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Constructing an Alternative Measure of Changes in Reserve Requirement Ratios

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Brunner (1961) proposed that a monetary base measure should account for changes in reserve requirement ratios.[1] Following Brunner's lead, both the Federal Reserve Bank of St. Louis and the Board of Governors of the Federal Reserve System calculate monetary base series that account for changes in reserve requirement ratios. In earlier work (see, for example, Haslag and Hein, 1990), researchers have demonstrated that the existing monetary base series can be additively decomposed into high-powered money and an index value, measured in dollars, that gauges the effects of changes in reserve requirements. The index is constructed as differences in reserve requirement ratio structure relative to some base period reserve requirement structure, multiplied by the quantity of deposits against which reserves were required to be held. Accordingly, the index is interpreted as changes in the amount of reserves freed (absorbed) by lowering (raising) reserve requirement ratios relative to the base period structure.

Some researchers have questioned the method in which changes in reserve requirement ratios are constructed. Neumann (1983, p.595), for example, asserts that because of the index calculation, the St. Louis adjusted monetary base "is a biased indicator of Federal Reserve policies as its rate of change reflects changes in the behavior of banks and the public." Frost (1977, p.169) also criticized the Brunner approach, asserting that the reserve index measures changes in deposit flows and changes in reserve requirement ratios. Frost used a conventional, nonlinear model of the money supply process, deriving an alternative monetary base measure. Changes in this monetary base measure <u>should</u> "reflect the combined effect of Federal Reserve open market operations and reserve requirement changes on the ratio of growth of the money stock."

The purpose of this paper is twofold. First, a measure is constructed and provided, separating the effects of changes in reserve requirement ratios--denoted the reserve adjustment index--from changes in deposits. Recently, several researchers (see Lougani and Rush (1991), Toma (1988), Plosser (1990), and Haslag and Hein (1992)) have examined the effects of changes in reserve requirement ratios. In constructing our index measure, we derive a measure of changes in reserve requirement ratio changes. We employ Brunner's liberated reserves notion, constraining changes in the reserve index measure to equal zero during periods in which no changes in reserve requirement structures were implemented. To this end, we provide a dollar measure of changes in reserve requirement dating back to 1929. One specific aim in this paper is to distinguish changes in reserve requirement ratios from deposit-flow movements. Our focus, therefore, is on the index value itself: measuring the effect of reserve requirement ratio changes, as opposed to the properties of a monetary base measure.

Second, we undertake an empirical investigation of the importance of this measurement issue. While the criticism of the existing procedure is well known, the significance of the distortion has been left unexamined. We provide results indicating that the reserve requirement ratio measure is indeed statistically different from the conventional measure that comprises both reserve requirement ratio effects and deposit-flow effects. Our main finding in this section is that the distortion in the conventional reserve index measure is not as trivial as some may believe.[2] We use measures of reserve-requirement effect and deposit-flow effect in an analysis of each one's marginal predictive content. The evidence suggests that one should relax the implicit assumption in RAM which restricts the effects to be equal.

In short, there is evidence supporting the notion that one can reject the null hypothesis that the coefficient on the reserve requirement measure is equal to the coefficient on the deposit-flow measure in several reduced-form equation. As such, the evidence suggests that researchers would want to distinguish between reserve-requirement effects and deposit-flow effects in empirical analysis.

1. The Reserve Adjustment Index

The existing monetary base series provides researchers with a measure that captures monetary policy implemented through open market operations and discount window borrowings, which change the value of high-powered money, and reserve requirement ratio changes, which change the value of the index. One important concern is that index value responds to decisions under the purview of households and depository institutions in addition to actual changes in reserve requirement ratios. Critics claim that current index values misestimate the effects of changes in reserve requirement ratios by including these nonpolicy effects.

To illustrate this criticism, consider the conventional version of the index as constructed by the Federal Reserve Bank of St. Louis, referred to as the reserve adjustment magnitude (RAM), which is calculated as

$$RAM_t = (r_b - r_t)'D_t, \qquad (1)$$

where r_b is the vector of reserve requirements that are set by the Federal Reserve System during a preselected base period, r_t is the vector of reserve requirement ratios in place at time t, and D_t is the vector of deposit types against which reserves are required to be held. Equation (1) indicates that RAM captures changes in reserve requirements such that if reserve requirement ratios are lowered, for example, RAM will increase.

