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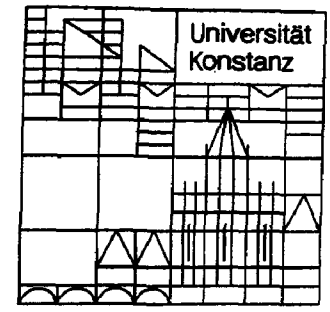

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The Effectiveness of Norwegian Capital Controls

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Abstract

The Norwegian capital controls had a significant effect on stock returns only in the early eighties when controls were stringent although they did not influence short-term interest rates throughout the sample period (1980-90). Our result thus contributes to a growing body of evidence on the ineffectiveness of capital controls in developed economies. Apart from evasion through international trade (leading and lagging, misinvoicing), the dichotomous structure of the Norwegian economy and of the controls offered arbitrage possibilities. A dominant outward oriented oil sector was banned from the domestic capital market and referred to international markets while the case was reversed for the rest of the economy. Linkages between offshore and mainland economy prevented the control system from working.

JEL classification: F21; F31; F32; F36

1 Introduction

This paper analyzes empirically the effectiveness of Norwegian capital controls in the eighties. We do this in the framework of a portfolio balance model by comparing return differentials of two assets, i.e. short-term deposits and stocks, between the onshore and the offshore market and between Norway and the US, respectively.

Norway constitutes a particularly interesting case: It had imposed a set of very restrictive regulations on transborder capital movements and was one of the very last West European economies to open up its credit markets. Capital controls were phased out as late as July 1, 1990! Moreover, the structure of the Norwegian economy was (and still is) remarkable. A very outward oriented shipping sector contributed an average 2.6 % to GDP, but 16.6 % to total export in 1980-89. More importantly, the oil sector has become very dominating since the second oil price shock, producing an average of 14 % of the GDP and around one fifth of domestic capital formation (Statistcal Yearbook of Norway, various issues). These two sectors were granted free access to world credit markets, but banned from domestic markets, while the rest of the economy was referred to the domestic capital market and only restrictively allowed to use foreign sources. This dichotomy in regulation makes the system of Norwegian foreign exchange controls even more interesting. The controls, designed to "*insulate the domestic credit market and the domestic interest rate level from external influence*" (Norges Bank 1989:43) were gradually liberalized during the eighties. The investigation into whether these controls actually served their alleged purpose is furthermore interesting, because it shows how long this Nordic economy has already been effectively integrated in the European financial markets, the declined EU membership notwithstanding.

It is rather surprising though that, apart from Vikøren (1994), the financial integration of the Norwegian economy has not been studied hitherto. Yet, even Vikøren does not explicitly test for the effectiveness of capital controls as we do, following the standard Dooley & Isard (1980) approach; furthermore our coverage is broader, comprising also of equity returns. The reason for this is that capital

controls may be ineffective on an overall basis, but constitute an efficient tool for discouraging certain transactions.

We analyze the interest rate differential between onshore and offshore rates first, and then we turn to differentials of equity returns. Lastly, we offer some concluding remarks.

2 The Model

The approach of Dooley & Isard (1980), adopted here, is built on a simple portfolio balance model of the domestic private sector and of nonresidents, both of which optimize their portfolio, given the existing capital controls and the (individual) prospects of future capital controls.[1] The Norwegian private sector can invest in Norwegian assets, with return i^d in Norway and i^e in the international market, and in foreign assets, with expected return $i^* + \Delta e$, where i^d, i^e and i^* are the interest rate on domestic (kroner) deposits, the eurokroner interest rate and the euro-interest rate on foreign deposits respectively; Δe stands for the expected depreciation of the kroner. Foreigners (both private and public sector) have the same option. The asset demand functions are given by

$$B^n = f(i^d - i^* - \Delta e, i^d - i^e, W^n, C) \tag{1}$$

$$B^* = g(i^d - i^* - \Delta e, i^d - i^e, W^*, C) \tag{2}$$

where B^n and B^* denote, respectively, the Norwegian private and the foreign holdings of kroner government debt, W^n and W^* the Norwegian and foreign financial wealth. C is a measure of capital controls already in place. Asset demand depends positively on both the return differentials and wealth. The total supply of kroner debt is B^s, so asset market equilibrium entails

$$B^s = B^n + B^* . \tag{3}$$

[1] Other papers that use the Dooley and Isard method for investigating the effects of capital controls are Claassen and Wyplosz (1982) for France, Phylaktis (1988) for Argentina, Phylaktis (1990) for Argentina, Chile and Uruguay, and Spiegel (1990) for Mexico.

