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The Impact of Banking Crises on Money Demand and Price Stability

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Policymakers in countries undergoing banking crises should not worry about the structural stability of money demand functions, the behavior of money demand during crises can be modeled by the same function used during periods of tranquility But policymakers should be aware that in some instances crises can give rise to variance instability in the price or inflation equations

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Summary findings

Martinez Peria empirically investigates the monetary impact of banking crises in Chile, Colombia, Denmark, Japan, Kenya, Malaysia, and Uruguay. She uses cointegration analysis and error correction modeling to research:

- Whether money demand stability is threatened by banking crises.
- Whether crises bring about structural breaks in the relationship between monetary indicators and prices.

Overall, she finds no systematic evidence that banking crises cause money demand instability. Nor do the results consistently support the notion that the relationship between monetary indicators and prices undergoes structural breaks during crises. However, although individual coefficients in price equations do not seem to be severely affected by crises, crises can sometimes give rise to variance instability in price or inflation equations.

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The Impact of Banking Crises on Money Demand and Price Stability

by

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I - Introduction

Banking crises have plagued countries around the world from Argentina to Zambia over the last two decades. In recent years, several papers have focused on identifying banking crisis episodes and studying their causes.[1] However, until very recently, the importance of a sound banking sector for monetary policy implementation did not receive much attention. Two exceptions are the recent studies by Garcia-Herrero (1997) and Lindgren, Garcia, and Saal (1996). Both studies describe some of the distortions and problems that banking crises can create for the assessment and implementation of monetary policy. They argue that banking crises complicate the conduct of monetary policy because they destabilize money demand and money multipliers, they diminish the effectiveness of monetary instruments, and they affect the relationship between monetary indicators and prices. Ultimately, banking crises, they argue, may reduce the government's ability to achieve its inflation objective.

Monetary indicators refer to variables that help explain the behavior of prices and are monitored by policy-makers to guide them in the conduct of monetary policy. Also, these variables are typically included in the empirical equations for prices. Monetary aggregates are frequently used as monetary indicators.[2] Central banks monitor the behavior and demand for monetary aggregates because they are reputed to be useful in explaining the behavior of prices. Furthermore, these variables are readily available to the monetary authorities at high frequencies, and they are considered to be better measured than other indicators.

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[1] See Caprio and Klingebiel (1996), Demirguc-Kunt and Detragiache (1997), and Lingren, Garcia, and Saal (1996).

[2] Monetary aggregates have been traditionally used as targets for the conduct of monetary policy because they were thought to have a tightly controllable and reliable link to prices. Over time financial innovation and other factors have led central banks to abandon the use of monetary aggregates as strict targets for the conduct of monetary policy. Instead, monetary aggregates are increasingly being used as monetary indicators.

Garcia-Herrero (1997) and Lindgren et al. (1996) argue that, because banking crises destabilize the demand for money, they are likely to affect the relationship between prices and monetary aggregates. Thus, they argue monetary authorities may benefit, in particular during crises, from expanding the set of indicators they monitor to include other indicators like exchange rates, interest rates, and stock prices. Though very informative, these studies rely heavily on a descriptive approach rather than on a systematic econometric evaluation of the problems that banking crises may bring.[3]

This paper conducts an empirical analysis of the monetary effects of banking crises. We research two issues. First, we evaluate the claim that money demand stability is threatened by the occurrence of banking crises. Secondly, we analyze the relationship between monetary indicators and prices and, in particular, we test whether crises cause a structural break in this relationship.

The study focuses on the following country and crises episodes: Chile (1981-87), Colombia (1982-1988), Denmark (1987-1992), Japan (1992-present), Kenya (1985-1989, 1992-1995), Malaysia (1985-1988), and Uruguay (1981-1985).[4,5] These countries were chosen in order to obtain a geographically representative sample of countries that experienced banking problems over the last two decades.[6]

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[3] Garcia-Herrero (1997) conducts a Johansen-type cointegration analysis to study long-run money demand stability, but she warns that her analysis is incomplete and that her sample is too short. Lindgren, Garcia, and Saal (1996) cite evidence found by Baliño and Sudararajan (1991) that broad money demand intercepts and interest elasticities change during banking crises in Argentina, Chile, Philippines, Spain, and Uruguay. However, Baliño and Sudararajan's analysis does not contemplate issues like cointegration and error correction modeling, so it is unclear whether the equations they base their results on are well specified.

[4] The dates in parentheses correspond to the periods identified by Caprio and Kinglebiel (1996) and Lindgren, Garcia, and Saal (1996) as periods of banking crises.

[5] Table A.1 in the appendix contains information on the causes, extent, and consequences of the crises we focus on.

[6] Though we started our investigation with a sample of 17 countries that experienced crises over the last two decades, data limitations reduced the number of countries included in the final analysis to the 7 mentioned above.

In our empirical estimations, we use cointegration analysis and error correction modeling to find appropriate dynamic specifications for money and prices in each of the countries under study. Parameter constancy tests on the estimated money demand equations help us evaluate the hypothesis that money becomes unstable during periods of crisis. We focus on broad money since the demand for narrow money is more likely to be affected by issues such as financial innovation and deregulation, events that can themselves lead to instability. Finally, aside from examining which variables are significant indicators of the behavior of prices, we also perform parameter constancy tests to determine whether crises bring about a structural break in the relationship between prices and monetary indicators.

Overall, this paper does not find any systemic evidence that banking crises cause money demand instability. Regarding the determinants of prices, we find that money, exchange rates, foreign prices, and domestic interest rates are significant indicators of price behavior. Finally, the results do not support the notion that the relationship between monetary indicators and prices undergoes a structural break during these episodes. However, for three out of the seven countries in this study, there is evidence of variance instability in the price equations as a result of banking crises.

The rest of the paper is organized as follows. Section II briefly reviews the relevant literature. Section III outlines the empirical methodology used in this paper. Section IV presents the empirical results. Finally, section V concludes.

II - Literature Review

A number of papers have studied the demand for money and the determinants of inflation in the countries included in this paper. Table A.2 in the appendix summarizes most of these papers. These studies help guide the construction of the money demand and price/inflation specifications. Wherever possible and appropriate, we try to use the same measures of the "own" and "outside" rates of money for each country and to include most of the variables found to be significant in previous studies.[7] However, the majority of these papers cover different sample than we do, and also they do not explicitly examine the impact of banking crises on the stability of money demand.