An additional feature of equation (1) which is that RAM is defined as the product of changes in reserve requirement ratios and deposits. For example, if the current reserve requirement ratio structure is less than that of the base period, an expansion (contraction) of deposits will estimate an additional freeing (absorbing) of reserves, resulting in RAM increasing (decreasing). In this case, simple uniform deposit growth will suggest a freeing of reserves. Of course, such a freeing of reserves is not due to a policy action, but rather occurs because of public actions as suggested by Frost and Neumann. Deposit contraction would do just the opposite in this setting; in effect, RAM would underestimate the full size of the reserve requirement ratio change because the product falls as deposits contract. Deposit growth or contraction, then, influences the measurement of monetary policy actions relative to an arbitrary base period. Alternatively, if the current reserve requirement ratio structure is greater than the base period structure, then changes in deposits will affect RAM but now in the opposite direction. Regardless, as long as the reserve requirement structure at any point in time differs from the base period, RAM will change with deposit shifts, even if the reserve requirement structure remains intact. Neumann calls such effects "passive" and argues that such effects mismeasure policy actions insofar as RAM will change when no policy actions were taken.[3]

2. Constructing the Reserve Step Index

We offer an alternative measure that is not affected by such deposit flows. To create our reserve step index (RSI), we use data on weekly changes in required reserves.[4] To begin, we follow the St. Louis practice in that RSI is constructed using the average reserve requirement ratio structure over the period 1976-80 as its base period.[5] To construct our RSI measure, we find the monthly value of RAM that is closest to zero and select this as our benchmark. This means setting the value of the RSI equal to zero for that month. In this regard, we selected August 1978 as our base period.

The dates of changes in reserve requirement ratios were obtained from the Annual Report of the Board of Governors for every year from 1929 to the present. With the dates of the changes in reserve requirement ratios, the difference between required reserves in the week(s) in which the change in structure took place and the week prior to change is used as the value of reserves freed (absorbed) by the policy action.[6] (Our use of weekly data will be important later in the empirical analysis.) This measure is added (subtracted) to the previous level of RSI, resulting in a cumulated measure of dollar changes in required reserves. We first move forward from August 1978, looking for the first date on which changes in reserve requirement ratios were altered after August 1978. On that date, we calculate the monthly change in RSI according to equation (2):

$$(2) \qquad RSI_t - RSI_{t-1} = \begin{cases} RR_{t-1} - RR_t & \text{if reserve requirement changes} \\ 0 & \text{otherwise.} \end{cases}$$

Similarly, from the August 1978 benchmark, we move backward, looking for dates on which changes in the reserve requirement ratio structure were implemented. In months with no change in reserve requirements, the step index was held constant.

Equation (2) represents the dollar amount of reserves freed (absorbed) by changes in reserve requirements in the particular week in which the policy action was enacted. We then sum across all the changes in RSI that took place within a month, adding this monthly value of the change in RSI to the previous month's level. As such, we obtain a cumulative measure of changes in reserve requirement ratios across time.

The relationship between changes in RSI and changes in RAM is straightforward. First note that $RR_t = r_t D_t$ (where RR is required reserves). Substituting this expression into equation (1), one can write

$$\Delta RAM_t = r_b{}'\Delta D_t + \Delta RSI_t, \tag{3}$$

for periods in which changes in reserve requirement ratios occur (Δ is the difference operator). In periods in which no changes in reserve requirements take place, $r_t = r_{t-1}$, such that

$$\Delta RAM_t = r_b{}'\Delta D_t - r_t{}'\Delta D_t. \tag{4}$$

Together, equations (3) and (4) describe the movements in RAM, differentiating between periods in which changes in reserve requirement ratios occur and periods in which only changes in deposit levels occur. Equations (3) and (4) share a common term, $r_b{}'\Delta D_t$. This terms represents the amount of required reserves if the base period reserve requirement structure were in place today.

The sole difference between the periods with and without reserve requirement ratio changes is in the second term on the right-hand side. In equation (4), we refer to $r_t' \Delta D_t$ as the deposit-flow effect because changes in deposits change RAM even though $r_t = r_{t-1}$. In short, reserves are treated as freed as deposits change over time. However, the second-term in equation (3) captures the quantity of reserve freed in response to changes in reserve requirement ratios, hence RSI.

In periods in which no changes to reserve requirements occur, $\Delta RSI = 0$ by construction. Thus, $\Delta RAM_t - \Delta RSI_t = r_b' \Delta D_t - r_t' \Delta D_t$, for periods in which $\Delta r_t = 0$. For periods in which reserve requirement changes occur, $\Delta RAM_t - \Delta RSI_t = r_b' \Delta D_t$.

