

IMF WORKING PAPER

©1990 International Monetary Fund

This is a working paper and the author would welcome any comments on the present text. Citations should refer to an unpublished manuscript, mentioning the author and the date of issuance by the International Monetary Fund. The views expressed are those of the author and do not necessarily represent those of the Fund.

WP/90/97

INTERNATIONAL MONETARY FUND

European Department

A Note on Saving-Investment Correlations in the EMS

Prepared by Jagdeep S. Bhandari and Thomas H. Mayer*

Authorized for distribution by Leslie Lipschitz

October 1990

Abstract

This paper extends recent work by Feldstein and Horioka (1980) and Bayoumi (1990), and examines saving-investment correlations for industrial countries in the post-war period. The focus of the enquiry is on differences observed between EMS and non-EMS countries. It is seen that the EMS countries exhibit much lower saving-investment correlations than their non-EMS counterparts. This result supports the hypothesis that exchange rate stability achieved in the EMS has been an important factor in promoting international capital mobility.

JEL Classification Numbers:
210, 431

* The views expressed here are our own and should not be interpreted as representing those of the International Monetary Fund.

Contents

	<u>Page</u>
Summary	iii
I. Introduction	1
II. Test Results	1
1. Cross-section results	1
2. Sub-periods	3
3. Pooled data	4
III. Concluding Remarks	5
Table 1. Cross-Section Saving-Investment Correlations in 1987-87	2
Table 2. Cross-Section Sub-periods Correlation in 1975-78, 1979-82, 1983-87	3
Table 3. Cross-Section Time Series Saving-Investment Correlations in 1975-87 and 1979-87	4
Figure 1. Saving-Investment Correlations for 16 Industrial Countries, 1975-87	2a
Figure 2. Saving-Investment Correlations for ERM Countries (and Austria), 1975-87	2b
Figure 3. Saving-Investment Correlations for Selected Non-ERM Countries, 1975-87	2c
Figure 4. Saving-Investment Correlations for 16 Industrial Countries, 1975-78	4a
Figure 5. Saving-Investment Correlations for ERM Countries (and Austria), 1975-78	4b
Figure 6. Saving-Investment Correlations for Selected Non-ERM Countries, 1975-78	4c
Figure 7. Saving-Investment Correlations for 16 Industrial Countries, 1979-82	4d
Figure 8. Saving-Investment Correlations for ERM Countries (and Austria), 1979-82	4e
Figure 9. Saving-Investment Correlations for Industrial Non-ERM Countries, 1979-82	4f
Figure 10. Saving-Investment Correlations for Industrial Countries, 1983-87	4g
Figure 11. Saving-Investment Correlations for ERM Countries (and Austria), 1983-87	4h
Figure 12. Saving-Investment Correlations for Selected Non-ERM Countries, 1983-87	4i
References	6

Summary

This note extends recent work on saving-investment correlations. It has been observed that saving and investment rates in the non-industrial countries during the era of the gold standard were virtually uncorrelated. By contrast, saving-investment rates in the postwar period exhibit a high degree of correlation. Some research argues that the correlation observed in the recent period indicates interventionist government policies rather than low capital mobility. Similarly, weak correlation in the era of the gold standard reflects little or no government intervention during that period.

This note focuses on the dichotomy between EMS and non-EMS countries and examines saving-investment correlations for the industrial countries in the postwar period. Its hypothesis is that the EMS area, with its requirement of fixed exchange rates (within relatively narrow margins), decreasing administration barriers to capital mobility, and increasingly noninterventionist fiscal policies, approximates conditions existing under the gold standard. This is tested by examining cross-section and pooled data for 16 industrial (EMS and non-EMS) countries over the period 1975-87, as well as over relevant sub-periods. The hypothesis is broadly confirmed and suggests that exchange rate stability in the EMS has promoted capital mobility.

I. Introduction

In a famous paper, Feldstein and Horioka (1980) argue that the degree of international capital mobility can be measured by examining the correlation of saving and investment across countries, with high capital mobility resulting in low saving and investment correlations and vice-versa. In their work, Feldstein and Horioka (op. cit.) find that saving and investment rates are highly correlated, thus suggesting the existence of low capital mobility to those authors. Subsequent work (for example, by Penati and Dooley (1989), Dooley, Frenkel and Mathieson (1987), and Bayoumi (1990)) has essentially confirmed the empirical finding of high saving-investment correlations in industrial countries. In particular, Bayoumi (1990) attempts to isolate the reasons for the observed high correlation in post-war data and concludes that the principal reason for the high observed correlation is the presence of government intervention and that, in fact, the degree of private capital mobility has been high and has tended to increase over time. Bayoumi (op. cit.) also notes that during the gold standard era, there appears to be virtually no correlation between saving and investment rates. Since the gold standard period is typically regarded as a period of little or no government intervention, he is led to conclude that observed post-war correlations must be an artifact of government policy.

The present note extends Bayoumi's investigation of saving-investment correlations for industrial countries during the post-war period. In particular, the focus is on the dichotomy between the EMS and non-EMS countries. The hypothesis is that the EMS area, with its requirement of fixed exchange rates (within relatively narrow margins), decreasing administrative barriers to capital mobility, and increasingly non-interventionist fiscal policies, approximates conditions similar to those existing under the gold standard. If this hypothesis is correct, then it follows that the EMS countries should exhibit low saving-investment correlations in comparison to non-EMS countries. To investigate this hypothesis, cross-section and pooled cross-section time series analyses of saving-investment data is conducted for a number of industrial countries (EMS and non-EMS). The principal results are discussed below.

II. Test Results

1. Cross-section results

The cross-section tests are carried out on the basis of average annual data over the 1975-87 period for 16 industrial countries taken from OECD National Accounts Statistics. ^{1/} All saving and investment

^{1/} The countries chosen were Belgium, Denmark, France, Ireland, Italy, Federal Republic of Germany, Netherlands, Austria, Spain, Sweden, Switzerland, United Kingdom, Australia, Canada, Japan, and the United States.

data were converted into relative form by dividing by nominal national disposable income. The cross-section data are plotted in Figures 1-3. These plots illustrate the relationships subsequently established by means of formal regression techniques. Specifically, visual inspection of the plots reveals the presence of much stronger correlation between saving and investment in the non-EMS countries (Figure 3) than for the EMS group (which also includes Austria) in Figure 2. ^{1/} Figure 1 refers to all 16 industrial countries as a group and, unsurprisingly, indicates the presence of a relationship of a lesser degree than the non-EMS group but stronger than for the EMS countries.

These visual impressions are confirmed by the results of formal statistical techniques. Table 1 presents OLS estimates of the regression equation.

$$(I/Y)_i = \delta + \beta(S/Y)_i + \epsilon$$

where the subscript *i* refers to the country. Thus, there are 16 observations for the combined group of EMS and non-EMS countries and 8 observations for each of the two groups.

Table 1. Cross-Section Saving-Investment Correlations in 1975-87

	B-coefficient	Standard Deviation	R ²
All 16 industrial countries	0.58**	0.14	0.56
EMS countries plus Austria	0.21	0.41	0.04
Non-EMS countries	0.63**	0.13	0.79

** Indicates statistical significance with a 1 percent error probability (two-tailed t-test).

Inspection of the results in Table 1 reveals that there is virtually no correlation between saving and investment over this period for the EMS group (plus Austria). Specifically, the correlation coefficient R² is 0.04 while the estimate of β is insignificantly different from zero. By

^{1/} The term "EMS country" refers here to all countries participating in the exchange rate mechanism of the EMS (i.e., the first seven countries listed in footnote 1 of the previous page) plus Austria, which pegs its exchange rate to the deutsche mark. Other EC countries not participating in the exchange rate mechanism of the EMS though being a member of the system (i.e. Spain and the United Kingdom) have been classified as non-EMS countries.