The modeling and empirical approach used to estimate the demand for money in this study resembles that of Baba, Hendry, and Starr (1992), Ericsson, Hendry, and Prestwich (1998), and Ericsson and Sharma (1998). These papers focus on different countries and are not concerned with the impact of banking crises on money demand. However, we follow these papers in their treatment of issues like cointegration, error correction modeling, and parameter constancy.

There is a vast empirical literature on the "information content" (i.e., ability to explain prices) of monetary indicators that is related to the analysis conducted in this paper.[8] Most of these studies evaluate the information content of monetary indicators by estimating vector autoregressive models (VARs) of prices, monetary aggregates, and other potential monetary indicators and by conducting F-exclusion tests to determine the marginal explanatory power of each indicator in explaining prices. This literature has mostly focused on the case of the U.S. and other developed countries.[9] Furthermore, to our knowledge, the existing literature has not

[7] The "own" return on money (M2 in this paper) typically refers to the average rate on deposits included in M2. The "outside" rate of money refers to the average rate on some alternative asset not included in M2 (typically T-bills or government bonds).

[8] See Baumgartner and Ramaswamy (1996), Baumgartner, Ramaswamy, Zettergren (1997), Caramazza and Slawner (1991), Davis and Henry (1994), Friedman and Kuttner (1992), Hamann (1993), Hostland, Poloz, and Storer (1987), Mahdavi and Zhou (1997), Sims (1980), Stock and Watson (1989), among others.

[9] Hannan (1993) is an exception. This study examines the relationship between money, output, and prices

empirically analyzed the impact of banking crises on the relationship between prices and indicators.

The problem with the studies that focus primarily on the information content of monetary indicators is that changes in their explanatory power may be caused by increases in their volatility or noisiness over certain samples. Also, changes in the degrees of freedom in the estimation of the price equation can also affect the results. For example, a preliminary analysis we conducted indicates that the explanatory power of most monetary indicators, including money, drops during crisis periods, relative to tranquil periods.[10] However, the lack of statistical significance of certain variables may very well be due to the loss of degrees of freedom over the much shorter crisis periods.

This paper improves and adapts the methodology on the information content of monetary indicators described above, in order to study the impact of banking crises on the relationship between prices and indicators. Instead of focusing on examining the explanatory power of certain variables over different samples, this paper tests for potential structural breaks in the relationship between prices and monetary indicators. Structural stability is a more relevant matter for policy-makers than the issue of whether a given variable happens to be statistically significant over a particular sample. As long as the pre-crisis price equation remains stable over the crisis periods, policy-makers can continue to use this formulation to model prices.

This study also pays substantial attention to the issue of cointegration (i.e., the potential long-run relationship between prices and monetary indicators), which has been ignored by most studies on the information content of monetary indicators. Finally, aside from modeling prices as a function of domestic monetary and financial variables only (as most studies do), following De

in a group of Pacific Basin countries that underwent a process of financial liberalization during the 1980s.
[10] Results are available upon request.

Brouwer and Ericsson (1998) and Juselius (1992), we also control for the potential impact of wages, unemployment, and external factors on prices.

III - Empirical Methodology and Data

To examine the monetary impact of banking crises, we estimate dynamic money demand and price/inflation equations using monthly data for each country for the period 1975-1998.[11] The purpose of estimating these equations is twofold. First, we want to determine whether money demand becomes unstable during banking crises. Secondly, we want to test whether crises cause a structural break in the relationship between monetary indicators and prices.

A number of steps are involved in the empirical analysis and testing of the issues discussed above. First, we conduct unit root tests to determine whether the variables included in the empirical analysis are stationary (see section III.1). Second, we test for cointegration between prices and the monetary, labor, and external factors determining prices (see section III.2). Third, we obtain single equation error correction models for money and prices (see section III.3). Finally, we conduct parameter constancy tests to examine the stability of the money demand and price/inflation equations (section III.4).

III.1 Testing the presence of unit roots

Standard inference procedures do not apply to regressions that contain non-stationary series. Therefore, for each country, we conduct augmented Dickey-Fuller (1981) unit root tests to evaluate whether the variables used in our empirical analysis are stationary.

Given a series

[11] The sample for individual countries might be smaller than 1975-1998 depending on data availability. See the data appendix.

$$y_t = \mu + \beta y_{t-1} + \varepsilon_t \qquad (1)$$

where μ and β are parameters and ε_t is assumed to be white noise. y_t is stationary if $-1< \beta<1$. The augmented Dickey-Fuller test to determine if y_t is non-stationary is carried out by estimating an equation with y_{t-1} subtracted from both sides of the equation and adding lagged difference terms to control for higher order correlation in the series.

$$\Delta y_t = \mu + (\beta - 1) y_{t-1} + \delta_1 \Delta y_{t-1} + \delta_2 \Delta y_{t-2} + \ldots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t \qquad (2)$$

This augmented specification is then used to test whether β-1=0 against the alternative that β - 1<0. Dickey and Fuller (1981) have determined the distribution and the critical values for this test. Finally, non-stationary variables are differenced as many times as needed (depending on the variables' order of integration) until stationary is achieved.

III.2 Testing cointegration

Following Juselius (1992), we model domestic prices in each of the countries in our sample as a function of monetary, external, and cost push factors. In other words, we assume that consumer price inflation can be associated with inflation in the labor markets, that is wages being above the underlying steady-state level; with monetary inflation, that is, excess money, and with imported inflation.

For each country, we conduct Johansen (1988) cointegration tests to determine whether there exist any long-run equilibrium relationships in the monetary, labor, and external sectors. Given a vector autoregressive system (VAR) of order p:

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + u_t \qquad (3)$$

where y_t is a k-vector of non-stationary I(1) variables and u_t is a vector of innovations. The VAR can be re-written as:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + u_t \qquad (4)$$

where

$$\Pi = \sum_{i=1}^{p} A_i - I \qquad \Gamma i = -\sum_{j=i+1}^{p} A_j$$

According to Granger's representation theorem, if the coefficient matrix Π has rank r<k, then there exist kxr matrices α and β each with rank r such that $\Pi=\alpha\beta'$ and $\beta' y_t$ is stationary. r determines the number of cointegrating relations (the cointegrating rank). Each column of β is a cointegrating vector. The elements of α are referred to as the adjustment parameters in the vector error correction model.

