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Long-run Money Demand in Chile

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Chile's recent switch to an autonomous central bank makes it essential to understand the determinants of money demand. This paper has added to the existing literature on money demand in Chile in two dimensions. First, we study the major determinants of M2 money demand in addition to those of M1 demand. Secondly, as Chile is an emerging open economy, it is argued that the failure to identify stable conventional money demand functions may arise from the omission of the nominal effective exchange rate. It is found that income and the interest rate are not sufficient for the formulation of a long-run stable demand for M1 and M2 money in Chile. In order to identify a long-run stable money demand function for M1 and M2, the nominal effective exchange rate should be incorporated. An interesting result is that the exchange rate measure affects the demand for M1 and M2 money differently. In particular, it appears that currency depreciation in Chile may lead to a shift from M1 into M2, as well as into foreign currency. The results of this paper provide the central bank of Chile with useful information.

I. Introduction

Chile's recent switch to an autonomous central bank makes it important to understand the underlying determinants of money demand in order to implement effective monetary policy. Recent evidence has suggested that the conventional formulation of the long-run money demand function for Chile is not stable. Examining M1, Arrau and De Gregorio (1993), hereafter ADG, contend that the failure to find a long-run stable money demand function for M1 suggests that there is an important permanent component in the relationship that is not captured by the traditional variables of interest and income. They argue that this amounts to an omitted variable problem, rendering inference based on such estimates unreliable. ADG hypothesize that it is likely that in a country like Chile, where financial markets and economic conditions have experienced dramatic changes, this missing element may be financial innovation. They model financial innovation, which they say may be thought of as technological progress in transactions and financial regulation/deregulation policy changes, as an unobservable shock that exhibits permanent effects on the demand for money.

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ADG examine the demand for M1 balances and show that a stable money demand relationship can be identified when this notion of financial innovation is taken into account. They find that the transactions elasticity of money demand is very close to unity. However, their estimates of interest rate elasticity are still high, but fall somewhat (to about -0.5) when they include the financial innovation variable. While ADG attribute the omission to financial innovation, we take a more standard and much simpler approach. It has been argued that the inclusion of an exchange rate measure may make the money demand relationship stationary (Lee and Chung (1995), Bahmani-Oskooee and Shabsigh (1996)). We believe this is appropriate for several reasons. First, reliance on an estimated value of financial innovation introduces a possible channel for error, in the sense of the generated regressor problem described by Pagan (1984). The use of financial innovation in the conduct of monetary policy requires the central bank to first estimate financial innovation. The central bank may not have much, or any, control over financial innovation. In fact, each time a regulatory policy changes, financial innovation is induced. The inclusion of an exchange rate does not require an additional estimation step, and thus reduces the possibility of introducing additional error into the process.

The primary task of this paper is to examine the stationarity of real money demand for M1 and M2 in Chile. In one sense, this paper extends the work of ADG by studying the determinants of M2 as well as those of M1. However, we hypothesize that the inability to identify a stable money demand function may be attributed to the omission of an exchange rate measure. This would suggest that Chile's money demand behaves like that of many other countries, requiring an exchange rate be added to the money demand function for stability (see Lee and Chung (1995) and Bahmani-Oskooee and Shabsigh (1996) and the literature cited therein). It is important to note, however, that we do not argue that financial innovation is unimportant, or that it does not impact money demand in some way, but that a simpler and more commonly used specification of the major determinants of money demand can render the money demand relationship stationary. As such, the central bank of Chile could learn from observing the actions and history of other central banks whose economies behave in a similar fashion. In practice, the conduct of monetary policy is made simpler in the context of an omitted variable problem if the relevant omission can be attributed to the exchange rate instead of financial innovation.

II. Background

A common theme in many theoretical macroeconomic models is an aggregate money demand function that links real balances, a measure of real income or transactions activity, and a short-term interest rate or other measure of the opportunity cost of holding real balances. In the conventional money demand function, real income represents the increasing demand for money as a producer's and consumer's good, by way of an income effect, as income rises. This is sometimes referred to as "transactions demand". The interest rate term represents the interest elasticity of both the transactions demand for money and the speculative demand through Tobin's portfolio balance model, and may represent a potential substitutability against bonds in production and consumption decisions (Branson (1989, p.343)). As pointed out by Hoffman *et al*. (1995), a stable long-run money demand function is a central proposition to monetarist models, New Classical monetary models, and even some New Keynesian models and real business cycle models that incorporate inflation and the general price level. Empirically, however, the literature on long-run money demand equations has documented periods of "missing money". The most famous of these studies was conducted by Goldfeld (1976) who first documented this phenomenon in the United States. Others have found that conventional money demand functions are often plagued by the problem of unstable parameters (see Breuer and Lippert (1996) for an overview).