After constructing ΔRSI for each month, we construct a time series for the level of RSI, adding the monthly changes derived from equation (2) to the previous month's value of RSI. In doing so, we obtain a cumulative dollar measure of changes in reserve requirements indexed to August 1978. Our aim is to provide a measure that is as free of the deposit-flow effect as possible. Our approach focuses solely on the infrequent, permanent aspect of changes in reserve requirements. By construction, changes in deposit levels during period of stable reserve requirements result in no change in our RSI measure.

It should be noted that RSI represents an average, as opposed to a marginal, tax concept. If one were to divide RSI by the quantity of deposits against which reserves must be held, the term would represent the average reserve requirement ratio. Barro and Sahasakul (1983) and Seater (1985) develop average marginal tax rate series for the United States. For our purposes, detailed data are necessary on the quantity of deposits held at banks by each reserve-requirement distinction. Such data, however, are not available. Thus, our efforts yield a first approximation of changes in average marginal reserve requirement ratios.

3. Comparing RSI and RAM over time

Figure 1 plots the original RAM series and the step index from January 1929 through June 1991. (The actual monthly series for RSI is included in the appendix.) The RSI does not move in periods between changes in reserve requirement structures. In the absence of the deposit-flow effect, the step index is constructed as a sequence of infrequent, permanent shocks.

The two reserve index series are qualitatively similar, although some important differences emerge. For example, the period between 1929 and 1936 represents a sizeable departure between the two measures. The RSI hovers around -$4 billion, indicating that reserve requirements were higher during this interval than those in place during the 1978 base period. In contrast, RAM is near zero until about 1936 and only then declines. This episode epitomizes the deposit-flow effect. The difference between the two measures results from the sharp reduction in deposits during the 1930s. Even though the reserve requirement tax was relatively high, deposit levels were smaller. The researcher using RAM would be treating the reduction in RAM as if the quantity of reserves absorbed was small in terms of reserve requirement ratios higher than the 1976-80 base period. From RAM, one would infer that reserve requirement had very little effect as a means of restrictive monetary policy. RSI, however, suggests a much more restrictive policy stance was in place in the 1929-36 period relative to the August 1978 base period. In fact, RAM appears to understate the level of potency of reserve requirement ratio changes from 1929 through about 1945.

Another large disappearance occurs when an abrupt increase in deposits in 1973 drove RAM down sharply. RSI indicates, however, that very few reserves were absorbed by monetary policy actions. The rapid deposit growth in this period exaggerates the policies regarding reserve requirements. RSI suggests that the level of reserve requirements in 1973 was not greatly different from 1978 and only slightly higher in the aggregate. However, as the public moved deposits into these reservable accounts in 1973, RAM estimates the level of reserve requirements as being more restrictive relative to the 1978 base period. Similarly, in the early 1980s deposit growth drove RAM sharply higher, giving a somewhat inflated view of the impact that monetary policy actions had in terms of freeing reserves.[7]

4. A Time Series Analysis of the Differences between RSI and RAM

By displaying the levels of RAM series and the RSI, Figure 1 suggests differences between the two measures. However, the figure does little to shed light on how important such differences are. One way to shed further light on this issue is to examine the long-run relationships between the RSI and RAM.

The long-run relationship is tested for using cointegration techniques. If deposit-flow effects are short-run phenomenon that result in temporary deviations between the two measures, then deviations between the two series disappear in the long run. On the other hand, if deposit flows are significant and not self reversing, there is likely to be little relationship in the two series in the long-run.

In short, the question is whether the methodology has significant long-run impacts in terms of measured changes in reserve requirement ratios. This examination is conducted using the cointegration procedures developed in Engle and Granger (1987). Both RAM and the RSI are integrated of order one.[8] The following is the output from a regression using levels of RAM and the RSI (standard errors in parentheses)

$$(5) \qquad RAM_t = \underset{(0.125)}{-0.323} + \underset{(0.17)}{0.862}\, RSI_t + e_t$$

D-W = 0.03 $R^2 = 0.82$.