Johansen's test of cointegration consists of estimating the Π matrix in an unrestricted form and testing whether we can reject the restriction implied by the reduced rank of Π. If there are k endogenous variables, with one unit root each, there can be from zero to k-1 linearly independent, cointegrating relations. The trace and maximal-eigenvalue statistics are used to test the number of cointegrating vectors.[12]

The distribution of the cointegration tests is affected by the assumptions made about the deterministic parts of the model. In other words, the distribution of the test depends on whether we allow for a trend and/or constant term (see Johansen and Juselius (1990), and Johansen

[12] $\eta_r = -T\sum_{i=r+1}^{k} \log(1-\lambda_i)$ is the trace statistic and $\xi_r = -T\log(1-\lambda_{r+1})$ refers to the maximal eigenvalue statistic. In both cases, r=0,1,2..k-2,k-1.

(1994)). In this paper, the constant and seasonals enter unrestrictedly in the VAR. Also, we allow for a linear trend in the cointegration space.[13]

As in Juselius (1992), we conduct the cointegration analysis in each sector (monetary, labor, and external) separately, rather than examining cointegration among all possible determinants of inflation for a number of reasons. In the first place, the data sample is not large enough to examine systems including as many as ten variables. Secondly, as indicated by Juselius (1992. p406) "a drawback of the analysis of the multivariate cointegration model is that the difficulties of interpreting the cointegration space grow when more variables are added to the VAR system."

III.2.a *Cointegration testing in the monetary sector*

We test for cointegration among the variables in the vector $Z^{1}_{t}{}'=\{m,p,y,I^{o},I^{a},\Delta p,t\}$ where m is the logarithm of nominal or real M2 (depending on the order of integration of M2), y is the logarithm of a measure of income (usually industrial production measured in logarithms), I^{o} is the level of the own rate of return on M2 (in most cases an average deposit rate), I^{a} is the level of a measure of the return on alternative assets outside from M2 (e.g., government bonds or bills), and t is a time trend. In those cases where there is evidence that money is I(1), we exclude inflation, Δp (defined as the change in the logarithm of prices), since this variable will be stationary.

[13] We include a trend in the cointegration space in order to obtain a test for cointegration invariant to the value of the constant term (see Johansen (1995)). Also, we restrict the trend to the cointegration space since we typically do not think that growth rates are quadratic, which they could be if the trend entered unrestrictedly.

III.2.b <u>*Cointegration testing in the labor/wage sector*</u>

If wages and prices are I(1), we test for cointegration between the variables in the vector $Z^{2a}{}_t{}'=\{w,u,p,t\}$. In this case, w corresponds to the logarithm of nominal wages, u is the log of the unemployment rate, and p is the log of prices. Once again, t is a time trend. For the countries where prices and wages are I(2), we obtain an I(1) representation by examining cointegration among the following variables $Z^{2b}{}_t{}'=\{w-p, u, \Delta p, t\}$ where w-p is the real wage (defined as the log of wages minus the log of prices) and Δp is, once again, the inflation rate.

III.2.c <u>*Cointegration testing in the external sector*</u>

If domestic and foreign prices are I(1), we test for cointegration among the vector of variables $Z^{3a}{}_t{}'=\{p,e,p^*,I,I^*,t\}$. In this case, p corresponds to the logarithm of domestic prices, e is the log of the exchange rate with respect to the dollar or deutsche mark depending on the country, p* is the logarithm of the foreign price level (represented by the U.S. or German price level depending on the country), I is the domestic interest rate, and I* is the corresponding foreign (U.S. or German) interest rate.[14] Following Juselius (1992), we include interest rates in the cointegration analysis, because the determination of exchange rates takes place in both the goods and capital markets. Therefore, we need to account for the interaction between them to understand the external effects on prices.

When there is evidence that domestic prices could be I(2), we examine cointegration among the following variables $Z^{3b}{}_t{}'=\{p-e,p^*,\Delta p,I,I^*\}$. Once again, Δp is the inflation rate.

[14] For Chile, Colombia, Japan, Kenya, Malaysia, and Uruguay, the exchange rate used is that of each country's domestic currency vis-à-vis the dollar. Also, for these countries the relevant foreign price level is the U.S. price level, and the foreign interest rate is the rate on U.S. government t-bills. In the case of Denmark, we use the krone/deutsche mark rate, German prices are the relevant foreign prices, and we use the interest rate on German government bonds as the relevant foreign interest rate. The exchange rate is expressed as domestic currency per unit of foreign currency.

III.3 <u>Single equation error correction modeling</u>

After testing for cointegration in the monetary sector, we develop an error correction model (ECM) for money for each country in our sample. The conditional ECM for money is of the form:

$$\Delta m_t = c + \sum_{i=1}^{k-1} \gamma_{1i} \Delta m_{t-i} + \sum_{i=0}^{k-1} \gamma_{2i} \Delta p_{t-i} + \sum_{i=0}^{k-1} \gamma_{3i} \Delta y_{t-i} + \sum_{i=0}^{k-1} \gamma_{4i} \Delta I^{O}_{t-i} + \sum_{i=0}^{k-1} \gamma_{5i} \Delta I^{A}_{t-i} + \sum_{i=0}^{k-1} \gamma_{6i} \Delta e_{t-i} + \lambda_1 ' ECMmoney_{t-1} + \omega_t \quad (5)$$

where ω_t is a white noise error term. *ECMmoney* refers to the cointegrating vectors found (if any) for the monetary sector. The remaining variables have been defined above. For those countries where there is evidence that money and prices are I(2), Δm is replaced by Δ(m-p) and Δp is replaced by ΔΔp, the second difference of prices..

Similarly, we develop an ECM to analyze the short-run and long-run determinants of prices/inflation. This ECM model incorporates the cointegrating vectors found for the monetary (*ECMmoney*), labor (*ECMwages*), and external sectors (*ECMexternal*). The ECM for prices is of the form:

$$\Delta p_t = c + \sum_{i=1}^{k-1} \pi_{1i} \Delta p_{t-i} + \sum_{i=1}^{k-1} \pi_{2i} \Delta m_{t-i} + \sum_{i=0}^{k-1} \pi_{3i} \Delta y_{t-i} + \sum_{i=0}^{k-1} \pi_{4i} \Delta I^{O}_{t-1} + \sum_{i=0}^{k-1} \pi_{5i} \Delta I^{a}_{t-1} + \sum_{i=0}^{k-1} \pi_{6i} \Delta w_{t-i} +$$

$$\sum_{i=0}^{k-1} \pi_{7i} \Delta u_{t-i} + \sum_{i=0}^{k-1} \pi_{8i} \Delta e_{t-i} + \sum_{i=0}^{k-1} \pi_{9i} \Delta p^{*}_{t-1} + \sum_{i=0}^{k-1} \pi_{10i} \Delta I^{*}_{t-1} + \sum_{i=0}^{k-1} \pi_{11i} \Delta sp_{t-1} +$$

$$\alpha_1 * ECMmoney_{t-1} + \alpha 2 * ECMwages_{t-1} + \alpha 3 * ECMexternal_{t-1} + v_t \quad (6)$$

where v_t is a white noise error term and the majority of the remaining variables are defined above. Δsp refers to the change in stock prices. In those cases where money, prices, and wages are I(2), the first differences of these variables (Δm_t, Δp_t and Δw_t) are replaced by their second differences ($\Delta\Delta m_t$, $\Delta\Delta p_t$, and $\Delta\Delta w_t$ respectively).

