  which is rationed by bank credit rationing. In addition to  $\bar{r}$ ,  $\Delta D$  and  $K$  are monetary policy instruments.

In 1986-87, both the interest ceilings and restrictions on capital flows were dismantled. In this regime,  $r$  and  $K$  are endogenous and  $A$  is zero. The  $Y$ ,  $r$  and  $\Delta R$  being at their market clearing levels, notional demand equals effective demand.

Totally differentiating the model of equations (1), (2), and (3), we get matrix equation (12) for the interest ceiling case, observing that  $T = 0$  in the initial stationary state equilibrium. Eq. (13) is the corresponding equation for the general case. The former (latter) equilibrium is stable, assuming that excess

demand on the goods market leads to a rise in excess demand (output), that on the money market to a fall in output (rise in the interest rate), and a balance of payments surplus to an increase in foreign exchange reserves, as the reader can readily verify.

$$\begin{bmatrix} z & 1 & 0 \\ L_Y & L_a a_A & -1 \\ T_Y & 0 & -1 \end{bmatrix} \begin{bmatrix} dY \\ dA \\ d\Delta R \end{bmatrix} = \begin{bmatrix} dG + (E_e + T_e)de + E_r dr \\ d\Delta D - L_e de - L_r dr \\ -T_e de - K_r dr \end{bmatrix} \quad (12)$$

$$\begin{bmatrix} z & -E_r & 0 \\ L_Y & L_r & -1 \\ T_Y & K_r & -1 \end{bmatrix} \begin{bmatrix} dY \\ dr \\ d\Delta R \end{bmatrix} = \begin{bmatrix} dG + (E_e + T_e)de \\ d\Delta D - L_e de \\ -T_e de \end{bmatrix} \quad (13)$$

$$z \equiv 1 - E_Y - T_Y$$

We obtain the following policy effects under interest rate ceilings from Eq. (12):

$$dY = \frac{1}{D_1} \{ -L_a a_A dG + d\Delta D + [T_e - L_e - L_a a_A (E_e + T_e)] de + (K_r - L_r - L_a a_A E_r) dr \}, \quad (14)$$

$$d\Delta R = \frac{1}{D_1} \{ T_Y (d\Delta D - L_a a_A dG) + [L_Y K_r - L_r T_Y - L_a a_A (z K_r + E_r T_Y)] dr + \quad (15)$$

$$+ \{ L_Y T_e - L_e T_Y - L_a a_A E_e [T_e (1 - E_Y) + T_Y] \} de \},$$

where  $D_1 \equiv -zL_a a_A + L_Y - T_Y > 0$ ,

$$a_A \equiv (L_Y - T_Y)/(K_r - L_r) - z/E_r > 0.$$

Eq. (14) shows that this is a regime with monetarist properties; policies affect output only to the extent that they affect the demand for or supply of money. Thus monetary expansion is highly effective, its output impact being proportional to the change in the money supply, and the balance of payments change the marginal propensity to import multiplied by the change in income. Fiscal expansion is ineffective if the demand for (and supply of) money is not a function of the excess demand for credit ( $L_a = 0$ ), only the excess demand for credit increasing by the change in government expenditures, which thus crowd out private expenditures dollar for dollar. If the demand for money is a function of the excess demand for credit, the output change is proportional to the change in the demand for money. The balance of payments change is the income change multiplied by the marginal propensity to import. Finally, an increase in the ceiling interest rate has an expansionary effect on output. As the intuitive explanation is given in the text, we will not repeat it here.

The policy effects under market-determined interest rates are displayed in Table 2. There  $D_2$  is positive, as became evident in the foregoing discussion on stability. The effects of fiscal and monetary expansion are standard: a rise in income and a trade balance deficit, the interest rate rising in response to fiscal, and declining in response to monetary expansion. Monetary expansion also leads to a balance of payments deficit, while fiscal expansion does likewise if the reduced-form LM curve is flatter than the BP curve ( $L_Y K_r - L_r T_Y < 0$ ) and vice versa. As these effects are well known, we can keep the discussion brief.