The test for cointegration seeks to determine whether there is a unit root in the residual, e_t, from equation (5). Under the null hypothesis that there is a unit root in e_t, the test-statistic is -2.25, which is larger than the 5-percent critical value of -3.17. Hence, one fails to reject the null hypothesis that there is a unit root in the error term, suggesting that RAM and RSI are not cointegrated. The small value of the Durbin-Watson statistic also suggests that RAM and RSI are not cointegrated. The evidence, therefore, suggests there is no long-run relationship between RAM and RSI. The implication is that RAM gives weight to a deposit-flow effect that would affect the forecast of changes in reserve requirement ratios over an infinite horizon. Equation (5) suggests that the deposit-flow effect is integrated of order one--that is the deposits against which reserves must be held have a unit root--so that RAM and RSI are not cointegrated.

5. Relationships to Economic Activity

The previous section focused on a comparison of the two series. Thus far, the evidence presented formalizes what a casual empiricist would infer from the plot of the two series; that the series exhibit very different properties. The value gained by separating the reserve-requirement effect and deposit-flow effect is clearer if the two series have differential content in the context of explaining macroeconomic behavior. Two specific questions are examined here. First, does the deposit-flow measure and/or RSI help to explain movements in macroeconomic variables over and above the explanatory power present in RAM?[9] Second, are the coefficients on deposit-flow measure equal to the coefficients on RSI?

The first questions focuses on the value added by separating the deposit-flow effect and the reserve-requirement effect. Here is where our use of weekly data affects how one implements the empirical strategy. The changes in required reserves during the week in which reserve requirements are changed will generally not equal the difference between RAM measured during the month in which reserve requirements changed and month before the change occurred. The deposit-flow measure is calculated as the change in RAM between those months in which no reserve requirement changes occurred. Still, the sum of the change in RSI and the change in the deposit-flow variable do not equal the change in RAM because of the difference between weekly changes in required reserves used to construct RSI and monthly values of RAM. Hence, the change in RAM is equal to the change in RSI plus the change in the deposit-flow measure plus some "monthly noise" for periods in which reserve requirements change.

The strategy taken here was to estimate a reduced-form model in which the percentage change in RAM, the percentage-change in the deposit-flow variable, and the percentage-change in RSI (each as a proportion of the adjusted monetary base) are included in the specification. RAM implicitly restricts the coefficients on the deposit-flow effect and the reserve-requirement effect to be equal. By including the deposit-flow measure and RSI in the regression we can test whether this restriction is supported by the data. The presence of the monthly noise means that this test is not equivalent to testing whether the coefficient on RSI is equal to the coefficient on the deposit-flow measure.

We estimate reduced-form models of the inflation rate (using the fixed-weight deflator), the percentage change in real GNP, and the percentage change in nominal GNP. The right-side variables in these regressions are lagged values of the percentage change in high-powered money as proportion of the monetary base along with RAM, RSI, and the deposit flow-variable. In the inflation and output growth equations, we include lagged values of the inflation rate and real GNP growth. In the nominal GNP growth equation, its lagged value is included. As one notices, the regressions are individual regressions from two separate VAR systems: one with the adjusted monetary base decomposed into four components, the inflation rate and output growth and the other with the same four components and nominal GNP growth. One lag of each variable is included in the results reported below. Quarterly data are obtained from Balke and Gordon (1986) on real GNP and the fixed-weight deflator for the period 1929-83. We estimate the regressions over two periods: 1929-83 and 1951-83.[10]

A point on interpreting our results. The reduced-form setting used in this analysis does little to shed light on the transmission mechanism differentiating the reserve-requirement effect from the deposit-flow effect. The key reason for separating the two effects in a reduced-form specification is that the deposit-flow effect signals changes affecting the demand for deposits by households and the supply of deposits by banks. As such, the deposit-flow effect measured in this reduced-form equation is an amalgam of these different shocks.[11] However, the reserve-requirement effect is a tax on the banking system, and hence is a particular type of shock. While these tests do not provide direct evidence on the structural effects, they provide evidence as to whether separating reserve-requirement effects help to predict economic activity differently that the amalgam of shocks picked up by the deposit-flow effect.

Table 1 reports the results from estimating the reduced-form equations for the 1929-83 period and the 1951-83 period. The key result reported in Table 1 is that the coefficient on the lagged value of RSI is significant at the 5-percent level in the real GNP and nominal GNP equations for the 1929-83 sample and in the nominal GNP equation for the 1951-83 period. This finding suggests that changes in RSI help to predict changes in output growth and nominal spending growth differently than do the other components in RAM. As such, this evidence supports our original claim that reserve-requirement effects need to be separated out from RAM.