Figure 1
Saving-Investment Correlations for 16 Industrial Countries, 1975-87

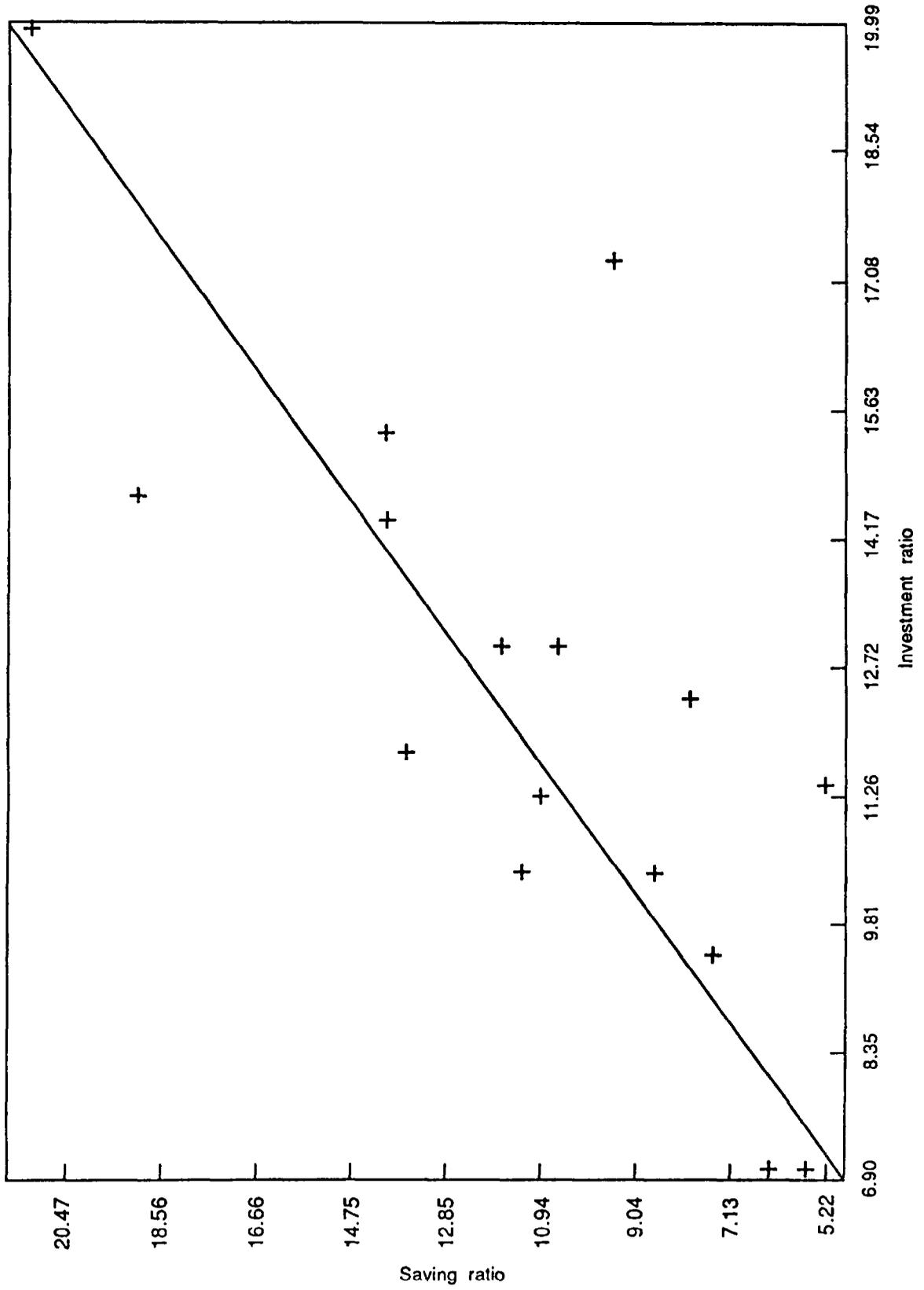


Figure 2

Saving-Investment Correlations for ERM Countries (and Austria), 1975-87

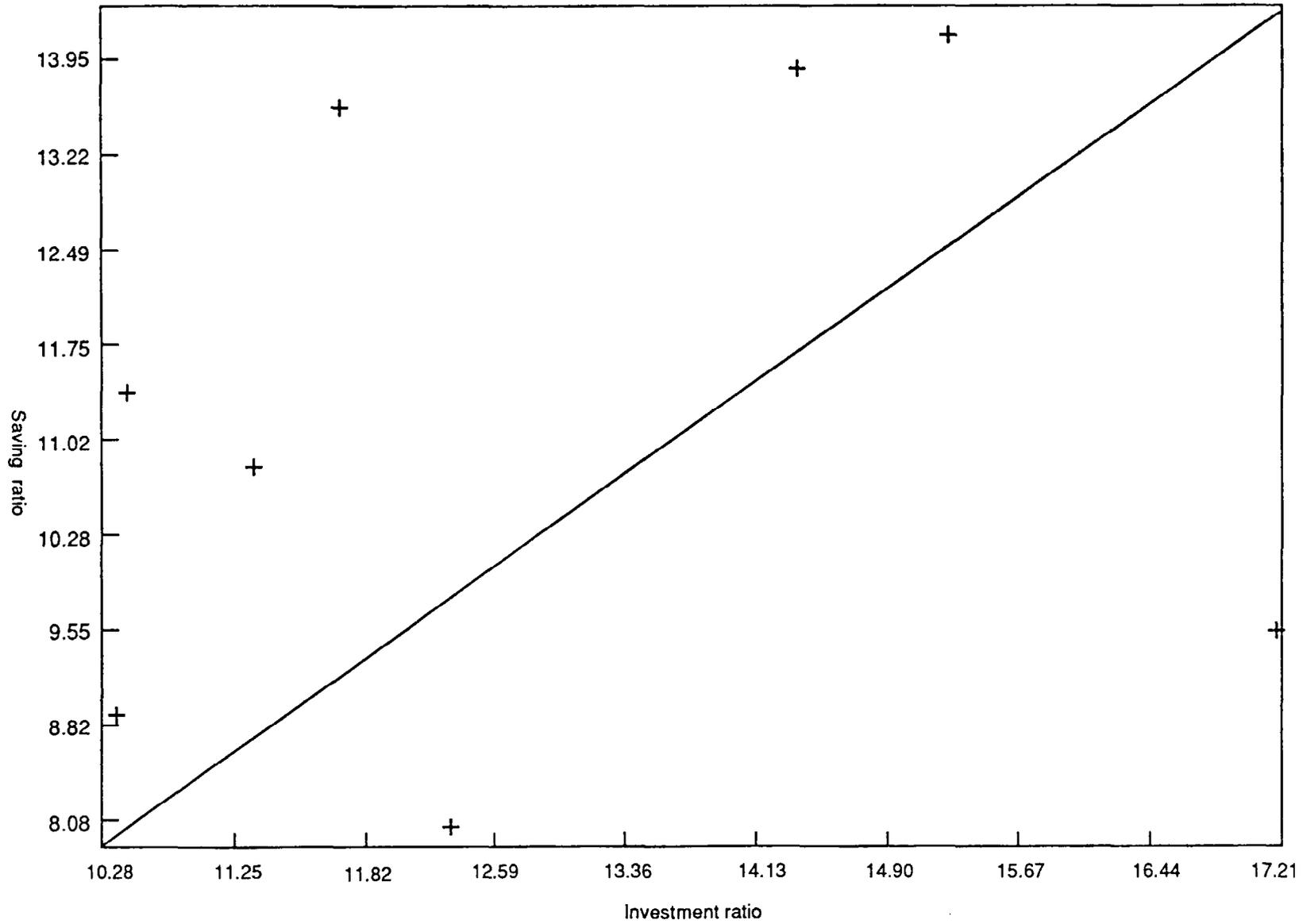
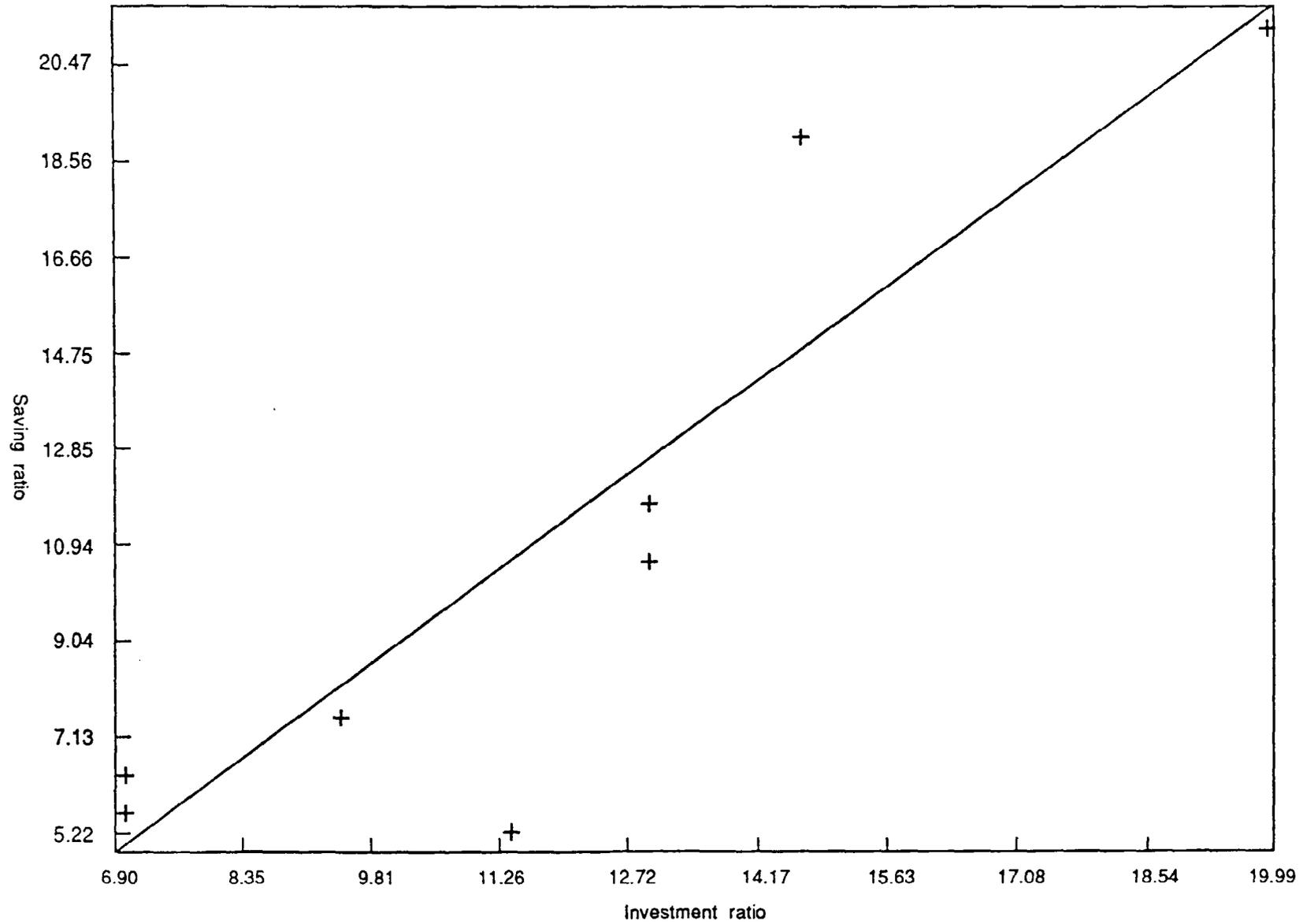