Examinations of money demand have typically focused on obtaining estimates of the elasticity of money demand with respect to income and the interest rate. These estimates can be used to more accurately predict future money supply growth provided they are stable over time. It is important to have information about the stability of money demand in order to implement effective and appropriate monetary policy. Given that monetary policy may have significant implications for the macroeconomy, early studies of money demand focused mainly on the stability of individual coefficient estimates. Studies of this type include those by Goldfeld (1973, 1976), Arango and Nadiri (1981), Boughton (1981), Butter and Fase (1981), Gordon (1984), McKinnon *et al*. (1984), Rose (1985), and Fair (1987), to name just a few.

Given recent advances in macro-econometric modeling (Engle and Granger (1987) and others), it is possible to examine the joint time series properties among a set of variables in addition to the individual time series properties. The identification of stable money demand functions can be accomplished by examining the cointegrating relationships among a monetary aggregate and its determinants. A number of studies have used cointegration techniques to examine money demand, including those by Baum and Furno (1990), Dickey *et al*. (1991), Hafer and Jansen (1991), Hendry and Ericsson (1991), Hoffman and Rasche (1991), Miller (1991), Friedman and Kuttner (1992), McKnown and Wallace (1992), Mehra (1992), Arrau and De Gregorio (1993), Hoffman *et al.* (1995), Lee and Chung (1995), Bahmani-Oskooee and Shabsigh (1996), and Breuer and Lippert (1996). The central theme in these papers is the stability of the money demand function; however, a general consensus concerning the existence of a stable money demand relationship has not emerged. A variety of factors may be responsible for the mixed findings such as differences in sample periods, measures of money, income, and the interest rate, or the cointegration technique used. It is quite possible that studies that fail to identify stable money demand relationships suffer from the omitted variable problem. For example, the omission of a relevant determinant such as the effective exchange rate could explain the inability to identify a stable money demand function.

A finding of cointegration indicates stable money demand and provides evidence that the particular monetary aggregate may be useful as a policy instrument. We begin by examining the conventional money demand function and seek to identify a stable long-run relationship among money, income, and the interest rate. However, given that Chile is an emerging open economy, it may be that developments in the foreign exchange market could destabilize the conventional money demand relationship as a result of portfolio shifts between domestic and foreign currency (Arango and Nadiri (1981)). Over thirty years ago it was proposed that the demand for money could depend on the exchange rate in addition to income and the interest rate, though it was not formally tested at that time (Mundell (1963)). Following McKinnon *et al*. (1984), Lee and Chung (1995), and Bahmani-Oskooee and Shabsigh (1996), if it is found that the conventional money demand is not cointegrated, then the nominal effective exchange rate is introduced to the specification in order to identify a stable money demand function. The results will provide Chile's central bank with information regarding the choice of policy instrument.

III. Data and Methodology

We use quarterly data obtained from the International Financial Statistics CD-ROM database for the time period of 1980:1-1996:1. The sample period is constrained by the availability of the data. The following data are used in this study: seasonally adjusted M1 money, M2 money (defined as the sum of M1 plus quasi money), the consumer price index (P), gross domestic product (Y), the short-term deposit interest rate (R), and the nominal effective exchange rate (ER). From these data real money is defined as (M/P)×100 and real income as (Y/P)×100. The nominal effective exchange rate is an index that represents the ratio of an index of the period average exchange rate for the domestic currency to a weighted geometric average of exchange rates for the currencies of selected partner (or competitor) countries. Thus, an increase in the nominal effective exchange rate represents an appreciation of the domestic currency. All variables are entered in natural logarithms.