Since the covered interest parity holds in the Euromarket, we can write

$$\Delta e = i^e - i^* + \phi \,, \tag{4}$$

where ϕ is the exchange risk premium. Combining eqs. (1)-(4) and assuming eqs. (1) and (2) to be linear, leads to

$$i^d - i^e = \alpha_0 + \alpha_1 B^s - \alpha_2 W^n - \alpha_3 W^* + \alpha_4 \phi + \alpha_5 C \tag{5}$$

with α_i positive (i=1,...,4) in the normal case. Eq. (5) can be viewed as the sum of a political risk premium associated with *prospective* capital controls ($\alpha_0 + \alpha_1 B^s - \alpha_2 W^n - \alpha_3 W^* + \alpha_4 \phi$) and an effective tax caused by the *already existing* capital controls ($\alpha_5 C$). According to the simple portfolio balance model of the exchange rate (e.g. Branson et al. (1977)) the exchange risk premium can be written as (adopting a linear specification)

$$\phi = \beta_0 - \beta_1 B^s + \beta_2 W^n + \beta_3 W^* \tag{6}$$

with β_i positive (i=1,2,3) in the normal case. Substituting eq. (6) into eq. (5) and adding a disturbance term, yields our regression equation:

$$i^d - i^e = \underbrace{\gamma_0 + \gamma_1 B^s + \gamma_2 W^n + \gamma_3 W^*}_{DIFF_{pol.risk}} + \gamma_4 C + \nu \tag{7}$$

where ν is assumed to follow a normal time-independent distribution with zero mean. $DIFF_{pol.risk}$ estimates the differential due to the political risk of future imposition of capital controls, whereas $\gamma_4 C$ measures the tax effect of the controls in place. Since the coefficients of B^s , W^n and W^* have opposite signs in eqs. (5) and (6), the signs of γ_i (i=1,2,3) are indetermined. The political risk premium and the exchange risk premium are negatively related. The sign of $\gamma_4 C$ depends on the type of control: it is negative in the case of capital export restrictions and positive for capital import restrictions. The interest differential due to political risk depends on the gross stock of government debt and the distribution of total wealth among the Norwegian private sector and the foreigners.

3 Overview of Norwegian Capital Controls

The eurokroner market has existed since the end of 1977, but it only really began to function in November 1978, after Norges Bank allowed the large Norwegian banks to borrow and lend freely on the international market, provided their combined net foreign exchange position (spot plus forward) was approximately zero on a daily basis. In April 1980 all banks were allowed access to the euro-market (Grønvik 1991). In September 1980 the general price freeze including all lending rates was discontinued. It is only after this date, that the comparison between onshore and offshore rates becomes viable to measure the effectiveness of *capital* controls as such.[2]

Transborder portfolio investment was almost prohibited, borrowing abroad required restrictively granted licenses, and inward direct investment was made subject to concessions. The minor amount of outward direct investment was treated liberally. Banks had to balance their total foreign position (spot and forward) and nonresidents were restricted from holding Kroner accounts, just as residents were restricted from holding foreign exchange accounts. Only companies with foreign currency transactions were allowed to operate on the international deposit market, although their financial transactions were restricted in size, maturity and currency denomination. In December 1981, the maturity restriction (set at 12 months) was lifted for those firms. It followed a period of gradual and cautious liberalization, especially with regard to inward portfolio investment (Spring '82), but also outward portfolio investment and bank regulations were eased. A major liberalization package entered into effect in June 1984, affecting almost all types of transactions. Other residents were permitted access to the euro-market in December 1989. Capital controls were completely abolished by July 1990.