Figure 3

Saving-Investment Correlations for Selected Non-ERM Countries, 1975-87



contrast, the non-EMS group exhibits significant correlation between saving and investment with an R^2 value of .79 and an estimate of β which is insignificantly different from unity with a 1 percent error probability. These results are consistent with the hypothesis that capital mobility is high in the EMS group of countries much like during the gold standard period.

2. Sub-periods

In order to further investigate the hypothesis discussed above, the data are examined separately over three sub-periods, i.e. 1975-78, 1979-82, and 1983-87. The first sub-period is the pre-EMS period while the other sub-periods involve the EMS. The EMS period is broken down into two sub-periods on the basis that after 1982 the EMS entered a phase of greater exchange rate stability than before.

Figures 4-12 give the plots for saving and investment for each of the three sub-periods for the combined group, the EMS, and non-EMS groups, while regression results are presented in Table 2.

Table 2. Cross Section Sub-periods Correlation
in 1975-78, 1979-82, 1983-87

	β -coefficient	Standard deviation	R^2
All 16 industrial countries, 1975-78	0.67**	0.16	0.56
1979-82	0.59**	0.19	0.40
1983-87	0.51**	0.10	0.63
EMS countries plus Austria, 1975-78	0.47	0.60	0.09
1979-82	0.15	0.42	0.02
1983-87	0.32	0.32	0.14
Non-EMS countries, 1975-78	0.68**	0.19	0.67
1979-82	0.73**	0.17	0.75
1983-87	0.54**	0.11	0.81

** Indicates statistical significance with a 1 percent error probability (two-tailed t-test).

These results broadly confirm the earlier finding for the entire period that very low correlations are obtained from the EMS countries together with much higher correlations for the non-EMS countries. One would,

however, have expected lower correlation for the EMS group in the post 1982 period as compared with the first two sub-periods (reflecting the hardening of the EMS after 1982), but this is not borne out by the regressions. It is true, however, that the post-1982 relationship between saving and investment for the EMS countries is much weaker compared with this relationship in the pre-EMS period.

3. Pooled data

The cross-section results reported above are based on a fairly limited number of observations which may affect the precision of the statistical estimators. In a last step, the saving-investment equation was therefore estimated with pooled data for (i) the country groups and the three sub-periods (i.e., 1975-78, 1979-82, and 1983-87), and (ii) the country groups and the two later sub-periods (1979-82 and 1983-87). The results are presented in Table 3.

Table 3. Cross-Section Time Series Saving-Investment Correlations in 1975-87 and 1979-87