An analysis of the time-series properties of variables used in macroeconomic research is particularly important when examining the causal relationship between variables that exhibit a common trend (see, for instance, Granger (1986), Engle and Granger (1987), and Johansen (1991)). Thus, following ADG, before proceeding to the cointegration analysis and the estimation of long-run money demand, the time-series properties of the individual variables were examined by conducting stationarity or unit root tests. A time series containing a unit root follows a random walk and requires first-differencing to obtain stationarity, and is said to be first-order integrated, I(l). A variable that is stationary in level form is I(0). We used the following well-known augmented Dickey-Fuller (ADF) test to check for the presence of unit roots:

$$\Delta X_t = \rho_0 + (\rho_1 - 1)X_{t-1} + \rho_2 t + \sum_{j=1}^{m}\phi_j \Delta X_{t-j} + u_t, \tag{1}$$

where X is the individual time-series under investigation, Δ is the first-difference operator; t is a linear time trend; u_t is a covariance stationary random error and m is determined by Akaike's information criterion to ensure serially uncorrelated residuals. The null hypothesis is that X_t is a nonstationary time series and is rejected if $(\rho_1 - 1) < 0$ and statistically significant. The finite sample critical values for the ADF test developed by MacKinnon (1991) are used to determine statistical significance. If the series are found to be I(1), then it is possible that a long-run relationship among them may exist that tends to keep the series from drifting too far apart from each other over long horizons.

Two or more I(l) time series are said to be cointegrated if some linear combination of them is stationary. Tests for cointegration seek to discern whether or not a stable long-run relationship exists among such a set of variables. The existence of a common trend among the monetary aggregate and the determinants of money demand means that in the long run the behavior of the common trend will drive the behavior of the variables. Shocks that are unique to one time series will die out as the variables adjust back to their common trend. In the context of this study, a finding of cointegration would simply mean that the transmission mechanism between the monetary aggregate and its determinants is stable, and thus more predictable over long periods.

For this study we chose to use the Johansen-Juselius (1990) multivariate cointegration procedure to determine the number of cointegrating vectors. This technique is preferred to the Engle-Granger (1987) method for several reasons. First, the Engle-Granger procedure depends upon the normalization of the variables and may be sensitive to the choice of dependent and independent variables in the cointegrating equation. The estimation of the long run equilibrium regression requires the researcher to place one variable on the left-hand side of the equation and use the other as a regressor. In practice, it is possible that the arbitrary choice of one variable as the dependent variable and the other as the independent variable may lead to the conclusion that the variables are cointegrated, whereas reversing the choice of dependent and independent variables may indicate no cointegration. Further, because the Engle-Granger procedure relies on a two-step estimator in which the first step is to generate the residuals from the cointegration regression and the second step is to use the residuals generated from it to test for unit roots, any error introduced by the researcher in the first step also affects the second step. This is a classic case of the generated regressor problem documented by Pagan (1984) and may lead to incorrect inference about the cointegrating properties among the variables. The Johansen-Juselius procedure has also been shown by Phillips (1991) to have optimal properties in terms of symmetry, unbiasedness, and efficiency. Gonzales (1994) provides evidence of the superior properties of the Johansen-Juselius technique as compared to several other procedures. Another advantage is that, unlike the Engle-Granger cointegration methodology, the Johansen-Juselius procedure is capable of determining the number of cointegrating vectors in the relationship.

As outlined in Hoffman *et al*. (1995), the Johansen-Juselius approach to testing for cointegration considers a p-dimensional vector autoregression that may be written as a conventional "error correction" model as follows:

$$\Delta X_t = \mu + \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} - \prod X_{t-k} + \varepsilon_t, \tag{2}$$

where the $\prod$ matrix contains information about the long-run relationships between the variables. Let the rank of the $\prod$ matrix be denoted by r. When $0 < r < p$, the

Π matrix may be factored into $\alpha\beta'$, where α may be interpreted as a $p \times r$ matrix of the error correction parameters and β as a $p \times r$ matrix of cointegrating vectors. The vector of constants, μ, allows for the possibility of deterministic drift in the data series. Maximum likelihood estimates for α, β, and Γ_j are derived in Johansen (1988). To test the hypothesis that there are at most r cointegrating vectors, one calculates the trace statistic (λ_{trace}). The maximum eigenvalue test (λ_{max}) is based on the null hypothesis that the number of cointegrating vectors is r against the alternative of $r+1$ cointegrating vectors. Johansen and Juselius (1990) provide critical values for the λ_{trace} and λ_{max} statistics.