[Table 2 about here]

However, only the trade balance response to devaluation is unambiguous and positive. As to  $dY/de$ , in the real wage model the numerator of the expression equals  $(K_r - L_r)(1 + T_E)E_e + E_r(L_e - T_E E_e)$ , where  $L_e = L^*$  (see note 14). The  $L^*$  is normally a large number compared to  $T_E E_e$ , which makes the second term normally negative. Since the first term is also negative, devaluation is normally contractionary in the real wage model. In the money wage model the numerator equals  $(K_r - L_r)T_e + E_r(L_e - T_e)$ , where  $L_e = (1 - b)L^*(1 - \eta_L \cdot \gamma)$ , with  $\eta_L \cdot \gamma$  the income elasticity of the demand for money (see note 12). The first term in the numerator being positive, the numerator and the expression are unambiguously positive if the income elasticity of the demand for money exceeds or equals unity. Otherwise the direction of the effect of devaluation depends on parameter values.

$d\Delta R/de$ , or the balance of payments response to exchange rate adjustments, is composed of the interaction of the same factors. The first two terms in the numerator are positive. A sufficient condition for devaluation to improve the balance of payments is that either  $T_e \geq |E_e|$ , or the third term is non-negative. The former condition holds in the money wage model so that in this model devaluation improves the balance of payments. However, the opposite inequality holds in the real wage model, where  $T_e = T_E E_e$ . In the real wage model, then, the sufficient condition for  $d\Delta R > 0$  is that the BP curve be no steeper than the LM curve. It is worth noting, however, that even if the balance of payments effect of devaluation is favorable, in the real wage model ( $\rho = 1$ ) it is based on a decline in output: one cannot improve the country's competitiveness by devaluation, but domestic goods prices increase proportionally to the exchange rate, given the level of output.

Any one of the other exogenous variables can, of course, disturb the equilibrium, e.g.  $P_F$ ,  $r_F$ ,  $W_0^S$  or  $\rho$ , and  $T_0$ . We will not discuss these at length, as they did not play a key role in the events under consideration.

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## Notes

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1. The Bank of Finland blamed the crazy years on the tax deductibility of interest expenses. However, interest expenses had been deductible from time immemorial, and deductibility had been restricted in the 1980's, not the reverse. The point is that if a large excess demand for credit is suddenly satisfied, a substantial boom follows, and the deductibility of interest expenses is likely to play a marginal role with disturbances of this size (see e.g. Kaminsky and Reinhart (1999)).

2. The average indebtedness of the household sector remained fairly reasonable in relation to its assets: in 1987-89 the market value of assets increased by 61 % and liabilities by 73 %, so that liabilities rose from 12.6 % of assets to 13.6 %. In 1989-92, assets declined by 22 %, while liabilities were roughly unchanged, which increased the ratio to 17.3 %. Of course these averages conceal a large variance. See Jonung et al. (1996).

3. Bank loan officers must, of course, have shared the expectations of relative stability. In a depression of this magnitude, many an acceptable credit risk turns bad because the decline in the economy affects the profitability of investments. This is thus not necessarily a sign of excessive ex ante risk-taking.

4. For example, the old bank management was allowed to continue. It faced a one-way bet: It had an incentive to extend loans to problem customers even at a negative expected interest rate to prevent their loans from surfacing as non-performing. In the best case, the customers would turn around with

general business conditions and in the worst the management could buy time and hold its position longer rather than risk immediate dismissal.

5. The uncovered interest parity condition, implying perfect capital mobility:

$r - r_F - \dot{e} = 0$ . Adding and subtracting the forward premium of the currency ( $f$ ) yields:  $(r - r_F - f) + (f - \dot{e}) = 0$ . The first expression in this equation is the covered interest arbitrage condition. The interpretation of the second expression is the risk premium of the currency. Expected depreciation in the expression for the risk premium can hardly be expected to be unaffected by a credible devaluation. The domestic interest rate can then be reduced after the devaluation.