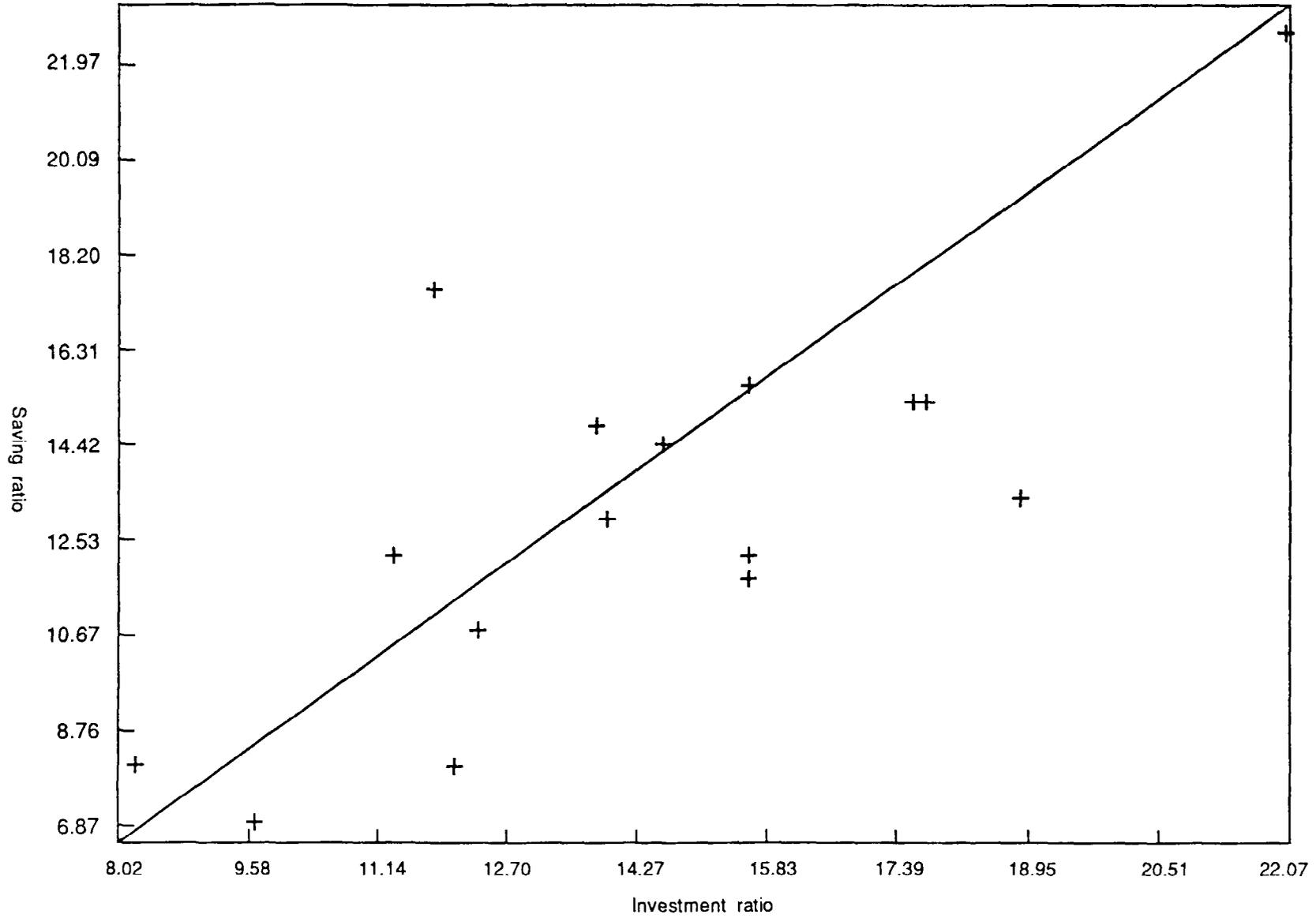
	β -coefficient	Standard Deviation	R^2
All 16 industrial countries			
1975-78, 1979-82, 1983-87	0.61**	0.09	0.52
1979-82, 1983-87	0.56**	0.11	0.45
EMS countries plus Austria			
1975-78, 1979-82, 1983-87	0.44*	0.21	0.17
1979-82, 1983-87	0.25	0.29	0.05
Non-EMS countries			
1975-78, 1979-82, 1983-87	0.66**	0.08	0.73
1979-82, 1983-87	0.63**	0.10	0.74

*, ** Indicate statistical significance with a 5 percent and 1 percent error probability, respectively (two-tailed test).

In general, the results derived from the cross-section regressions are confirmed by the pooled regressions. It is, however, worth noting that for the EMS group a weak but positive correlation between saving and investment can be found when all three sub-periods are considered while no such relationship exists when the pre-EMS period is deleted.