After estimating the ECM equations for money and prices, we reduce these models to obtain parsimonious representations. In other words, we exclude all insignificant variables and lags. At each stage, we conduct F-tests to compare the previous model with the latest reduced version of the model, in order to verify that the restrictions implied by the reduced model are indeed accepted.[15]

III.4 Testing parameter constancy

We examine the stability of the single equations for money and prices in a number of ways. First, we perform Hansen (1992) tests for individual coefficient, variance, and joint (error variance and coefficients) stability. In general, these tests may have low power because the break-point is unknown.[16] Secondly, we present sequentially estimated one-period ahead and break-point Chow (1960) statistics. Third, to test whether the instability arises explicitly from the crisis period, we report a Chow-type F-test, which we label F-CRISIS. This test compares the equations estimated over the whole sample (i.e., the sample including the crisis and tranquil periods) with the estimates for the period excluding the banking crisis. Finally, we interact the regressors in the price equation with a dummy that equals one during crisis periods (and zero otherwise) and we test whether these interaction terms are significant. The purpose of these regressions is to study whether the relationship between prices and individual monetary indicators is disrupted by crises.

[15] These tests are available upon request.
[16] See Hansen (1992).

III.5 The data

Monthly data on monetary aggregates, financial variables (like exchange rates and interest rates) come from national sources (e.g., central bank bulletins, ministry of finance reports, etc.) and international sources (IMF and OECD databases). Wherever possible, we also control for the role of wages, the unemployment rate, and external factors (like foreign prices and interest rates) in explaining prices. These variables come from the same sources mentioned above. For all countries, we try to cover the period closest to January 1975 - June 1998. A data appendix, at the end of the paper, describes the data used, the corresponding sources, and the relevant sample periods for each country in our study.

IV - Empirical results

IV.1. Unit root tests

Because this study includes a significant number of countries and variables, we do not discuss the unit root test results in detail here. However, Table A.3 in the appendix presents the augmented Dickey-Fuller (ADF) statistics, for each variable, in each country, in the sample. Every ADF statistic is reported for the shortest lag length obtainable without dropping a lagged difference significant at the 5% level.

For all countries, the hypothesis of a unit root cannot be rejected for any of the nominal variables in levels. Interest rates, output, the unemployment rate, and the change in the exchange rate appear to be unequivocally I(1) in most countries. Also, in general, prices, M2, and wages seem to be I(1). However, for Chile, Denmark, Malaysia, and Uruguay there is some evidence that these variables may be I(2). In particular, for these countries, either the Dickey-Fuller tests accept the hypothesis of a unit root at the chosen lag length (or at surrounding lags), or the estimated coefficient on the lag of the variable is close to one for the chosen lag length (or for lags surrounding it).

Given the unit root test results, we conduct the cointegration analysis assuming that all variables (in levels or log levels) are I(1) first. For countries were the evidence is mixed, we also try an I(2) approach. By an I(2) approach, we mean that we transform the supposedly I(2) variables to obtain an I(1) representation before conducting the cointegration analysis (see Johansen 1995). For example, in the cointegration analysis for money, if money and prices are I(2), an I(1) representation implies examining cointegration between m-p and Δp, along with other I(1) variables (typically interest rates). For each country, we report the results from the approach that yields the most sensible results, given economic theory.

IV.2. Cointegration results

As discussed in the previous section, we use Johansen's (1988) procedure to conduct the cointegration analysis for each sector, in each country. We determine the lag length of the system used to perform the cointegration analysis by estimating a regular VAR (starting at 14 lags or 13 lags depending on whether variables are I(1) or I(2)) and sequentially reducing the model until the F-test for the last lag of all remaining variables reject further reduction.[17]

Below, we discuss the cointegration results for all countries, by sector affecting prices. First, we display the results for the monetary sector (section IV.2.a). Secondly, we present the results obtained for the labor sector (section IV.2.b). Finally, we report the results for the external sector (section IV.2.c).

[17] The results from these tests are available upon request.

IV.2.a. Cointegration results for the monetary sector

The cointegration results for money are shown in Table 1. This table indicates the rank of the system chosen, the names given to the cointegrating vectors found, and the coefficients for the cointegrating vectors. We report the lag of the system chosen, the actual trace and maximum eigenvalue statistics, and the corresponding critical values in Table A.4 in the appendix.

For Chile, Denmark, Japan, Malaysia, and Uruguay, we pursue an I(2) approach. In other words, because we found some evidence that money and prices are I(2) in these countries, we transform these variables to obtain an I(1) representation suitable to test for cointegration (see Johansen 1995). Thus, we examine the cointegration between real money (m-p), income (y), inflation (Δp), the own rate of return on money (I^o), and its domestic alternative or outside return (I^a).[18,19]

For all five countries mentioned above, we find at least one cointegrating vector that has a long-run real money demand interpretation. We find that inflation always has a negative impact on real money demand as expected, and income has a unit elasticity. The own rate of return on money (i.e., the average deposit rate) is positive and significant in the equations for Denmark, Japan, and Uruguay. Furthermore, the own and outside rates of return on money have opposite and equal effects for Japan and Denmark.[20,21] For Chile and Malaysia, interest rates do not affect money demand.

[18] Initially, given the unit root results, we assumed all variables to be I(1) and we tested for cointegration between m,p,y, I^o, and I^a. However, for these countries this approach was unsuccessful (the results are available upon request). Also, given that from the unit root tests there was some evidence that prices, money, and wages are I(2), we decided to test for cointegration using an I(2) approach.

[19] The exact definition of the return for money and the outside rate of return for each country is in the data appendix.

[20] Following Juselius (1998), we allow a dummy that captures the period after the withdrawal of capital controls in Denmark to enter the cointegration space. This dummy is significant in the cointegration vector for money demand, indicating that money demand fell following the banning of controls.