Since Norway pursued a low-interest rate policy, we focus on capital export restrictions. These were liberalized in December 1981 and in December 1989. The controls are represented by two dummies: D81 (equal to one for 1980.II-81.IV and

[2]For a chronology of Norwegian capital controls cf. Brekk (1987), Norges Bank (1989), and Schulze (1992).

zero otherwise) and D89 (equal to one for 1982.IV-89.IV and zero otherwise), for which we expect a negative sign in eq. (7) as these controls inhibit the exploitation of more profitable investment opportunities in the Euromarket. In order to avoid a downward bias, capital control dummies should enter the regression equation only for those quarters, in which the controls were actually binding, i.e. in which the desired capital outflow was larger than was permitted. Since this bindingness is not directly observable, we resort to an indirect measure and consider the restrictions to be nonbinding if the private nonbank sector has actually been importing short term capital on a net basis.

4 Short-Term Interest Rate Differential

Like Dooley and Isard (1980), we calculate B^s, W^n and W^* as linear combinations of government debt (DEBT), official foreign exchange reserves (RES), and the net stock of Norwegian claims on nonresidents, equal to the accumulated current account surpluses ($\sum$ CAS) as follows:

$$B^s = \text{DEBT} + \text{RES} \tag{8}$$

$$W^n = \text{DEBT} + \sum \text{CAS} \tag{9}$$

$$W^* = -\sum \text{CAS} \tag{10}$$

As external interest rate (i^e) we use the 3-month eurokroner rate; for the internal rate we could use the special 3-month deposit rate Norwegian commercial banks offer to large customers made available by Dr. Vikøren from Norges Bank. Due to data availability, our sample consists of quarterly data and runs from 1980.III to 1990.IV.

Eq. (7) is estimated with OLS and the results are depicted in Table 1.[3] The capital control dummy D81, having an insignificant coefficient of the right sign, and

[3]We report a number of diagnostic test statistics, the less familiar of which are briefly discussed below. BG(1) and BG(2) are Breusch-Godfrey statistics testing for first and second residual autocorrelation (distributed $\chi^2(1)$ and $\chi^2(2)$ respectively under H_0). ARCH(1) tests for first order autoregressive conditional heteroscedaticity, see Engle (1982)[distributed $\chi^2(1)$]. JB is the Jarque-Bera statistic testing for nonnormality of the residuals [distribution is χ^2].

D89, having an insignificant coefficient of the wrong sign, imply that the effective tax is estimated to be zero.

Table 1: CIP, 1980.III - 90.IV

	(1)	(2)	(3)	(4)
constant	0.160	0.188	0.102	0.143
	(0.48)	(0.56)	(0.33)	(0.47)
B_t^n	7.783	8.095	0.313	0.969
	(1.50)	(1.58)	(0.06)	(0.18)
W_t^n	-12.784	-13.393	-1.337	-2.523
	(1.53)	(1.63)	(0.15)	(0.29)
W_t^*	-13.702	-14.132	-2.048	-3.000
	(1.61)	(1.68)	(0.23)	(0.34)
D_{81}	-0.168	-0.189	-0.491	-0.515
	(0.77)	(0.88)	(2.08)	(2.20)
D_{89}	0.072		0.098	
	(0.60)		(0.90)	
$(r^d - r^e)_{t-1}$			0.468	0.454
			(2.77)	(2.71)
σ	0.319	0.316	0.290	0.289
$\bar{R}^2$	0.028	0.045	0.217	0.221
DW	1.288	1.257	2.256	2.222
BG(1)	7.101	7.691	2.814	2.137
BG(2)	7.049	7.712	3.224	2.500
ARCH(1)	0.838	0.523	0.001	0.044
NORM	2.649	3.091	2.108	1.754

Source: Norges Bank, BIS; t values in parentheses.