Figure 4

Saving-Investment Correlations for 16 Industrial Countries, 1975-78



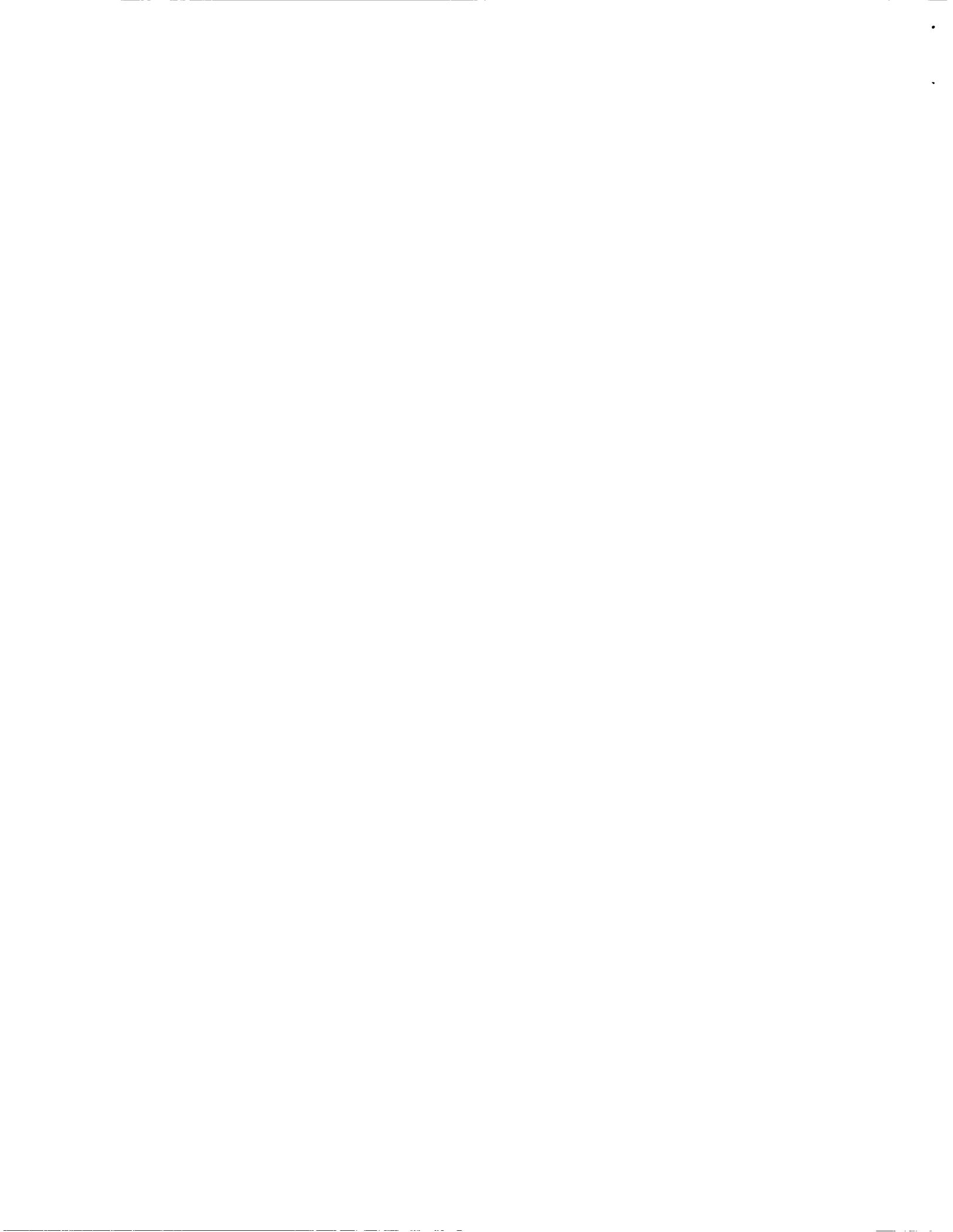


Figure 5

Saving-Investment Correlations for ERM Countries (and Austria), 1975-78

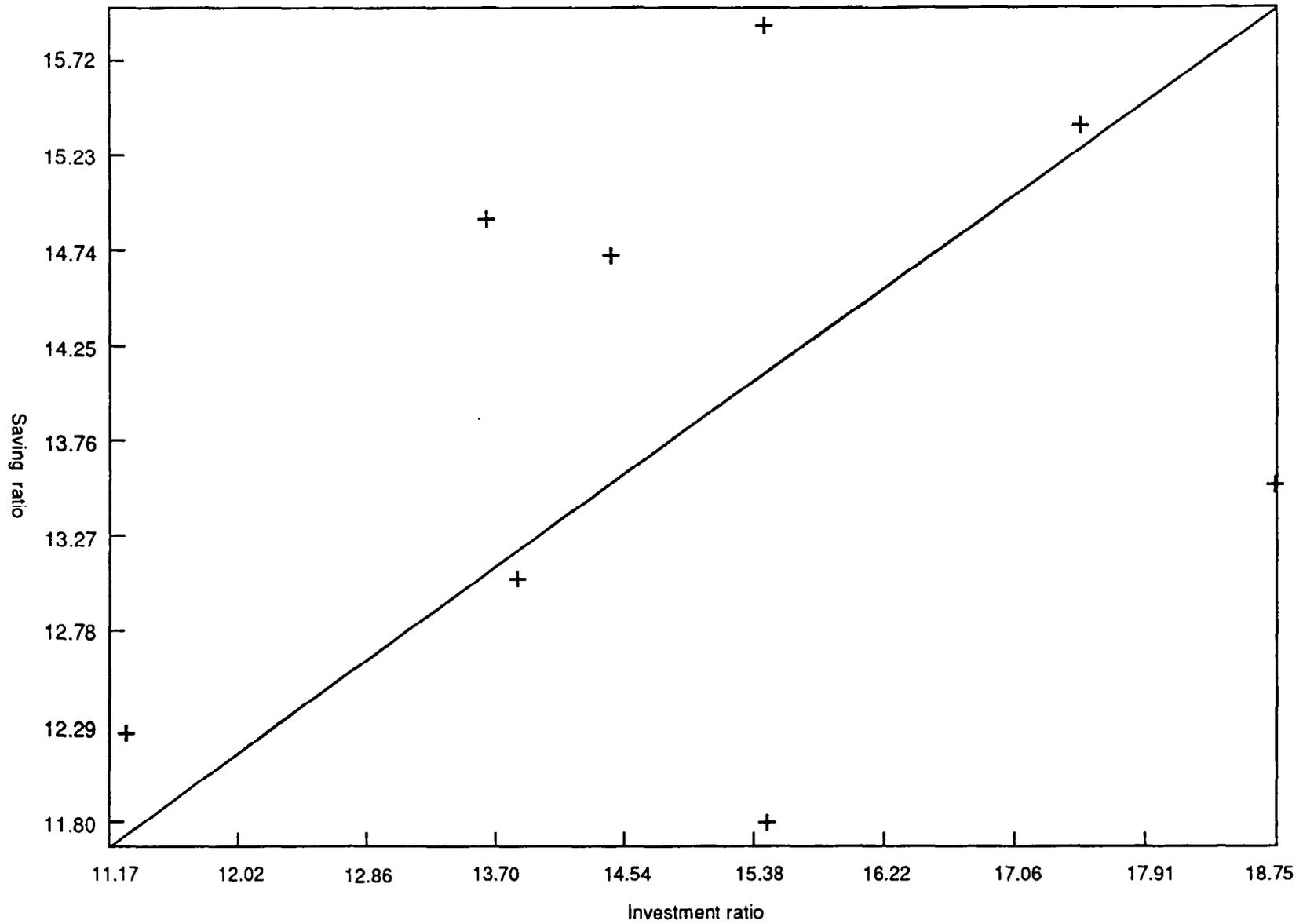




Figure 6
Saving-Investment Correlations for Selected Non-ERM Countries, 1975-78

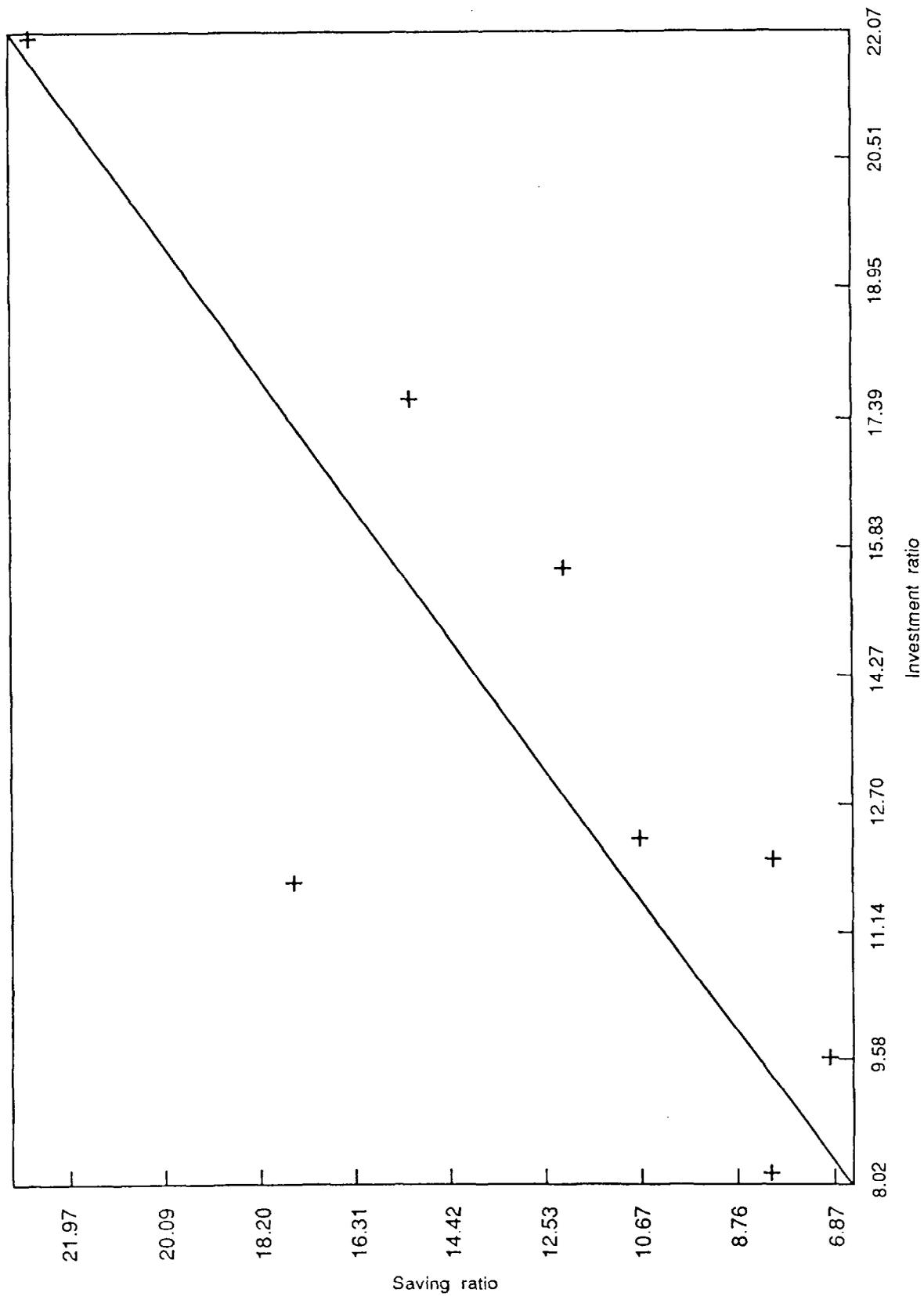


Figure 7
Saving-Investment Correlations for 16 Industrial Countries, 1979-82

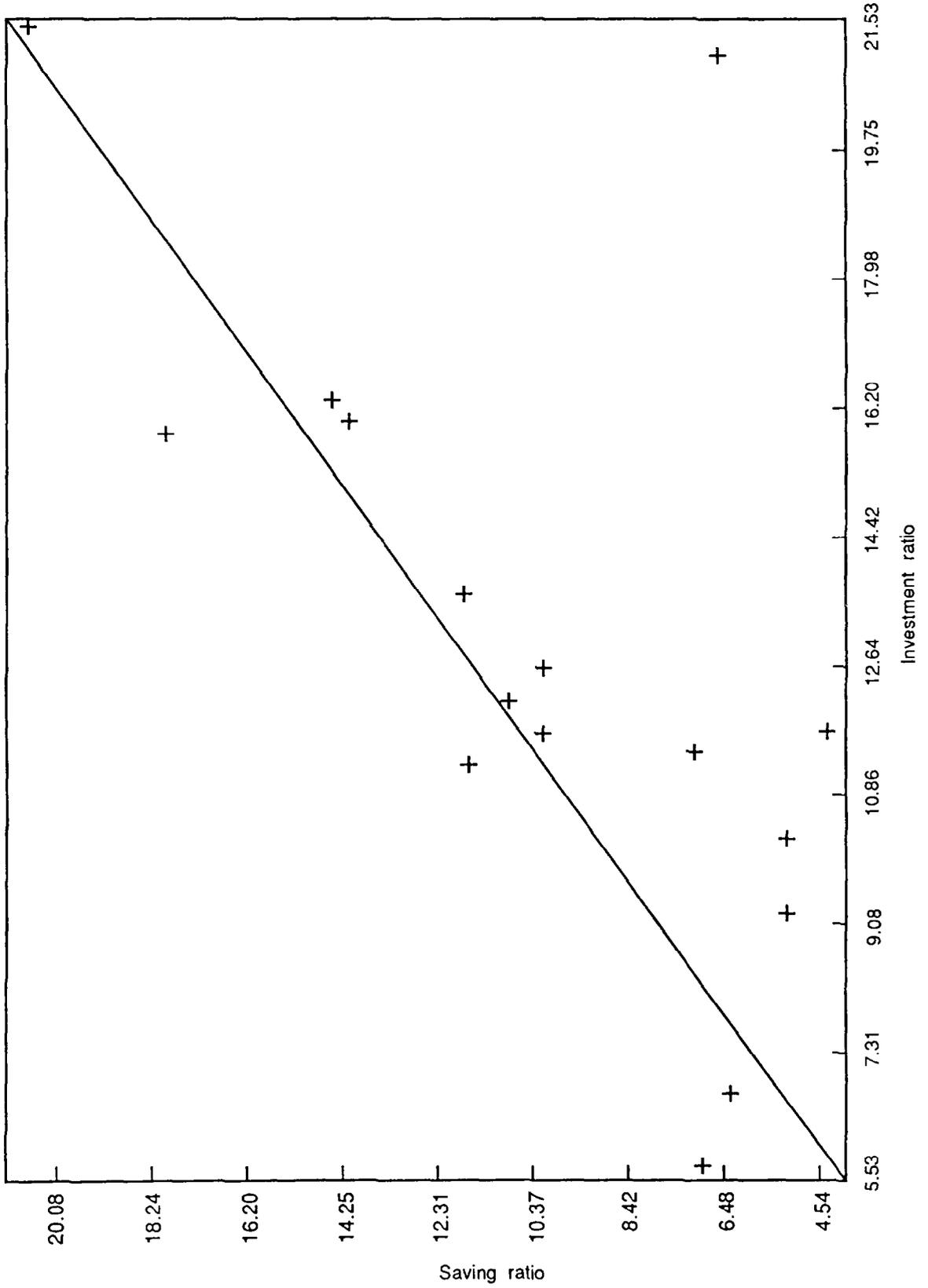


Figure 8
Saving-Investment Correlations for ERM Countries (and Austria), 1979-82

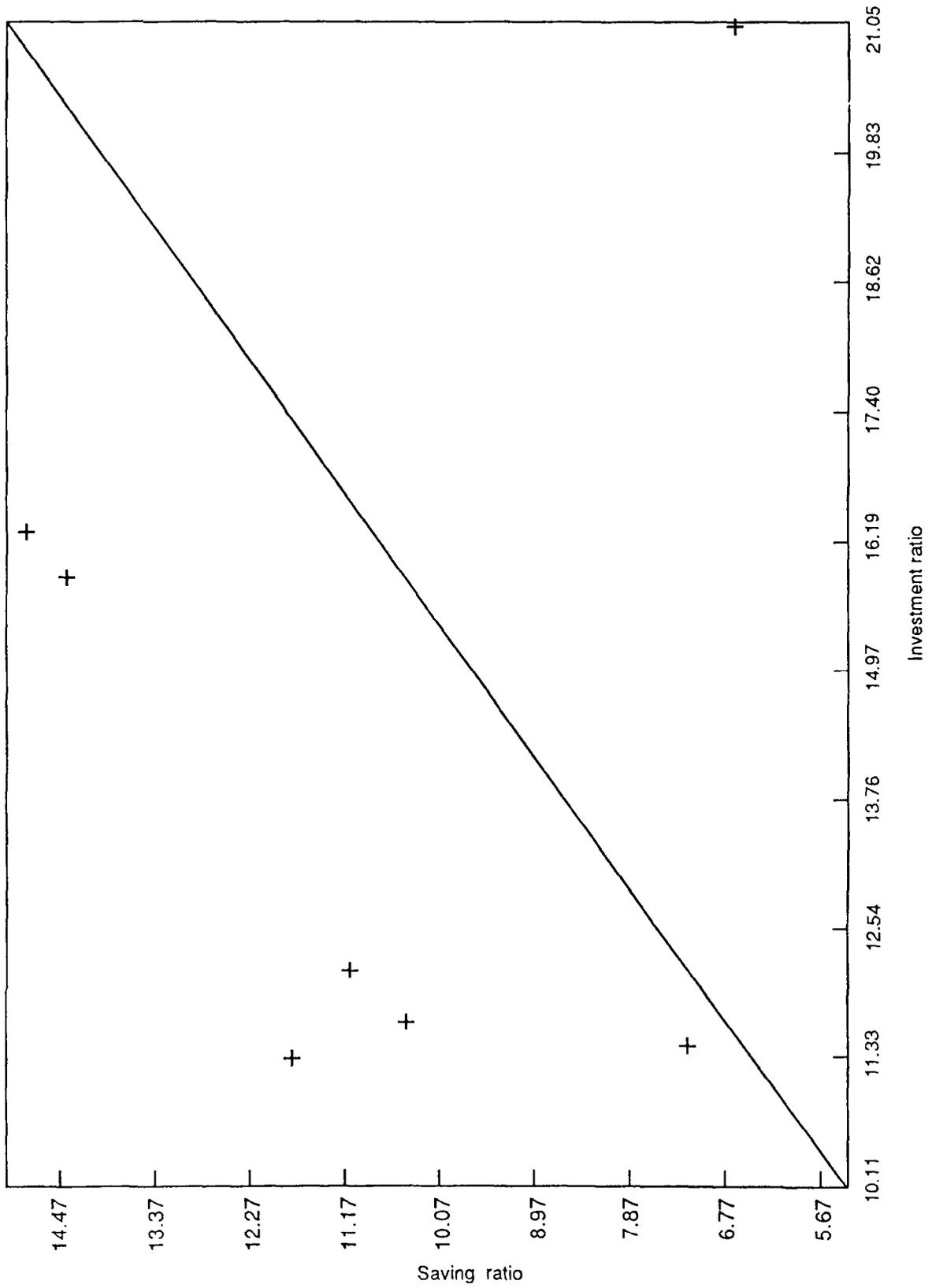


Figure 9

Saving-Investment Correlations for Industrial Non-ERM Countries, 1979-82

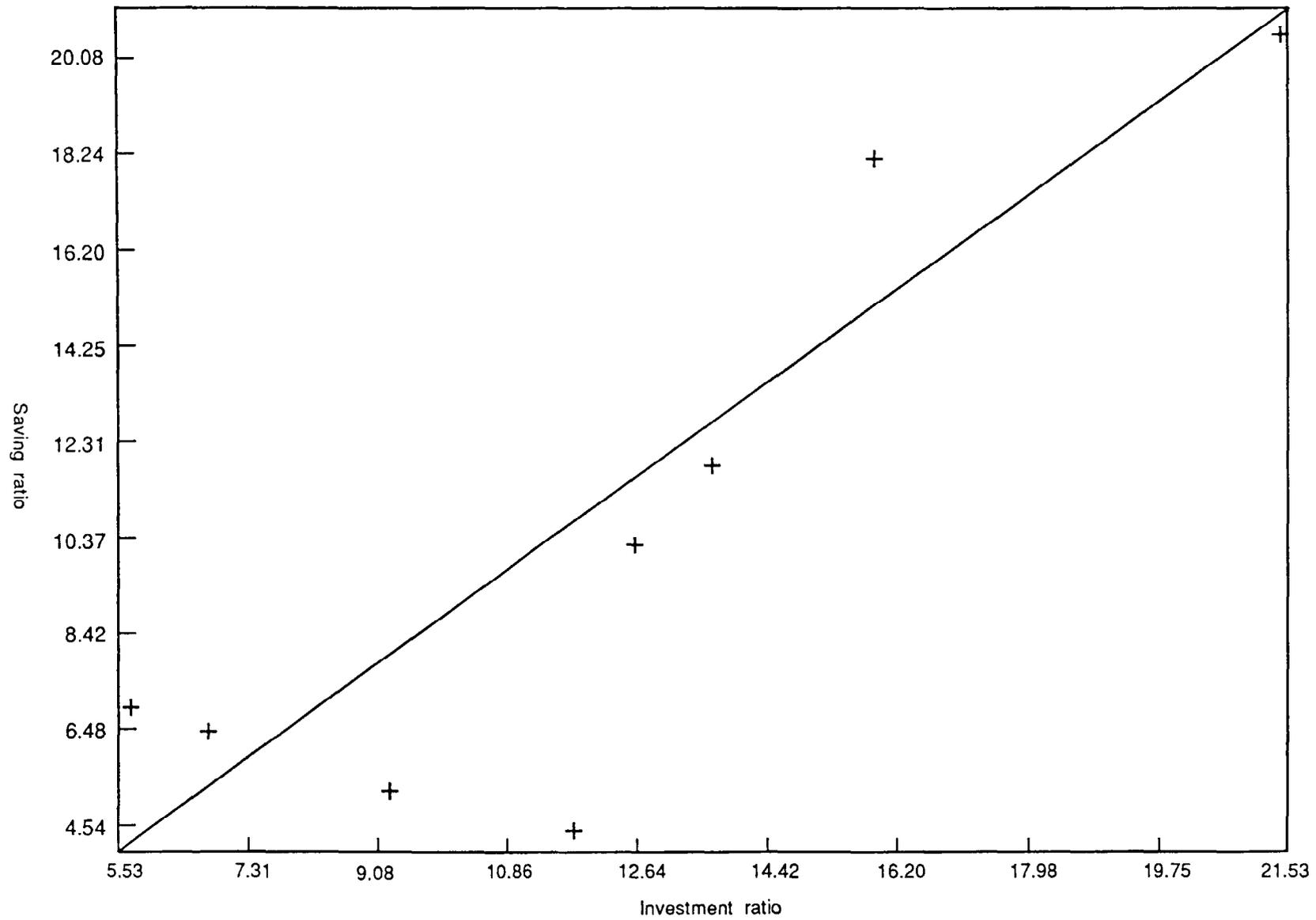