Another claim is that the reserve-requirement effect is different from the deposit-flow effect. In Table 1, the evidence suggests that the coefficient on RSI is different from the coefficient on either the deposit-flow variable or the "monthly noise" measure. (The monthly noise could be conceptually the same as deposit-flow, but more detailed data would be necessary to verify this.) The next step is to explicitly relax the assumption the reserve requirement effect and deposit-flow variable have equal-sized coefficients. We exclude RAM from the regression based on the evidence presented in Table 1, reporting the test statistics calculated under the null that the coefficient on RSI is equal to the coefficient on the deposit-flow variable. As Table 2 shows, the null hypothesis can be rejected at the 5- and 6-percent levels in the nominal GNP and real GNP equations, respectively for the 1929-83 sample. In contrast, one can reject the null hypothesis at the 8-percent level in the 1951-83 sample in the inflation equation, but one fails to reject the null in either the real or nominal GNP equations. The evidence, therefore, provides some evidence in support of the notion that the coefficients on RSI and the deposit-flow variable are equal.

Overall, the evidence supports our claim that reserve-requirement effects have different effects so that the implicit restriction imposed by RAM is not supported by the data. Hence, the evidence suggests that one should separate the reserve-requirement ratio effects from the deposit-flow effects that are commingled in RAM. Our goal is rather modest in that we seek differences in marginal predictive power. More specific issues, and differential effects, require further identifying restrictions.

6. Conclusion

We construct the reserve requirement step index to measure changes in reserve requirement ratios for the period 1929-91. The main benefit of this index is that it excludes the effects that changes in deposit quantities have on the existing measures. Our index focuses on changes in reserve requirement ratios, treating deposit-flow effects as containing separate, non-policy information.

Most important, we demonstrate that the deposit shifts resulting in changes in conventional reserve requirement measures are not trivial. Indeed, important historical examples of the significance of these deposit-flow effects are provided. Deposit-flow effects are significant enough to yield an absence of any apparent long-run association between our measure of changes in reserve requirements and the conventional measures. The differences in the measures also carry over to the macroeconomic setting. We test for the differences in marginal predictive power between the reserve-requirement effect and the deposit-flow effect. We provide evidence suggesting that the coefficient on RSI-the reserve requirement effect--is different from zero, suggesting that the reserve requirement effect is different from the coefficient on RAM. This evidence is added reason for separating the policy effect from those factors affecting deposit market equilibrium.

Our goal in this paper is rather modest. Its main contribution is constructing a data series, in the reserve requirement change that is directly under the influence of the policymaker is extracted from the existing measure. Important issues still remain, such as identifying a theoretical structure that explains how changes in reserve requirement ratios are different from other factors that influence the equilibrium quantity of inside money.

Footnotes

1 Tolley (1957, p.466) discusses a measure of changes in average changes in reserve requirement ratios. As Tolley mentions, his construction of an average reserve requirement ratio is "jointly determined by government, banks, and the non-bank public." However, Tolley's concept of an average reserve requirement ratio is quite different from Brunner's notion. Tolley included currency in his definition of reserve base. Consequently, currency has a reserve requirement ratio of one. Brunner focused on liberated reserves through changes in reserves required against deposits, not currency <u>and</u> deposits.

2 The criticism of the St. Louis reserve adjustment index measure also applies to the Board's reserve adjustment index measure. The primary difference in the two measures is that Board measure uses today's reserve requirement ratio structure as the base period, whereas the St. Louis version uses the average reserve requirement structure calculated over the period 1976-80.

3 In addition, adding RAM to, say, total reserves or source base results in a counterfactual series. For example, $TR_t = RR_t + ER_t = r_tD_t + ER_t$. Adding RAM yields an adjusted total reserves series which after substituting equation (1) for RAM is expressed as $r_bD_t + ER_t$. Hence, the adjusted total reserve series is a counterfactual of what required reserves would have been if the base-period reserve requirement structure were in place today plus today's excess reserves.

[4] Frost (1977) and Neumann (1983) suggest the construction of an improved RAM measure. Neumann suggests that D_t in equation (1) be replaced by a vector of average deposit levels for the entire period. Consider equal-sized changes in reserve requirements taken at two different times. Neumann's approach would indicate the same degree of easing by each move. Frost suggests a measure derived from the nonlinear model of the money supply process.

[5] We gratefully acknowledge the help of Dennis Mehegen at the Federal Reserve Bank of St. Louis for providing us with weekly data over the period January 1968 to June 1991.