IV. Empirical Results

The Johansen-Juselius cointegration procedure outlined above is used to test for the presence of cointegration among real money, real income, the interest rate, and if needed, the nominal effective exchange rate. If each of the individual time series contains a unit root then it is appropriate to proceed to cointegration analysis. Table 1 reports the augmented Dickey-Fuller (ADF) unit root tests. The ADF tests suggested that all of the variables are stationary in first-differences, i.e., integrated of order one, I(l). Thus, it is appropriate to proceed to the Johansen-Juselius cointegration tests. The Johansen-Juselius tests allow for linear deterministic trends in the data and include a constant term in the cointegrating equation. Based on Akaike's information criterion, four lags were included in the construction of the Johansen-Juselius tests. This lag structure was associated with no autocorrelation in the residuals. The general conclusions are not influenced by minor changes in the lag specification. As ADG explain, 1984 is the year in which a strong economic recovery began in Chile. Output and consumption continued to grow for the next five years and an upwardly biased income elasticity estimate would produce an overestimation of the demand for money during the recovery period. Thus, following ADG, we included a dummy variable in all estimations, which is 1.0 from 1984:1 on, and zero otherwise.

Table 1 ADF Unit Root Test Results

Variable	Levels	First-Differences
lnM1	-1.12	-7.52*
lnM2	-0.47	-5.57*
lnY	-2.47	-5.39*
lnR	-2.69	-7.42*
lnER	-1.66	-3.05*

Notes: Critical values are obtained from MacKinnon (1991). *, **, denote significance at 1% and 5% levels, respectively. "ln" denotes natural logarithm.

Tables 2.1 and 2.2 report that neither M1 nor M2 is cointegrated with income and the interest rate in the conventional money demand specification. Thus, if the monetary authorities in Chile use elasticity estimates from the conventional money demand function they will either under-predict or over-predict future money balances. The inability of the Johansen-Juselius cointegration procedure to identify a long-run relationship among money, income, and the interest rate may be due to an omitted variable problem. As stated above Mundell (1963), Arango and Nadiri (1981), McKinnon *et al.* (1984), Bahmani-Oskooee and Shabsigh (1996), and others, have suggested that this omitted variable may be the exchange rate.

Table 2.1 Cointegration Results for the Conventional M1 Money Demand Function: lnM1, lnY, lnR

	Null	Alternative	Statistic	95% C.V.	90% C.V.
λmax	$r=0$	$r=1$	11.7383	21.1200	19.0200
	$r\leq 1$	$r=2$	8.8112	14.8800	12.9800
	$r\leq 2$	$r=3$	1.2315	8.0700	6.5000
λtrace	$r=0$	$r\geq 1$	21.7810	31.5400	28.7800
	$r\leq 1$	$r\geq 2$	10.0427	17.8600	15.7500
	$r\leq 2$	$r=3$	1.2315	8.0700	6.5000

Note: "r" denotes number of cointegrating vectors.

Table 2.2 Cointegration Results for the Conventional M2 Money Demand Function: lnM2, lnY, lnR

	Null	Alternative	Statistic	95% C.V.	90% C.V.
λmax	$r=0$	$r=1$	18.0137	21.1200	19.0200
	$r\leq 1$	$r=2$	7.6947	14.8800	12.9800
	$r\leq 2$	$r=3$	1.2106	8.0700	6.5000
λtrace	$r=0$	$r\geq 1$	26.9190	31.5400	28.7800
	$r\leq 1$	$r\geq 2$	8.9053	17.8600	15.7500
	$r\leq 2$	$r=3$	1.2106	8.0700	6.5000

Note: "r" denotes number of cointegrating vectors.

To determine whether we can obtain a stable long-run money demand function for M1 and M2, we add the nominal effective exchange rate, ER, into each of the money demand specifications. The results presented in Tables 3.1 and 3.2 indicate that the addition of the nominal effective exchange rate provides a stable money demand function in both cases. In particular, we find evidence of two cointegrating vectors in the case of M1, and one cointegrating vector in the case of M2. The former appears to have a more stable money demand relationship relative to that of M2, as Van Den Berg and Jayanetti (1993) contend that the "greater the number of cointegrating vectors, the more stable the relationship" (p.417).