The political risk premium is also zero as the parameter estimates are all insignificant and the fit is very poor. An F-test on the joint significance of the coefficients of B^s, W^n and W^* produced an F(3,37) value of 0.96, below the 5 % critical value of 2.86. In addition, the Durbin-Watson and Breusch-Godfrey statistics signal seri-

ously autocorrelated residuals. The relation is dynamically misspecified. To remedy this, we added a lagged interest rate differential as a regressor, on the assumption that the banks adjust the domestic deposit rate with some lag to changes in the eurokroner rate.

The estimation results of the dynamic equation are much better and imply an estimated effective capital control tax of 0.9 percent in the long run on domestic deposits for the early years in the sample period. The dummy D89, however, is still insignificant. Moreover, since all determinants of the political risk premium have small and highly insignificant coefficients, the estimated political risk premium associated with future capital controls is effectively zero. The F-test on joint significance of the three parameters was highly insignificant. This is not startling because after liberalizing the money market, the Norwegian government was continuously dismantling capital controls in other areas. In such a climate a reversal of the money market liberalization was certainly considered unlikely.[4]

Although there were some capital controls in force, it seems fair to conclude that on the whole the Norwegian money market appears to have been well integrated into the international money market in the 1980s. The fact that some private agents were barred from the international market did not prevent interest rate equalization, presumably due to the competitive banking system or illegal channels. Only in the early 1980s did we find some weak evidence of binding capital controls. Therefore it would make more sense to analyze the experience in the seventies, when the money market was highly regulated. Unfortunately, data unavailability constitutes a fatal stumbling block for such a venture.

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[4]We also estimated eq. (7) (the static as well as the dynamic version) after scaling B^s and W^n by world wealth ($W^n + W^*$), which is more in line with international capital asset pricing model (CAPM). Results were changed inperceptibly by this.

As an alternative to the partial adjustment specification of the Dooley and Isard equation, we also estimated a simple Error Correction Model (ECM) linking r^d to r^e and capital control dummies. This approach solely focuses on the time series characteristics of the two interest rates. The interest differential due to the effective capital control tax was now estimated at -0.5 percent for D81 (t-value estimate 2.49) and zero for D89 (t-value estimate 0.07).

5 Equity Return Differentials

In the early eighties international portfolio investment, the cross-border trade of long term stocks, was most severely regulated. We therefore turn our attention to the relative returns on stocks, employing the same theoretical framework as above: the expected return differential is explained by relative asset supplies, wealth and dummies representing capital controls. The actual return differentials (computed relative to US assets) include exchange rate changes and asset price changes. The portfolio balance model states that

$$E_t(r^n - r^u)_{t+1} = \delta_0 + \delta_1 A^n + \delta_2 A^u + \delta_3 W^n + \delta_4 W^u + \text{dummies} \qquad (11)$$

where A and W denote asset supply and wealth at the end of quarter t, r denotes the total return converted to kroner over quarter t and superscripts n and u denote Norway and United States, respectively. E_t denotes the expectation conditional on information available at the end of quarter t. Assuming rational expectations our regression equation reads

$$(r^n - r^u)_{t+1} = \delta_0 + \delta_1 A^n + \delta_2 A^u + \delta_3 W^n + \delta_4 W^u + \text{dummies} + \varepsilon_{t+1} \qquad (12)$$

where ε_{t+1} is a white noise prediction error. The sample period is 1978.I-90.III. Returns are expressed as quarterly rates.

Since Norway continuously experienced net capital import as to the trade in stocks (net selling of Norwegian stocks to abroad) over the whole sample period, regulations restricting outward capital movements are considered to have been non-binding by our classification criterion. Therefore we focus solely on the capital import restrictions. Until October 1979 foreigners could only purchase one million kroner of Norwegian quoted stocks. In February 1982 trade in quoted stocks became free, while there was licensing for nonquoted stocks. This licensing was abolished in January 1984.