[6] Our step reserve index measure is still subject to deposit flow effects, but only the deposit flows which occur between the weeks in which reserve requirement ratios are changed. Note that in equation (2), the RSI can be rewritten as $r_{t-1}D_{t-1} - r_tD_t$. Changes in deposits from t-1 to t will be picked up in RSI. To correct for this deficiency, one would need the use of detailed deposit data that is not generally available. We believe that this deposit-flow effect is small, especially relative to deposit-flow effects present in the reserve adjustment indexes that permit change in months in which no reserve requirement ratio changes occur.

[7] Haslag and Hein (1989) suggest that the Monetary Control Act of 1980 (MCA) effectively lowered reserve requirements for depository institutions. Toma (1988) had argued that the effect of imposing

reserve requirements on all other depository institutions, in addition, to Fed member banks, raised reserve requirements. Our RSI measure supports the inference that MCA effectively freed reserves.

8 The Phillips-Perron test is applied to RAM and the RSI in both level and percent-change forms. Under the null hypothesis that there is a unit root in RAM, the test statistics are 0.80 in level form and -25.67 in percent-change form, whereas the test statistics are 1.88 in level form and -46.38 in percent-change form for the RSI. The 5-percent critical value is -3.17. Switching the dependent and independent variables in equation (3) does not affect the results. Thus, the evidence suggests that RAM and the RSI are nonstationary in levels but stationary in percent change.

9 The issue is intertwined with differences between outside and inside money. The deposits against which reserve must be held are liabilities of banks, and thus reflect changes in demand for and supply of intermediated deposits. Changes in reserve requirement ratios, other things held constant, affect the demand for high-powered money.

10 The monetary variables are calculated relative to the monetary base. For example, $SB_t = (SB_t - SB_{t-1})/[(MB_t + MB_{t-1})/2]$, where SB denotes source base and MB denotes the monetary base. Note that $MB_t = SB_t + RSI_t + DEPFLOW_t + I(RAM_t - RSI_t)$, where I is an indicator function that equals 1 for periods in which there is a change in reserve requirements and 0 otherwise.

The 1951-83 period was selected because it encompasses the period after World War II and after the Fed-Treasury accord.

11 Fama (1982) argues that banks' decision to supply is likely to be related to changes in reserve requirements. By having both deposits and reserve requirements in the regression, we are implictly examining the effect of changes in reserve requirements on economic activity, holding deposits constant. The incidence of reserve requirement tax on deposits would be evident in the impulse response functions but not in this predictive context.

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Table 1

Regression Results for Inflation,
Output Growth, and Nominal GNP Growth Equations

Estimating Period: 1229-83 Estimated Coefficients

Variable	Inflation	Real GNP	Nominal GNP
	Equations		
Inflation	0.743** (0.049)	0.005 (0.122)	n.a.
real GNP	-0.001 (0.027)	0.274** (0.067)	n.a.
RAM	0.092 (0.102)	-0.439* (0.256)	-0.385 (0.291)
SB	0.008 (0.034)	0.055 (0.029)	0.040 (0.097)
RSI	-0.032 (0.101)	0.756** (0.254)	0.728** (0.292)
DEPFLOW	-0.015 (0.012)	-0.044 (0.029)	-0.047 (0.033)
nominal GNP	n.a.	n.a.	0.452** (0.060)

Table 1 (cont.)

Estimating Period: 1951-83

Inflation	0.618**	-0.552**	n.a.
	(0.078)	(0.201)	
real GNP	0.028	-0.019	n.a.
	(0.035)	(0.090)	
RAM	0.215**	0.183	0.286
	(0.098)	(0.252)	(0.192)
SB	0.210**	0.470**	0.520**
	(0.072)	(0.186)	(0.126)
RSI	0.122	0.186	0.383**
	(0.098)	(0.254)	(0.193)
DEPFLOW	-0.057	0.090	0.083
	(0.033)	(0.084)	(0.064)
nominal GNP	n.a.	n.a.	0.347**
			(0.084)

Legend: ** denotes signficant at the five-percent level
* denotes signficant at the ten-percent level