6. The terms of trade also deteriorated. The first 5 percentage points from the peak in 1990 was genuine. Much of the subsequent 5 points in 1991-92 appears to be associated with the devaluations, when Finland recaptured part of its lost market share (Table 1, Columns 10,11). It is thus a mirror image of the development during the “crazy years”.

7. The government carried out several reforms, timing them in a way that deepened the depression. For example, the tax deductibility of interest expenses on housing loans was restricted considerably, which reduced the demand for housing and further depressed housing prices. A worsening of (defined) pension benefits was made public, which gave all those who had the choice a strong incentive to retire before the benefits were cut. Increases in contributions to (defined benefit) pension plans, along with many other taxlike fees, may in the long run have been necessary, but not when unemployment was close to 20 per cent.

8. Note, however, that fiscal policy should be examined in the context of the state of economy and other policy measures: part of the tightening in 1991 can be defended as a means of cutting imports and softening labor unions to the money wage model in preparation for devaluation. Since the middle of

1993, it is difficult to see any defence for the tightness, given the level of unemployment.

9. The Bank of Finland answered the demands for lower interest rates by arguing that such a move would cause the long rates to rise. However, the dominant link between the rates is arbitrage, due to which short and long rates are generally positively correlated. A necessary condition for monetary relaxation to lead to a rise in long rates is that the rise in expected inflation dominates the downward effect due to arbitrage. This is rare except under a high level of employment. Under mass unemployment it is most unlikely.

10. The expression for the change in expenditures reads:

$$dE = (E_Y^* - E_{(V/PD)}^* \theta V) dY + E_r^* dr - E_{(V/PD)}^* \rho V de \quad (\text{B1})$$

The multiplier of  $dY$ , which is the new  $E_Y$ , is the marginal propensity to spend adjusted for the wealth effect. Ando and Modigliani (1963) have obtained a value of .06 for  $E_{(V/PD)}^*$ . The  $E_e$  is the marginal effect of the exchange rate on expenditures through the wealth effect. It is negative in the real wage model ( $r = 1$ ) and zero in the money wage model ( $r = 0$ ).

11. We get from Eq. (1):

$$dT = (T_E^* E_Y + T_{(PD/e)}^* \theta) dY - (T_{(PD/e)}^* \frac{Y_N - W_P^S}{Y_N - bW_P^S} - T_E^* E_e) de \quad (\text{B2})$$

The multiplier of  $dY$ , or  $T_Y$  is negative, since both its terms are negative,  $T_{(PD/e)}^*$  being negative if the Marshall-Lerner condition holds. The  $T_e$  is composed of the expenditure-switching effect and the expenditure-reducing or augmenting effect (the effect, on imports, of the exchange rate via real wealth

and thereby expenditures). The  $T_e$  is positive in the money wage model ( $W_P^S = 0$ ;  $E_e = 0$ ; see the Appendix) if  $T^* P D / e < 0$ , and in the real wage model ( $Y_N = W_P^S$ ;  $E_e < 0$ ) by reason of the wealth effect.

12. We get from Eq. (2), as above:

$$d(LP) = \left\{ \theta \left[ (1-b)L_Y^* Y + bL^* \right] + L_Y^* \right\} dY \quad (B3)$$

$$+ L_r^* dr + \frac{1-b}{Y_N - bW_P^S} \left[ L^* Y_N - (Y_N - W_P^S) L_Y^* Y \right] de.$$

$L_Y$  is the partial of the demand for nominal balances with respect to income and is positive.  $L_e$  is the corresponding partial with respect to the exchange rate. It is positive in the real wage model. In the money wage model it is positive, zero or negative depending on whether the income elasticity of the demand for money is smaller than, equal to or greater than unity.