Table 3.1 Cointegration Results for the M1 Money Demand Function including the Nominal Effective Exchange Rate: lnM1, lnY, lnR, lnER

	Null	Alternative	Statistic	95% C.V.	90% C.V.
λmax	$r=0$	$r=1$	25.1750**	27.4200	24.9900
	$r\leq 1$	$r=2$	20.3863**	21.1200	19.0200
	$r\leq 2$	$r=3$	11.0932	14.8800	12.9800
	$r\leq 3$	$r=4$	3.2329	8.0700	6.5000
λtrace	$r=0$	$r\geq 1$	59.8875*	48.8800	45.7000
	$r\leq 1$	$r\geq 2$	34.7124*	31.5400	28.7800
	$r\leq 2$	$r=3$	14.3261	17.8600	15.7500
	$r\leq 3$	$r=4$	3.2329	8.0700	6.5000

Notes: " r" denotes number of cointegrating vectors. * (**) denotes 5% (10%) level of significance.

Table 3.2 Cointegration Results for the M2 Money Demand Function including the Nominal Effective Exchange Rate: lnM2, lnY, lnR, lnER

	Null	Alternative	Statistic	95% C.V.	90% C.V.
λmax	$r=0$	$r=1$	26.6406**	27.4200	24.9900
	$r\leq 1$	$r=2$	12.2817	21.1200	19.0200
	$r\leq 2$	$r=3$	7.7635	14.8800	12.9800
	$r\leq 3$	$r=4$	4.4727	8.0700	6.5000
λtrace	$r=0$	$r\geq 1$	51.1585*	48.8800	45.7000
	$r\leq 1$	$r\geq 2$	24.5179	31.5400	28.7800
	$r\leq 2$	$r=3$	12.2362	17.8600	15.7500
	$r\leq 3$	$r=4$	4.4727	8.0700	6.5000

Notes: " r" denotes number of cointegrating vectors. * (**) denotes 5% (10%) level of significance.

Table 4 presents the normalized cointegrating vectors of the stable money demand functions for M1 and M2. Following the literature we normalized each vector by setting the coefficient on the monetary aggregate at -1.0 so that the vectors may be interpreted as money demand functions. First, note that the correct signs on income and the interest rate are obtained in each case. A casual review of Table 4 suggests that income elasticities are consistent in magnitude with those found by ADG. Likelihood ratio tests indicate that the income elasticity estimate for M1 is not significantly different from one, while we can reject the hypothesis that the estimate for M2 is one. The test statistic is χ^2 distributed with one degree of freedom with critical values 6.63, 3.84, and 2.71 for the 1%, 5%, and 10% levels, respectively. The test statistic for the M1 (M2) equation is 0.92 (10.83). In terms of the monetarist proposition that the money supply should grow at the same rate as output, these results suggest that M1 should grow at the same rate as output, but this is not the case for M2 growth.

Table 4 Normalized Cointegrating Vectors M1 and M2 Money Demand Specifications

lnM1	lnY	lnR	lnER
-1.0000	0.8407 (0.1659)	-0.0864 (0.0625)	0.0777 (0.0907)
lnM2	lnY	lnR	lnER
-1.0000	1.4073 (0.1237)	-0.1562 (0.0697)	-0.2921 (0.0764)

Note: Standard errors are in parentheses.

The estimate of long-run interest elasticity is smaller for M1 than for M2. This suggests that if these definitions of money are used as monetary targets, it will take a larger change in the interest rate to induce a desired change in the long-run demand for money in M1 than for M2. Both estimates of interest elasticity are smaller than that found for M1 by ADG.

In the case of M2 money demand, the negative estimated coefficient on the nominal effective exchange rate is consistent with the idea that depreciation of domestic currency raises the domestic currency value of an individual's foreign assets, and if this is perceived as an increase in wealth, then the demand for M2 money could increase (Arango and Nadiri (1981)). The positive coefficient on the nominal effective exchange rate in the case of M1 is suggestive of the notion that after depreciation of the domestic currency, and if the public expects further depreciation, then the public would demand more foreign currency and less domestic currency thus leading to a decrease in M1 money demand (Bahmani-Oskooee and Shabsigh (1996)). These results suggest that the exchange rate affects the demand for M1 and M2 money differently within Chile. It appears that currency depreciation in Chile may lead to a shift from M1 into M2, as well as into foreign currency.