Table 2 shows the estimation results when the three regimes are represented by three separate zero-one dummies [$D1$: 78.1-79.3; $D2$: 79.4-81.4; $D3$: 82.1-84.1]. It appears that the effective capital control tax was highest in the first subperiod when the controls were most severe. The estimated effect is fairly high and significant at the 5 percent level. The other two estimates of capital control effects are

Table 2: Equity returns, 1978.I - 90.III

constant	0.172
	(1.02)
K_t^n	-123.6
	(2.41)
K_t^u	5.989
	(2.03)
W_t^n	17.89
	(0.51)
W_t^u	-5.113
	(2.13)
$D1$	0.215
	(2.27)
$D2$	-0.059
	(0.76)
$D3$	0.161
	(1.44)

σ	0.150
$\bar{R}^2$	0.158
DW	2.218
BG(1)	1.754
BG(2)	2.801
ARCH(1)	1.791
NORM	0.521

Source: IFS, Morgan Stanley; t-statistics in parentheses.

insignificant. The test that the coefficients of the political risk premium determinants are jointly zero yields an F(4,46) statistic of 2.73, which is significant at the 95 % confidence level (critical F(4,46) is 2.57). Thus, a risk premium associated with prospective regulations explains part of the observed share yield differential, albeit only a small part as is indicated by the adjusted R^2 statistic of only 0.12.[5]

6 Conclusion

The investigation of Norway's capital controls for the sample period of 1978 - 1990 has produced the following results: The controls had had a significant effect on

[5]We also analyzed differentials of Norwegian bond returns vis-à-vis US bond returns. We were unable to identify a significant impact of capital controls (if there was any at all) due to the high volatility of the time series involved.

stock returns in the first subperiod, but have been ineffective from the mid–eighties onwards when controls were increasingly dismantled. It has proved hard, however, to identify a systematic influence of the controls on *short-term interest rates.*

That the results do not show a stronger impact of the capital controls may be partly due to data quality: the time series on stock returns display a high variance; but especially the unavailability of data for the seventies, when controls were really stringent, constitutes a fatal stumbling block for a more comprehensive analysis. It is also conceivable that results have been affected by our method of assigning (non)bindingness to the control dummies: although our method makes good sense, there is no guarantee that the assignment is entirely correct. An alternative approach, *viz.* endogenization of the regime classification (though theoretically promising) seems unfeasible in the face of the poor data quality. It would be overdemanding to expect the data to determine both incidence and effects of capital controls.

These remarks notwithstanding, our results suggest that the Norwegian capital controls have not been very effective on an overall basis in the eighties. At first glance this may seem very surprising, because the regulations were explicitly aimed at insulating the domestic credit markets: *"The wish to pursue an autonomous Norwegian monetary and credit policy is at present the main reason for the foreign exchange regulations."* (Brekk 1987: 28). It may be considered all the more surprising, because a broad variety of transactions (inward and outward portfolio and direct investment, borrowing abroad, purchase of vacation homes abroad and the like) was strictly regulated and the controls covered all relevant agents (private nonbanks, banks, insurance companies, other financial institutions).

Our result is, however, in line with an emerging body of evidence showing that for developed economies capital controls have been hardly effective in the medium and long term in the recent past. Controls became more and more leaky as time passed. This is shown by Browne & McNelis (1990) for Ireland, Spiegel (1990) for Mexico, and Gros (1992) and Gros & Thygesen (1992) for the EMS member countries.

A reason for this ineffectiveness of capital controls is that international trade provides ample opportunities to illicitly importing and exporting capital via leading and lagging of trade payments and via misinvoicing of international trade (see Schulze 1994). Moreover, the mere growth and the rising sophistication of financial

markets and the emergence of new financial instruments may have made it difficult for the authorities to keep track of these developments and to efficiently regulate and monitor the rising number and variety of transactions. A special Norwegian line of explanation lies in the dichotomous structure of the economy – and of the foreign exchange regulation. Since the shipping and the oil sector were unrestricted, the Norwegian economy possessed a window to the world financial markets, despite the controls. Backward and forward linkages of these sectors to the rest of the economy provided – legal and illegal – channels for foreign-originated funding. In the end, it may not only have been a growing insight into the advantages of efficient capital allocation that has led to the abolition of capital controls.

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