[21] For Chile, Colombia, and Uruguay, we do not include the rate of return outside of money from the

Aside from a long-run relationship for real money, for Chile, Denmark, and Malaysia, we also find evidence of the existence of other cointegrating vectors. For Chile, the second vector indicates that income is stationary around a trend, while the third vector suggests that the deposit rate is stationary. For Denmark, the Johansen procedure points to a rank 2 system. The second cointegrating vector for Denmark reflects a positive relationship between inflation, output, and interest rates spreads. For Malaysia, aside from the money vector, we also find that income, the own rate of return on money, and the outside rate are each stationary around a trend.

For Colombia and Kenya, where the Dickey-Fuller tests indicated that prices and money are I(1), we test for cointegration between nominal M2 (m), prices (p), the own rate of return on money (I^o), and its alternative return (I^a). We find that for these countries at least one cointegrating vector can be interpreted as a long-run money demand equation. We can also accept price homogeneity and unit income elasticities for these countries. For Colombia, interest rates do not seem to enter the long-run equation, while in Kenya we find that the outside or alternative rate of return on money has a negative impact on money demand.

For Colombia, we also find a second vector that specifies that the own return on money is trend stationary. For Kenya, we find two extra vectors, aside from the money demand vector. The second vector indicates a relationship between output, the outside interest rate, and a trend. The final vector shows that the spread between the own and outside rates of return on money is stationary around a trend.

Summarizing, the fact that we find evidence of cointegration in the monetary sector of all countries, even though these countries underwent banking crises at some point in the sample, indicates that the long-run stability of money demand is not threatened by these episodes.

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cointegration equations since there was no consistent measure for these countries for the full sample period.

IV.2.b. Cointegration results for the labor/wage sector

Table 2 reports the cointegration results for the labor/wage sector for all countries. In the case of Chile, Denmark, Japan, and Uruguay, given that we found some evidence that prices and wages are I(2), we test for cointegration between real wages (w-p), inflation (Δp), and the unemployment rate (u).

For each of the four countries mentioned above, we find evidence of one cointegrating vector with a long-run real wage interpretation. For Chile, Denmark, and Uruguay, we find that inflation and the unemployment rate negatively affect real wages. In the case of Japan, aside from testing cointegration between w-p, Δp, and u, we also include a dummy for July and June 1997 interacted by a trend. These variables aim to control for bonus payments paid in June during the early part of the sample and later in July of each year. We find one cointegrating vector where real wages are negatively affected by inflation. The unemployment rate does not seem to enter this relation.

For Colombia, we test for cointegration between nominal wages, prices, and the unemployment rate, given that we concluded from the unit root tests that prices and wages in Colombia are I(1). We find that wages are positively affected by prices, but the unemployment rate does not appear to play a significant role.

Finally, we do not report results for Kenya and Malaysia, because high frequency wage data is not available for these countries, for the period under consideration.

IV.2.c. Cointegration results for the external sector

Table 3 presents the cointegration results for the external sector. For Chile, Denmark, Japan, Malaysia, and Uruguay, where we found evidence that prices could be I(2), we use the

Johansen technique to test for cointegration between domestic prices expressed in foreign currency (p-e), foreign prices (p*), inflation (Δp), the domestic interest rate (I), and the foreign interest rate (I*).[22] For Colombia and Kenya, we pursue an I(1) approach instead. Thus, we test for cointegration between domestic prices (p), the dollar exchange rate (e), foreign prices (p*), the domestic interest rate (I), and the foreign interest rate (I*). Foreign prices (p*) refer to U.S. dollar prices in the case of Chile, Colombia, Japan, Kenya, Malaysia, and Uruguay. Also, for these countries, the exchange rate is the domestic currency rate vis-à-vis the dollar and foreign interest rates refer to the return on dollar assets (typically T-bills). For Denmark, foreign prices are German prices, the foreign interest rate is the rate on deutsche mark denominated assets, and the exchange rate is the krone/deutsche mark exchange rate.

For Chile, Denmark, Japan, Malaysia, and Uruguay, where the empirical evidence indicates that prices are I(2), we find at least one cointegrating vector that has a purchasing power parity (PPP) interpretation including a dynamic term, Δp.[23] Furthermore, in the case of Denmark, Japan, and Uruguay, there is evidence of a second vector that can be interpreted as an uncovered interest rate parity (UIP) relationship, given that $\Delta p = \Delta e$.[24]

[22] For Chile, Denmark, Japan, Malaysia, and Uruguay we test for cointegration between p-e, Δp, p*,i, and i*, given that for these countries we found evidence that p is I(2). In general, we find a cointegrating vector between p-e, p* and Δp. This is evidence that p is I(2). Also, this suggests that e or p* are I(2). In general, we do not think p* (German or U.S. prices) is I(2). We tested for cointegration assuming p* to be I(2), but the attempt was mostly unsuccessful. The only other possibility is that e is I(2). The main problem with this interpretation is that the Dickey-Fuller tests do not point to e being I(2). A possible explanation for this seemingly contradictory evidence is that Δe is I(1), but it has a large I(0) component on top of it. Thus, when we look at it as a univariate process all we see is white noise. However, when it comes to system analysis, it could be that p and e have matching I(2) components that cancel out and that may explain why we find cointegration between these variables.

[23] In the case of Chile, we test for cointegration between p-e, e, Δp, and p*. We do not include interest rates, because the money demand cointegration analysis suggested that the Chilean interest rate is stationary.

[24] If p and e are I(2) and p-e is I(1), then Δp and Δe are each I(1), but $\Delta p = \Delta e + I(0)$.

As mentioned above, for Colombia and Kenya, we examine cointegration between p, e, p*, I, and I*, since p and e appear to be I(1) in these countries. For Colombia, we find evidence of three cointegrating vectors. The first vector has a PPP interpretation. The last two vectors indicate that I and I* are stationary. For Kenya, we find two cointegrating vectors. The first vector is a combination of a PPP relationship and the I-I* spread. The second vector indicates that the spread between I and I* is trend stationary.

IV.3. Reduced single equation money demand results:

Is the stability of money demand affected by banking crises?

In this section, we present and discuss the results for the parsimonious, conditional, single-equation model for broad money demand for each country in our sample. The main purpose of this section is to test the constancy of broad money demand. In other words, we want to test whether countries that have experienced banking crises are likely to exhibit non-constant broad money demand functions.