As a final experiment in our study, we follow Bentzen and Engsted's (1993) method of examining the short-run elasticities of money demand. Bentzen and Engsted suggest estimating the following error-correction model for both real M1 and M2:

$$\Delta \ln M = c + \sum_{j=1}^{q} a_j \Delta \ln M_{t-j} + \sum_{j=0}^{m} b_j \Delta \ln Y_{t-j} + \sum_{j=0}^{n} d_j \Delta \ln R_{t-j} \tag{3}$$

$$+ \sum_{j=0}^{s} e_j \Delta \ln ER_{t-j} + \gamma \eta_{t-1} + \mu_t ,$$

where the lag orders q, m, n, and s are chosen so as to make the disturbance term white noise. Bentzen and Engsted suggest that in order to obtain the best demand function for use in forecasting, insignificant parameters should be deleted. The "cleaned up" money demand function can then be subjected to a CUSUM test to determine if the model is stable in terms of parameters, and, therefore, is good for forecasting. Table 5 presents a summary of these results. With respect to M1, we find that the short-run income elasticity is about 0.84 and is significant via a Wald (Granger-causality) test.

Short-run elasticities for interest rate and exchange rate are -0.75 and 0.29, respectively, and both are significant. For M2 demand note that only the short-run elasticity estimate for income is significant, and it is about 0.30. This suggests that M2 is less responsive than M1 to the interest rate and exchange rate in the short-run. In both cases, the speed of adjustment parameters are negative and significant. M1 responds faster than M2 to the previous period's deviation from long run equilibrium, with about 72 percent of the adjustment occurring within one quarter for M1 versus about 17 percent for M2. Plots of the CUSUM tests for both the M1 and M2 error-correction models were entirely within the two critical bounds at the five percent significance level, suggesting that both specifications are stable in terms of the parameters.

Table 5 Summary of the Bentzen and Engsted ECM Short- and Long-run Elasticities

	Σa	Σb	Σc	Σd	γ
Δ lnM1	-0.0253	0.8361	-0.7471	0.2885	-0.7183
		[4.8335]	[12.2517]	[4.2070]	[-4.5024]
		(0.028)	(0.000)	(0.040)	(0.000)
Δ lnM2	-0.3058	0.2958	-0.0052	-0.0361	-0.1668
		[9.4341]	[0.3704]	[0.3955]	[-3.2557]
		(0.002)	(0.543)	(0.529)	(0.002)

Notes: Results are from estimation of Equation (3). Σa, Σb, Σc, and Σd denote sum of the estimated coefficients on the righthand-side variables. Wald tests (distributed χ^2) for testing the null hypothesis that the coefficients on Σb, Σc, and Σd are jointly zero, respectively, are reported in square brackets with significance level in parentheses. γ is the estimated coefficient on the error-correction term. The corresponding t-statistic is in square brackets and significance level in parentheses. For both models, CUSUM plots were entirely within the two critical bounds at five percent significance level.

V. Concluding Remarks

The appropriate application of monetary policy depends upon the existence of a stable money demand relationship. Given Chile's switch to an autonomous central bank, it is essential to understand the major determinants of money demand in order to implement effective monetary policy. However, a recent study found that the conventional M1 money demand function for Chile was not stable over time, which was attributed to the failure to acknowledge an important determinant of money demand (Arrau and De Gregorio (1993)). The authors referred to this omitted variable as “financial innovation,” and once it was estimated and then taken into account, M1 money demand was found to be stable.

This paper has added to the existing literature on money demand in Chile in two dimensions. In particular, we study the major determinants of M2 money demand in addition to those of M1 demand. As Chile is an emerging open economy, we argued that the failure to identify stable money demand functions may arise from the omission of the nominal effective exchange rate.

The Johansen-Juselius cointegration procedure is used to examine the stability of

M1 and M2 money demand. It is found that income and the interest rate are not sufficient for the formulation of a long-run stable demand for M1 and M2 money in Chile. In order to identify a long-run stable money demand function for M1 and M2, the nominal effective exchange rate should be incorporated. In practical terms, the conduct of monetary policy is made simpler in the context of an omitted variable problem if the relevant omission can be attributed to the exchange rate instead of financial innovation. This is because accurate and reliable exchange rate data are readily available, whereas the concept of financial innovation must be proxied by an estimated variable. An interesting result is that the exchange rate measure affects the demand for M1 and M2 money differently. In particular, it appears that currency depreciation in Chile may lead to a shift from M1 into M2, as well as into foreign currency. Thus, the results of this paper provide the central bank of Chile with useful information.

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