Table 1. Finland's Depression in Figures

	1	2	3	4	5	6	7	8	9	10	11	12
	$\dot{Y}$	$(C\dot{P}I)$	$U$	$CA/Y$	$C_L$	$\dot{W}$	$r$	$S$	$P_H$	$X_F/M_o$	$TT$	$BFI$
1986	2	2.9	5.4	-1	92	6.6	11.9	38.7	492	96	111	-0.4
1987	6.9	4.2	5.1	-2.1	95	7.4	9.2	59.0	550	95	116	+2.6
1988	4.7	5.0	4.6	-3.0	103	8.8	8.5	93.4	749	92	119	-2.3
1989	5.4	6.6	3.5	-6.2	112	9.6	10.2	124.1	915	87	123	-1.3
1990	0	6.1	3.4	-6.7	116	9.1	10.6	132.5	859	86	120	+1.5
1991	-14	4.3	7.6	-5.6	112	6.1	14.9	100.0	733	81	118	+4.0
1992	5	2.1	13.1	-4.8	95	2.1	13.3	73.1	599	85	113	+1.8
1993	-1	1.1	17.9	-1.0	88	1.5	7.7	68.9	556	93	106	-4.3
1994	3.8	0.35	18.4	+1.4	95	4.5	4.4	116.3	592	94	111	-1.2
1995	4.6	0.3	17.2	+4.5	105	7.0	5.3	179.5	598	92	119	-1.8
1996	3.5	0.4	16.3	+4.3	101	3.3	3.7	199.0	603	88	118	-0.9

$\dot{Y}$   $\equiv$  rate of growth of the real GDP;  $(C\dot{P}I)$   $\equiv$  percentage change in the CPI;  $U$   $\equiv$  unemployment rate;  $CA/Y$   $\equiv$  current account balance as a percentage of the GDP;  $C_L$   $\equiv$  relative unit labor cost in manufacturing: Finland/OECD; OECD = 100;  $X_F/M_o$   $\equiv$  Volume of Finnish exports to OECD in relation to total imports by OECD countries, index;  $\dot{W}$   $\equiv$  rate of change in the wage rate in manufacturing;  $r$   $\equiv$  interbank overnight interest rate;  $S$   $\equiv$  Index of industrial stock prices;  $P_H$   $\equiv$  index of housing prices;  $TT$   $\equiv$  terms of trade;  $BFI$   $\equiv$  Blanchard Fiscal Impulse, % of GDP; Declining values indicate tightening (source: Honkapohja *et al.* (1996)).

Sources: Bank of Finland, Statistics Finland, and IMF International Financial Statistics Yearbook 1997.

Table 2. The Policy Effects in a Market-Determined System

	$dY /$	$d\Delta R /$	$(T \cdot P^D) /$
$/ dG$	$\frac{(K_r - L_r)}{D_2} > 0$	$\frac{(L_Y K_r - L_r T_Y)}{D_2}$	$\frac{(K_r - L_r) T_Y}{D_2} < 0$
$/ d\Delta D$	$\frac{-E_r}{D_2} > 0$	$\frac{-zK_r - E_r T_Y}{D_2} < 0$	$\frac{-E_r T_Y}{D_2} < 0$
$/ de$	$\frac{(K_r - L_r)(E_e + T_e) + E_r(L_e - T_e)}{D_2}$	$\frac{f}{D_2}$	$\frac{d}{D_2} > 0$

$$D_2 \equiv (K_r - L_r)z + E_r(T_Y - L_Y) > 0$$

$$z \equiv 1 - E_Y - T_Y$$

$$f \equiv z(L_e K_r - L_r T_e) + E_r(L_e T_Y - L_Y T_e) + (E_e + T_e)(L_Y K_r - L_r T_Y)$$