Tables 4 to10 report the estimated coefficients, standard errors, and test statistics for the reduced and final money demand equations for Chile, Colombia, Denmark, Japan, Kenya, Malaysia, and Uruguay, respectively. For all countries with the exception of Japan, we include the change in the exchange rate (Δe) as a regressor in the single equation for money.[25] We introduce this variable to control for the possibility of flight to foreign currency in countries were there are not a lot of competing assets relative to bank deposits, and/ or where the exchange rate has been traditionally pegged to a foreign currency.[26]

[25] With the exception of Denmark, where we use the krone/deutsche mark exchange rate, for all other countries the exchange rate variable refers to the domestic currency rate with respect to the dollar.

[26] We did not include the change in the exchange rate in the cointegration analysis, because we found this variable to be I(0) for all countries according to the Dickey Fuller tests.

For Colombia and Kenya, where money and prices appear to be I(1), inflation is not significant. We find that in all remaining countries, inflation, Δp (or the change in inflation ($\Delta\Delta p$ or $\Delta^2 p$) depending on the country), is significant and has a negative effect on the demand for real money.

With the exception of Japan, changes in income (y) have a positive effect on the demand for money. However, income is significant only in the equations for Chile and Malaysia.

The own rate of return on M2, I^o (typically the average deposit rate), has a positive and significant impact on the demand for broad money in Chile, Kenya, and Uruguay. This variable is positive but insignificant for Colombia and Japan, and negative but insignificant in Denmark, and Malaysia. Changes in the outside or alternative rate of return on money, I^a, have a significant negative impact on money demand in Denmark and Kenya. However, this variable is insignificant in the equations for Japan and Malaysia.

Exchange rate changes are mostly significant and have a negative impact on the demand for broad money in Colombia, Denmark, and Kenya.[27] In the case of Uruguay, the exchange rate has both a positive and negative impact on broad money, depending on the lag length. However, the overall effect is zero. The exchange rate is not significant in Chile and Malaysia. Finally, the error correction terms associated with long-run money demand are significant and negative in the dynamic money demand equations for all countries.

Tables 4 to 10, also present various diagnostic statistics, which show that the final equations obtained are well specified. These diagnostics statistics are tests against various alternative hypotheses: residual autocorrelation (AR), skewness and excess kurtosis (normality), autoregressive conditional heteroskedasticity (ARCH), and heteroscedasticity (hetero). The null

[27] An increase in the exchange rate represents a depreciation.

distribution of these statistics is designated by $X^2(.)$ or F(.,.), and the degrees of freedom are in parentheses.

With the exception of the AR test for Japan, we can accept the null hypotheses for each of these tests, in each of these countries. In other words, all equations for all countries are well specified except for the fact that there is some evidence of residual autocorrelation for Japan.

As mentioned above, parameter constancy is a critical issue we want to analyze concerning the estimated money demand functions. Figures 4 to 10 show innovations, one step residuals, sequentially estimated one-period ahead Chow (1960) and break-point Chow (1960) statistics. In these figures, the sequentially estimated Chow statistics are labeled *1upChows* and *NdnChows*, respectively.[28] Also, Tables 4 to 10 report the Hansen (1992) coefficients, variance, and joint test for parameter constancy. Finally, we test whether the model estimated over the whole sample is equivalent to that estimated over the period excluding the banking crisis. This test statistic is distributed as F(n1,n2), where n1 is the number of observations in the crisis period (i.e., the omitted observations), and n2 is the degrees of freedom of the model estimated over the full sample. If this F-test -labeled F-CRISIS- rejects, then we can infer that the instability in the money demand function arises from the period of the banking crisis, since the only difference between the overall sample and the sample excluding the crisis is the crisis period itself.

According to the recursively estimated Chow tests, Hansen stability tests, and F-CRISIS money demand in Chile, Denmark, Japan, and Malaysia appears to be stable.[29] So, from these

[28] The recursively estimated Chow tests are only useful in those cases when they include the crisis periods. In some countries, however, because our data sample starts well into the crisis, the recursive estimates start after the crisis period or well into it. In these cases, we rely on the F-CRISIS and Hansen tests for stability.

[29] In the case of Chile and Japan, we observe some one-period ahead Chow statistics that reject at 5%, but they are too few to jeopardize the overall stability of the estimated equation.

results, it seems that banking crises in these countries have not threatened the stability of the money demand equations.

The Hansen tests as well as the one-period ahead and break-point Chow tests provide evidence of parameter instability in the estimated money demand equation for Colombia. However, the instability in the equation seems to be coming from the period after the banking crisis. The Colombian banking crisis took place between 1982-87. When we estimate the model through 1989, rather than the overall sample 1981-1998, we find no evidence of instability according to the Hansen, and Chow tests (see figure 5.B.).

The one-period ahead Chow and, in particular, the break-point Chow tests provide some evidence of money demand instability in Kenya. However, the evidence is very marginal at 5% significance. Furthermore, the Hansen stability tests and the F-CRISIS indicate that the equation is stable. So, overall, we believe the results for Kenya accept the hypothesis of money demand stability.

Regarding the stability tests for the Uruguayan money equation, the results are mixed. On the one hand, the Hansen tests accept stability, but the F-CRISIS test rejects. Given that the Hansen tests typically have low power because the break-point is unknown, we are inclined to rely more heavily on the F-CRISIS test results. The one-period ahead Chow and break-point Chow tests are not particularly useful in this case because the recursive estimations conducted to obtain these tests start after the crisis period. However, it is clear from these figures, in particular from the residual bands, that the estimation in the 1980s was less precise and stable than during the 1990s. This suggests that the banking crisis during the period 1981-85 may have affected money demand stability in Uruguay.

To summarize, the results in this section show that with the exception of Uruguay, we find no overwhelming evidence that banking crises jeopardize broad money demand stability. [30] Table 11 presents a summary of the stability test results for the money demand functions in all countries. The evidence presented here, together with the cointegration results for money, indicate that whatever changes may have occurred in the demand for money owing to the banking crises can be explained by the same function used to model money demand at times of tranquility. Thus, we find that banking crises do not systematically threaten the short-run or long-run broad money demand functions.

IV.4. Reduced single equations for prices: Do banking crises cause structural breaks in the relationship between prices and monetary indicators ?

Tables 13 through 19 report the coefficients, standard errors, and test statistics for the parsimonious price single equations estimated over the full sample for each country. By full sample, we refer to the period covering the crisis and the tranquil episodes.[31] We find that lagged changes in broad money (or the second difference depending on the country) have a positive and significant impact on inflation (or its growth rate depending on the country) in Chile, Denmark, Japan, Kenya, and Uruguay. Money is insignificant for Colombia and Malaysia.