Figure 10

Saving-Investment Correlations for 16 Industrial Countries, 1983-87

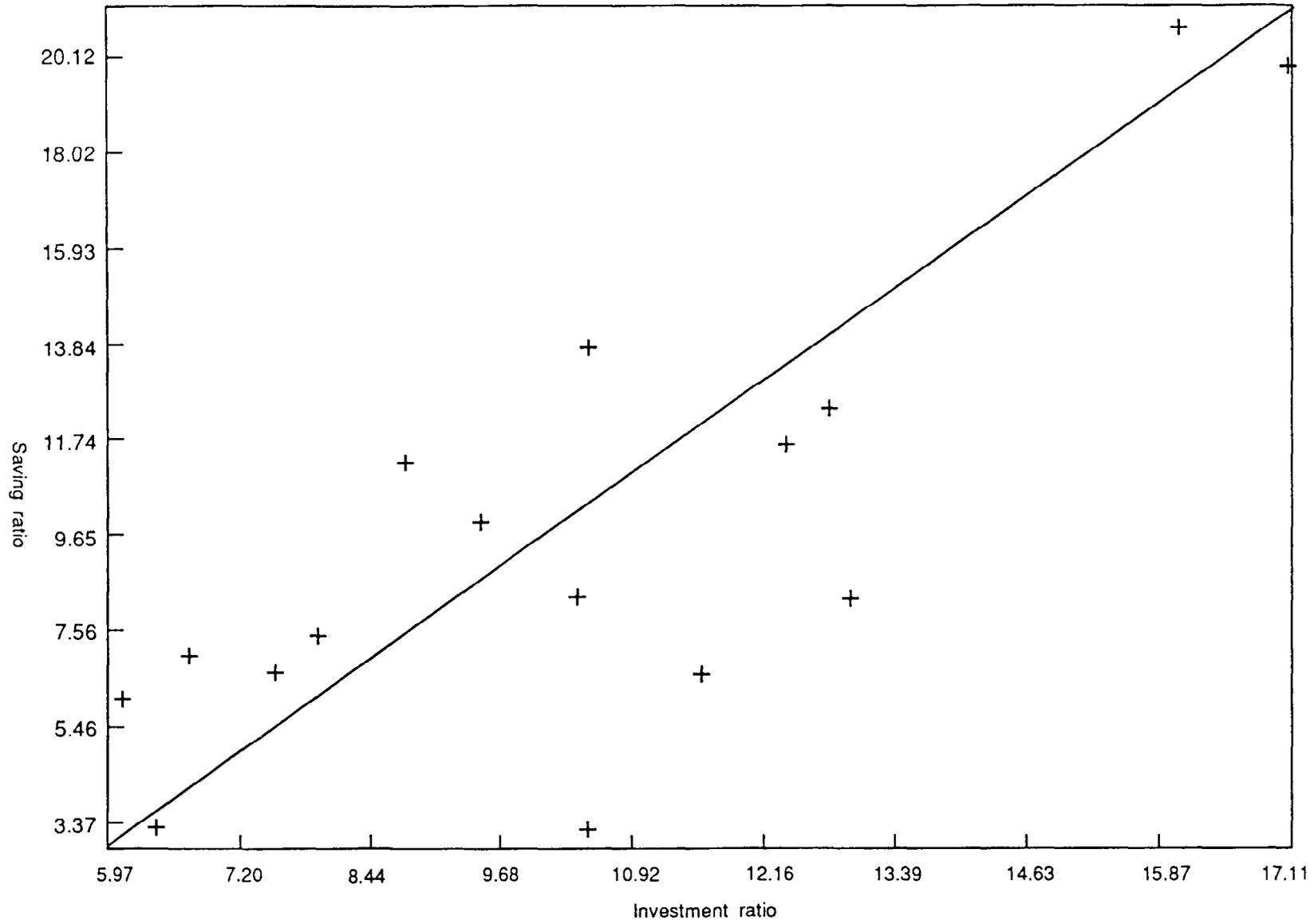


Figure 11

Saving-Investment Correlations for ERM Countries (and Austria), 1983-87

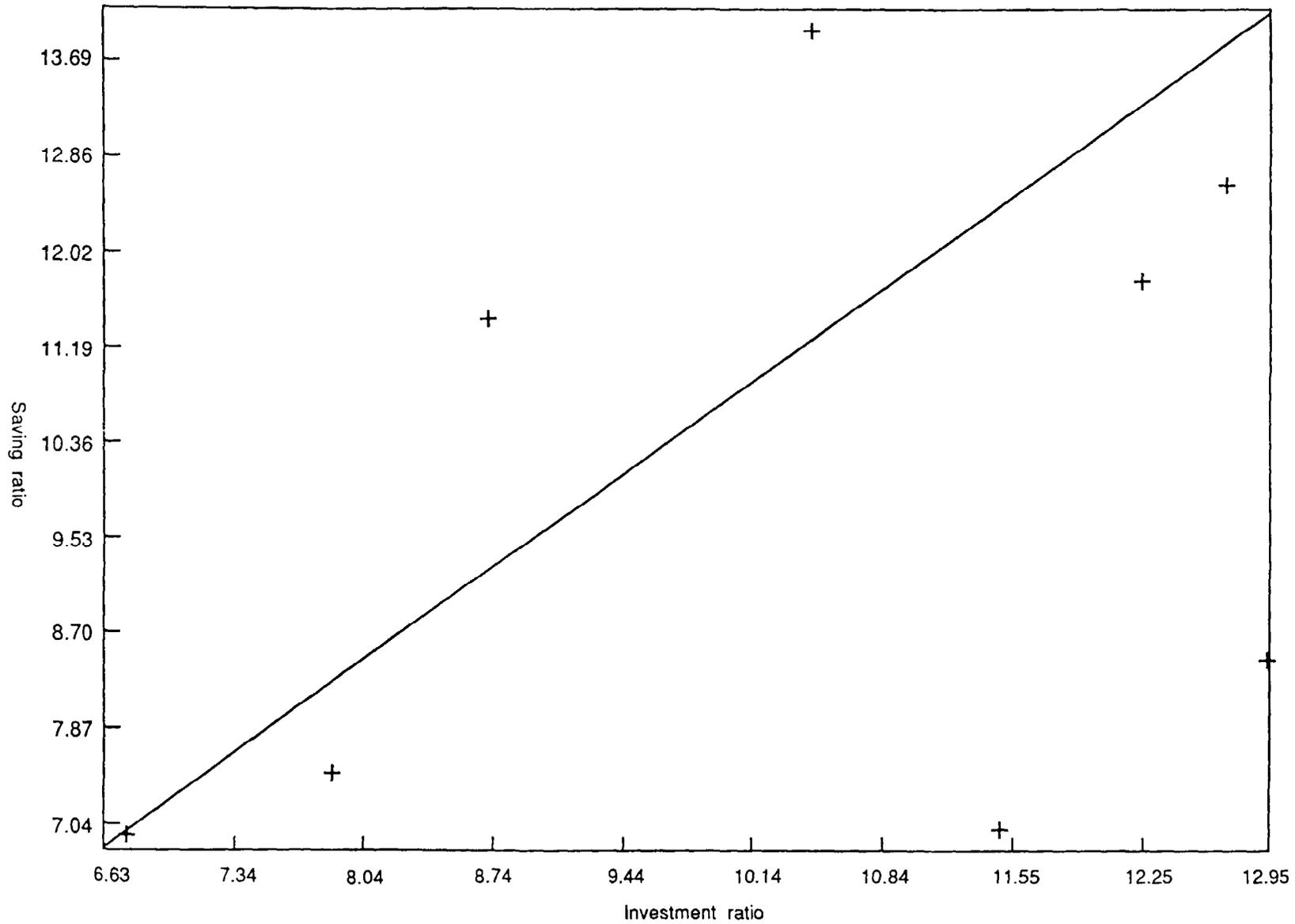
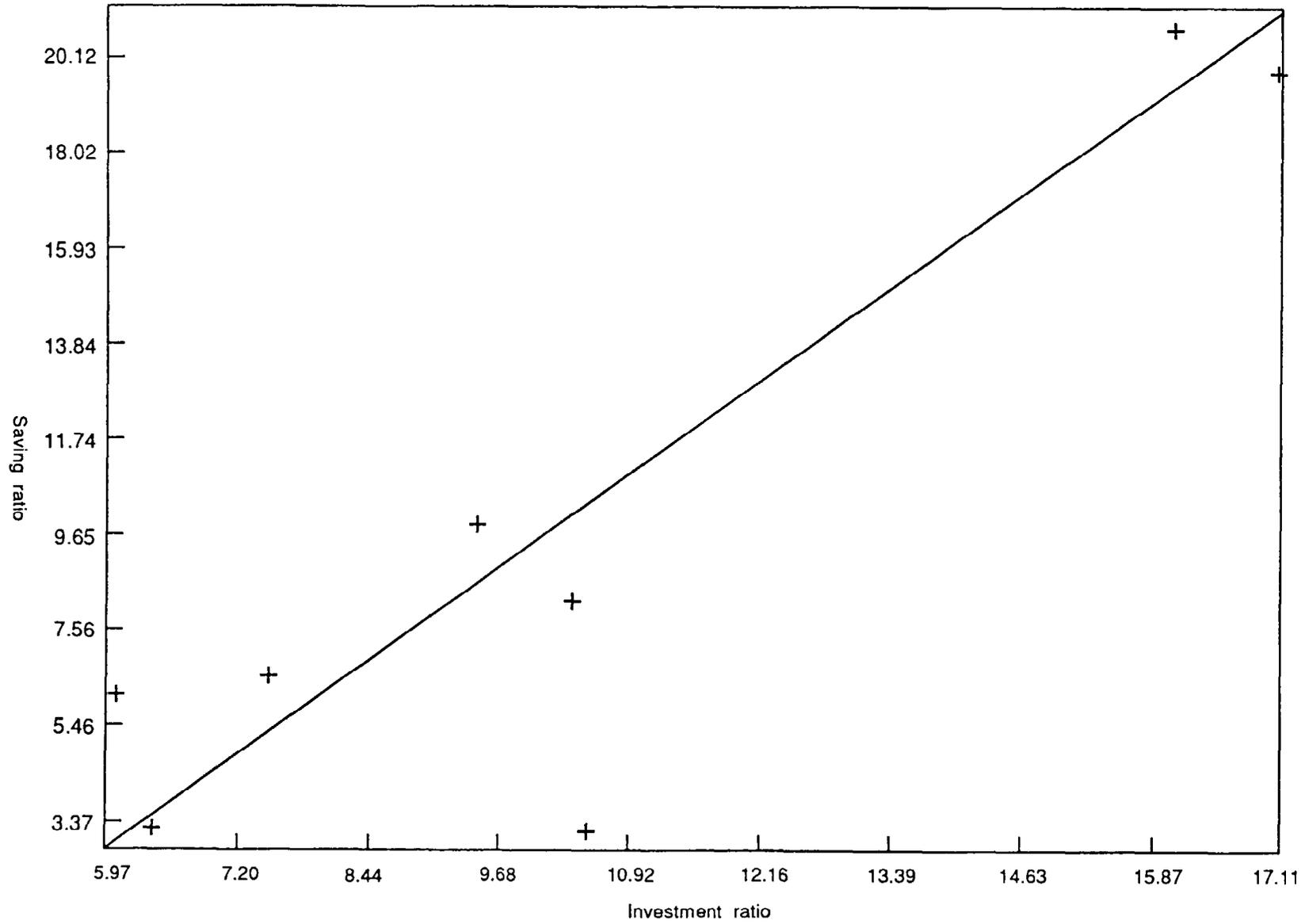


Figure 12

Saving-Investment Correlations for Selected Non-ERM Countries, 1983-87





This result appears to reinforce the argument that the EMS was instrumental in creating an environment wherein capital flows more easily from country to country within the EMS area.

III. Concluding remarks

The results presented in this note support the hypothesis that conditions have been restored in countries participating in the