$$d \equiv (K_r - L_r)[(1 - E_Y)T_e + T_Y E_e] + E_r(L_e T_Y - L_Y T_e) > 0$$

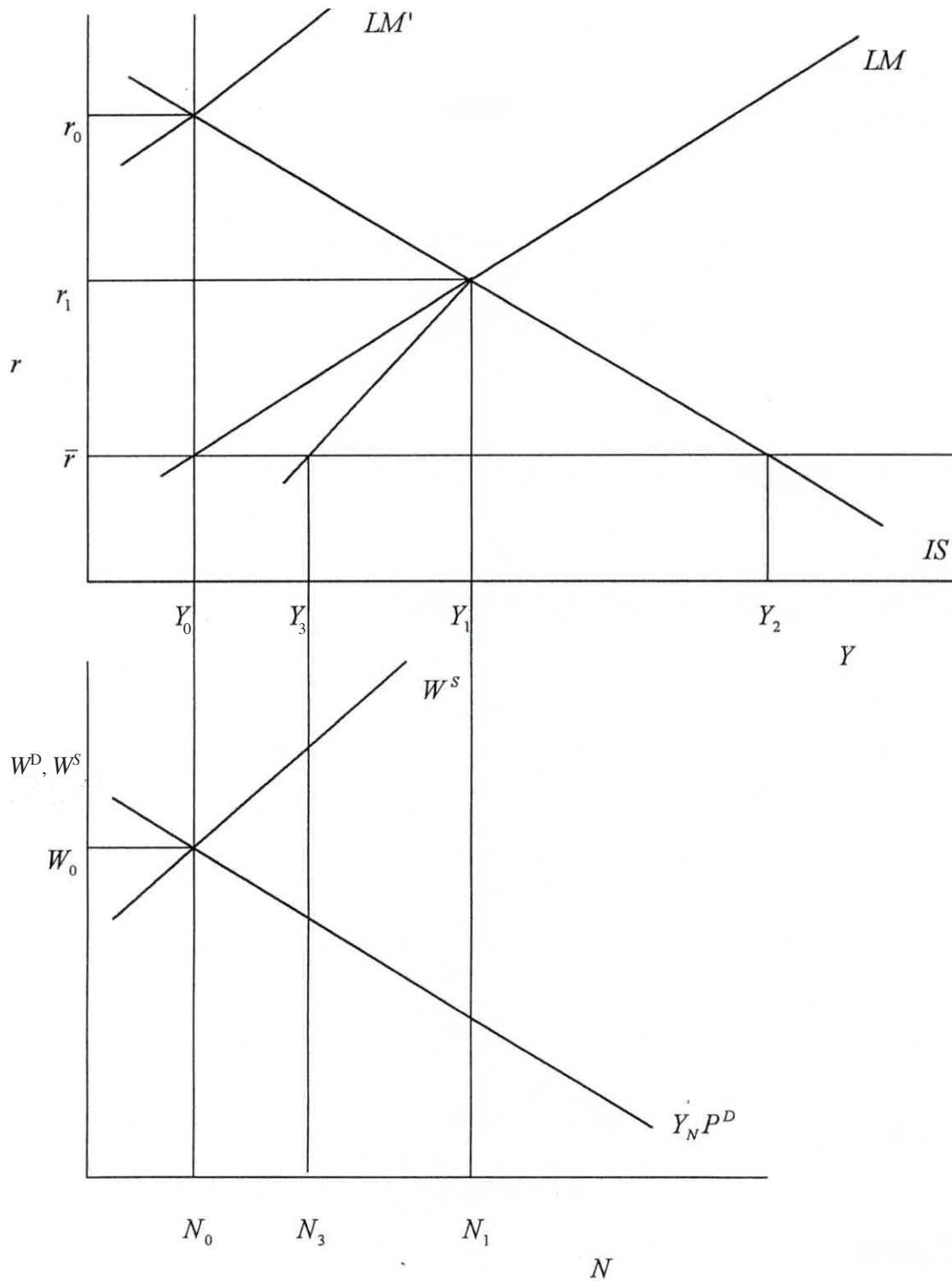


Figure 1. The Behavior of the Economy before and after Financial Market Liberalization

# Figure 2 Deregulation of financial markets in Finland