For Denmark, Japan, and Uruguay, changes in income are positive and significant in explaining prices. For all other countries, income is insignificant. Changes in the exchange rate (dollar exchange rate with the exception of Denmark) are largely significant and have a positive effect on inflation. Exchange rate changes are not significant for the Colombian and Danish price equations.

[30] In the case of Colombia, we found evidence of instability but it seemed to be arising in the 1990s, many years after the financial crisis in this country.

Foreign price changes (U.S. for all countries except Denmark where we include German prices) are, in general, positive and significant. On the other hand, foreign interest rates are significant only in the cases of Colombia and Uruguay.

Domestic interest rates (typically, the rate of return on money and its outside rate) have a negative significant impact on inflation. This is particularly the case for Chile, Japan, Malaysia, and Uruguay. For Kenya and Denmark, the own rate of return on money has a positive and significant effect.

Wage changes are significant for Colombia and Uruguay at 5% significance and for Denmark and Japan at 10%. In general, increases in wages result in higher inflation. On the other hand, increases in unemployment have a negative impact on inflation, but they are only significant for the case of Chile and Uruguay. Finally, stock prices changes (denoted as sp) have no significant impact on consumer price inflation across country.[32]

The significance of the error correction terms varies largely across countries. The PPP error correction terms are significant in the case of Chile and Denmark, while the error correction term interpretable as a UIP relationship is significant in the price equations for Denmark, Japan, and Uruguay. The money error correction terms affect prices in the equations for Denmark and Japan. Finally, wage cointegrating vectors are significant only for Denmark and Japan.

At the bottom of Tables 13 to 19, we present the diagnostic tests for residual autocorrelation (AR), skewness and excess kurtosis (normality), autoregressive conditional heteroskedasticity (ARCH), and heteroscedasticity (hetero). None of the price equations reject any of these specification tests. Thus, none of the estimated price equations present specification problems.

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[31] For most countries, the full sample covers approximately the period 1975-1998.

[32] Stock prices were only available for Chile, Colombia, and Japan.

We analyze the constancy of the estimated price equations using mostly the same methodology discussed for the money demand equations (see section IV.3). Figures 13 to 19 show innovations, one step residuals, sequentially estimated one-period ahead Chow and break-point Chow statistics. In these figures, the Chow statistics are labeled as *1upChows* and *NdnChows*, respectively. Also, we report the Hansen coefficients, variance, and joint tests for parameter constancy. In the Hansen tests, the break point date is unknown, so a finding of instability cannot be immediately connected to a given period. Therefore, to examine whether the instability is arising directly from the banking crisis period, we conduct a Chow-type F-test (labeled F-CRISIS as before) that compares the estimation of the model for the overall sample, with the results obtained for the sample excluding the crisis period. We summarize the information on these stability tests for the price equations in Table 12.

Both the Hansen tests, and the break point Chow test indicate that the Chilean price equation is stable. Also, F-CRISIS fails to find any evidence that the banking crisis period led to instability in the price equation. We obtain similar results for the Danish and Malaysian price equations.

According to the sequentially estimated one-period ahead and break-point Chow tests, the Colombian price equation appears stable. However, the Hansen tests reject stability. In particular, these statistics point to variance instability. This seemingly contradictory results can be reconciled by the fact that the recursive estimations start well into the sample. In other words, the Chow tests are not very useful in this case, because they practically do not cover the crisis period.[33] The F-CRISIS test rejects the hypothesis that both periods can be explained by the same

[33] The Colombian crisis took place between 1982-88. Recursive estimations for the price equation start around 1987.

equation. This seems to point to the fact that the price equation is particularly unstable during the banking crisis in Colombia.

Regarding the stability of the Japanese price equation, the Hansen tests indicate the presence of instability. However, this applies only to variance instability and the evidence is marginal, since the critical value for the Hansen variance test at 5% significance is roughly 0.5 and the test statistic is 0.52 (Hansen (1992)). Furthermore, the break-point Chow and F-CRISIS tests, indicate parameter constancy over the crisis period.

In the case of Kenya, the Hansen tests for variance stability, the one-period ahead, and the break point Chow tests indicate that the equation is not constant. In particular, we can observe from the recursively estimated Chow tests that the instability seems to occur during the 1990s. Kenya experienced two banking crises one over the period 1985-89 and another over the period 1992-95. The F-test for the 1980s crisis suggests that this period is not different from the overall sample. However, the 1990s crisis does appear to be different than the non-crisis period.

The evidence on stability for the Uruguayan price equation is mixed. The Hansen test accepts stability, but F-CRISIS, rejects. Thus, we are inclined to rely on the F-CRISIS result. The one-period ahead Chow and break-point Chow tests are not useful in this case because the recursive estimations conducted to obtain these tests start after the crisis period. However, we can see from the residual bands that the estimation in the 1980s was less precise and stable than during the 1990s.

The parameter constancy results discussed above focus mostly on the overall stability of the price equations. In order to test whether individual coefficients in the price equation are affected by the banking crises, we include interaction terms of each variable with a dummy that takes a value of one during the crisis periods. These results are reported in tables 20 through 26.

With respect to the interaction terms for money, they are negative in the case of Chile, Colombia, and Japan. This indicates that the coefficient on money is smaller during the banking crises in these countries. However, Japan is the only country where these interaction terms are significant. The interaction terms for money are positive for Denmark, Kenya, Malaysia, and Uruguay, but they are only significant at the 5% level in the case of the latter.

Regarding other indicators such as exchange rates, domestic interest rates, and stock prices, we find only marginal changes in the coefficients for exchange rates during crisis periods for Malaysia. Neither interest rates nor stock prices exhibit a significant increase or decrease in their coefficients during the banking crisis periods. Furthermore, we find that with the exception of Kenya, all interaction terms are jointly insignificant.

To summarize, the results from this section indicate that money, exchange rates, foreign prices, and domestic interest rates are significant in explaining prices in most countries. Stock prices, on the other hand, are not useful indicators of price behavior. In general, the relationship between prices and individual monetary indicators is stable, despite the occurrence of crises. However, in three out of seven countries we find some evidence of variance instability in the price equations.

V - Conclusions

Until very recently, not much attention was devoted to the monetary impact of banking crises. Two exceptions, Garcia-Herrero (1997) and Lindgren et al. (1996), warned about some of the adverse effects of banking crises for the conduct of monetary policy. Using mostly a descriptive approach, the authors argue that banking crises have significant implications for money demand stability, for the effectiveness of instruments, for the relationship between prices and monetary indicators, and for the overall impact of monetary policy. Though both of these studies are very interesting and informative, they arrive at their conclusions without a systematic empirical investigation of the issues they raise.