Table 2

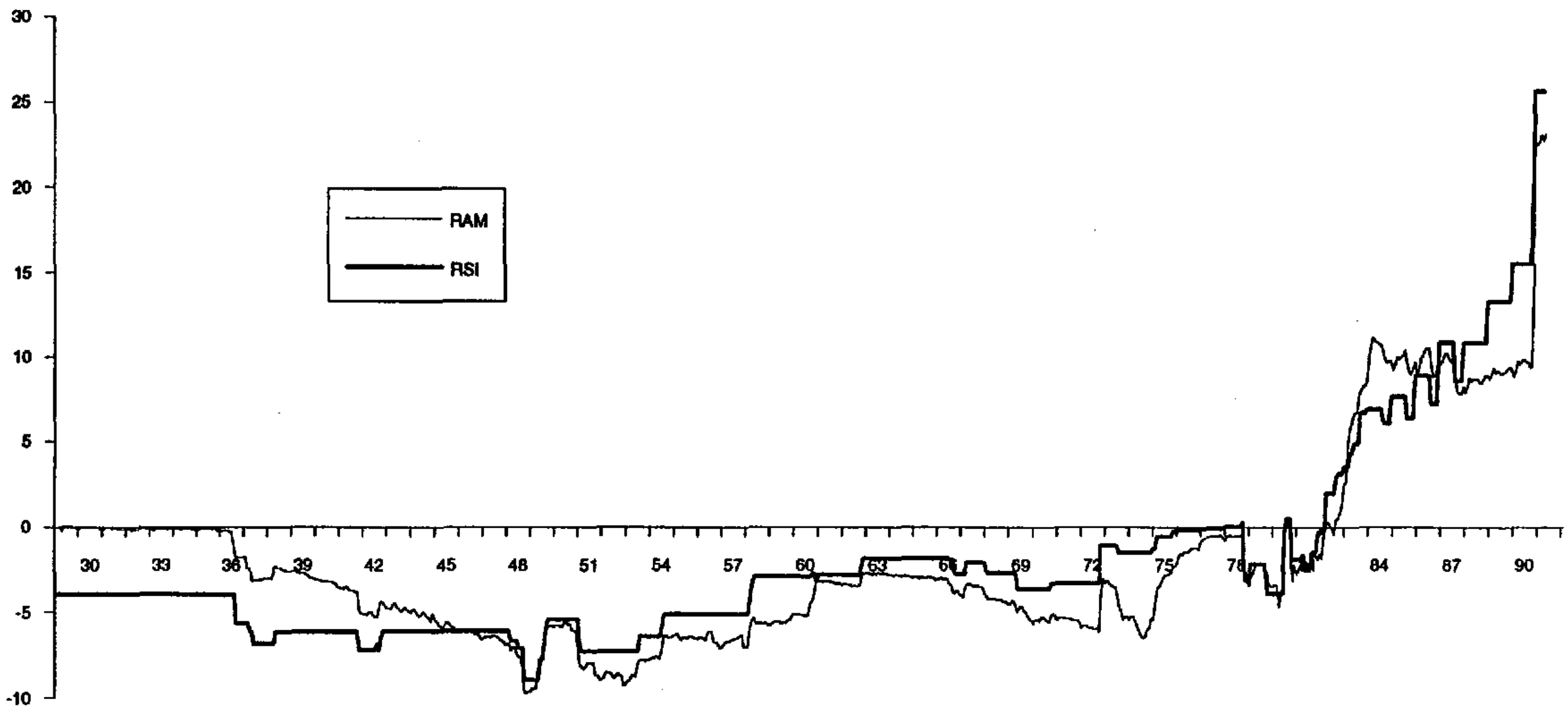
Test Statistics on the
Equality of RAM and DEPFLOW Coefficients

Estimating period: 1929-83

Equation	Test Statistic[1]	p-value
Inflation	0.67	0.42
real GNP	3.55	0.06
nominal GNP	3.62	0.05
Estimating period: 1951-83		
Inflation	2.98	0.08
real GNP	0.36	0.55
nominal GNP	1.12	0.29

[1] Reported is an F-statistics calculated with degrees of freedom (1, 212) for the 1929-83 sample and (1, 127) for the 1951-83 sample, respectively.