exchange rate mechanism of the EMS and Austria that facilitate international capital flows among the countries and therefore approximate conditions existing under the gold standard. Since similar conditions could not be observed in other industrial countries which over time also have adopted less interventionist policies (including a reduction in barriers to international capital movements), it appears that the exchange rate stability achieved in the EMS has been an important factor in promoting capital mobility.

Seen against this background, the external imbalances presently existing among EMS countries appear more "benign" than generally perceived. Nevertheless, to the extent that they are created through excessive government borrowing in some countries, or through speculative bubbles, policy action may be required.

References

Bayoumi, T., "Saving-investment Correlations: Immobile Capital, Government Policy or Endogenous Behavior?", IMF Staff Papers, Vol. 37 (June 1990).

Dooley, M., J. Frenkel, and D. Mathieson, "International Capital Mobility: What Do the Savings-Investment Correlations Tell Us?", IMF Staff Papers, Vol. 31 (September 1987), pp. 503-530.

Feldstein, M., and C. Horioka, "Domestic Saving and International Capital Flows", Economic Journal, Vol. 90 (June 1980), pp. 314-329.

Penati, A., and M. Dooley, "Current Account Imbalances and Capital Formation in Industrial Countries, 1949-81", IMF Staff Papers, Vol. 31 (1984), pp. 1-24.