Figure 1
Historical Values of RAM and RSI, 1929:1 - 1991:6



DATA APPENDIX
RSI, Monthly, 1929-91

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1929	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987
1930	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987
1931	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987
1932	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987
1933	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987
1934	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987
1935	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987
1936	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-3.987	-5.634	-5.634	-5.634	-5.634
1937	-5.634	-5.634	-5.634	-6.106	-6.106	-6.81	-6.81	-6.81	-6.81	-6.81	-6.81	-6.81
1938	-6.81	-6.81	-6.81	-6.81	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12
1939	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12
1940	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12
1941	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-6.12	-7.198	-7.198
1942	-7.198	-7.198	-7.198	-7.198	-7.198	-7.198	-7.198	-6.832	-7.198	-6.499	-6.107	-6.107
1943	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107
1944	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107
1945	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107
1946	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107
1947	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107	-6.107
1948	-6.107	-6.107	-6.667	-6.667	-6.667	-6.667	-7.101	-7.101	-7.101	-8.955	-8.955	-8.955
1949	-8.955	-8.955	-8.955	-8.955	-8.955	-7.748	-7.748	-6.932	-5.683	-5.41	-5.41	-5.41
1950	-5.41	-5.41	-5.41	-5.41	-5.41	-5.41	-5.41	-5.41	-5.41	-5.41	-5.41	-5.41
1951	-5.41	-7.066	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268
1952	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268
1953	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-7.268	-6.408	-6.408	-6.408	-6.408	-6.408
1954	-6.408	-6.408	-6.408	-6.408	-6.408	-6.408	-5.827	-5.154	-5.115	-5.115	-5.115	-5.115
1955	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115
1956	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115
1957	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115	-5.115
1958	-5.115	-5.115	-4.338	-3.46	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926
1959	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926
1960	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.926	-2.762	-2.762	-3.189
1961	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828
1962	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.828	-2.322	-1.872
1963	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872
1964	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872
1965	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872
1966	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.872	-1.991	-1.991	-2.787	-2.787	-2.787
1967	-2.787	-2.787	-2.787	-2.115	-2.115	-2.115	-2.115	-2.115	-2.115	-2.115	-2.115	-2.115
1968	-2.115	-2.714	-2.714	-2.714	-2.714	-2.714	-2.714	-2.714	-2.714	-2.714	-2.714	-2.714
1969	-2.714	-2.714	-2.714	-2.714	-3.657	-3.657	-3.657	-3.657	-3.657	-3.657	-3.657	-3.657
1970	-3.657	-3.657	-3.657	-3.657	-3.657	-3.657	-3.657	-3.657	-3.657	-3.331	-3.331	-3.331
1971	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331
1972	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-3.331	-1.107	-1.107
1973	-1.107	-1.107	-1.107	-1.107	-1.107	-1.107	-1.107	-1.522	-1.522	-1.522	-1.522	-1.522
1974	-1.522	-1.522	-1.522	-1.522	-1.522	-1.522	-1.522	-1.522	-1.522	-1.522	-1.522	-1.522
1975	-1.296	-1.296	-0.577	-0.577	-0.577	-0.577	-0.577	-0.577	-0.577	-0.577	-0.274	-0.274
1976	-0.274	-0.193	-0.193	-0.193	-0.193	-0.193	-0.193	-0.193	-0.193	-0.193	-0.193	-0.193
1977	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17	-0.17
1978	0	0	0	0	0	0	0	0	0	0.249	-3.184	-3.184
1979	-3.184	-2.241	-2.241	-2.241	-2.241	-2.241	-2.241	-2.241	-2.241	-3.963	-3.963	-3.963
1980	-3.963	-3.963	-3.963	-3.963	-3.963	-3.963	-0.742	0.445	0.445	0.445	-1.955	-1.955
1981	-1.955	-1.955	-1.955	-1.738	-2.578	-2.578	-2.578	-2.578	-1.527	-1.527	-1.527	-0.326
1982	-0.326	-0.326	-0.326	1.939	1.939	1.939	1.939	1.939	2.871	3.089	3.089	3.089
1983	3.498	3.498	3.498	4.328	4.328	4.85	4.85	4.85	6.289	6.681	6.681	6.681
1984	6.882	6.882	6.882	6.882	6.882	6.882	6.882	6.882	6.067	6.067	6.067	6.067
1985	7.655	7.655	7.655	7.655	7.655	7.655	7.655	7.655	6.36	6.36	6.36	6.36
1986	8.912	8.912	8.912	8.912	8.912	8.912	8.912	8.912	7.217	7.217	7.217	7.217
1987	10.864	10.864	10.864	10.864	10.864	10.864	10.864	10.864	8.584	8.584	8.584	8.584
1988	10.835	10.835	10.835	10.835	10.835	10.835	10.835	10.835	10.835	10.835	10.835	10.835
1989	13.305	13.305	13.305	13.305	13.305	13.305	13.305	13.305	13.305	13.305	13.305	13.305
1990	15.521	15.521	15.521	15.521	15.521	15.521	15.521	15.521	15.521	15.521	15.521	20.922
1991	25.624	25.624	25.624	25.624	25.624	25.624						

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