This study has attempted to fill this void in the literature on the monetary impact of banking crises. Using cointegration analysis and error correction modeling, we examined the claim that banking crises jeopardize money demand stability. Secondly, we used the same empirical methodology to examine the overall stability of the process for inflation, as well as the impact of crises on the coefficients of individual monetary indicators.

Our results suggest that the stability of money demand is not threatened by banking crises. With the exception of Uruguay, we found that money demand functions are stable. Regarding the indicators of price behavior, we found that changes in money, exchange rates, foreign prices, and domestic interest rates seem to be useful in explaining prices. Finally, even though in general we did not find that individual coefficients in the price equations change as a result of banking crises, in three out of the seven countries, we uncovered evidence of variance instability in these equations due to crises.

Given the results in this paper, we can draw two main conclusions that might be helpful for policy-makers facing banking crises. First, policymakers in countries undergoing crises should not be worried about the structural stability of money demand functions. Our results indicate that the behavior of money demand during crises can be modeled by the same function as during periods of tranquility. Second, although individual coefficients in the price equations do not seem to be severely affected by crises, policy-makers should be aware that crises, in some instances, can give rise to variance instability in the price/inflation equations.

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TABLE 1 - Cointegration Results: Money Demand

Country/ Vector Name	*Rank*	*Cointegrating Relations (standard error in parentheses)*
Chile[1]	3	
ChiECMrM2		$(m-p) = -0.0308 {*} \Delta p + y + 0.0035 {*} t$ (0.0028) (0.0005)
ChiECMytrend		$y = 0.0039 {*} t$ (0.0003)
ChiECMIown		I^O
Colombia	2	
ColECMnM2		$m = p + y + 0.0018 {*} t$ (0.0002)
ColECMIown		$I^O = -0.0308 {*} t$ (0.0089)
Denmark[2]	2	
DenECMrM2		$(m-p) = -0.0207 {*} \Delta p + y + 0.064 {*} I^O - 0.064 {*} I^A - 0.19 {*} CapConDum$ (0.0029) (0.007) (0.041)
DenECMinfl		$\Delta p = 0.007 {*} y + 0.002 {*} I^O - 0.0009 {*} I^A - 0.00002 {*} t - 0.003 {*} CapConDum$ *(0.002) (0.0002) (0.0002) (0.0000) (0.0009)*
Japan[3]	1	
JapECMrM2		$(m-p) = -0.0909 {*} \Delta p + y + 0.239 {*} I^O - 0.23 {*} I^A$ (0.0085) (0.049)
Kenya[4]	3	
KenECMnM2		$m = p + y + -0.235 {*} I^A + 0.0174 {*} t$ (0.006) (0.003)
KenECMgdp		$y = 0.065 {*} I^O + 0.0006 {*} t$ (0.005) (0.0005)
KenECMispr		$I^O = I^A - 0.0403 {*} t$ (0.009)
Malaysia[5]	4	
MysECMrM2		$(m-p) = -0.25 {*} \Delta p + y$
MysECMytrend		$y = 0.008 {*} t$ (0.0001)
MysECMIown		$I^O = -0.0368 {*} t$ (0.0085)
MysECMIalt		$I^A = -0.038 {*} t$ (0.0083)
Uruguay[6]	1	
UruECMrM2		$(m-p) = -0.0172 {*} \Delta p + y + 0.018 {*} I^O + 0.0027 {*} t$ (0.0028) (0.003) (0.0006)

This table reports the restricted cointegrating relations found for the monetary sector. Johansen's (1988) methodology was used to determine the number of cointegrating vectors and to test parameter restrictions on these vectors.
Definition of variables: *m* represents the log of M2, *p* is the log of CPI, *y* is the log of a measure of income (usually industrial production), I^o is the own rate of money, I^A is the alternative (outside) rate, and *t* is a time trend.

[1] Dummies for Dec.79, Jun.82, July82, Sept.84 and Oct.84 were included as unrestricted variables in the cointegration. See Table A.5.
[2] The following dummies were included as unrestricted variables: DVAT, DPRSTOP, DCOTAX, D92Q4, D83Q1, D83Q2, Dec.92, Jun.93, Jul.93, Aug.93. See Table A.5.
[3] The following dummies were included as unrestricted variables: May90, Apr.90, Apr.89, and Apr.97. See Table A.5.
[4] The following dummies were included as unrestricted variables: Feb.80, Jul.81, Mar.88, Mar.93. See Table A.5.
[5] The following dummies were included as unrestricted variables: Jan.84, Feb.84, Mar.84. See Table A.5.
[6] The following dummies were included as unrestricted variables: Nov.82, Dec.82, Dec.87, Jan.88, Nov.89, Dec.89, Jan.90, and Dec.92. See Table A.5.

TABLE 2 - Cointegration Results: Wages

Country/ Vector Name	*Rank*	*Cointegrating Relations (standard error in parentheses)*
Chile[7]	1	
ChiECMrwage		(w-p) = -0.0104*Δp – 0.2279*u – 0.0016*t
		(0.0018) (0.0428) (0.0004)
Colombia[8]	1	
ColECMnwage		w = p + 0.0012*t
		(0.0001)
Denmark[9]	1	
DenECMrwage		(w-p) =-0.0424*Δp – 1.26*u + 0.0027*t
		(0.0242) (0.293) (0.001)
Japan[10]	1	
JapECMrwage		(w-p) =-0.0294*Δp + 0.0066*DJuneT – 0.0066*DJulyT + 0.0008*t
		(0.0085) (0.0008) (0.0002)
Uruguay[11]	1	
UruECMrwage		(w-p) = -0.0025*Δp – 0.3483*u
		(0.0006) (0.0486)

This table reports the restricted cointegrating relations found for the labor sector. Johansen's (1988) methodology was used to determine the number of cointegrating vectors and to test parameter restrictions on these vectors. Definition of Variables: *w* is the log of wages, *p* represents the log of CPI, *u* is the log of the unemployment rate, and *t* is a time trend.

[7] The following dummies were included in the cointegration analysis as unrestricted variables: Jun.82, Jul.82, Sep.84, and Oct.84. See Table A.5.
[8] The seasonal dummies included in this cointegration are centered seasonals. In addition, each centered seasonal is interacted with a dummy variable for 1990. See Table A.5.
[9] The following dummies were included as unrestricted variables: DumVAT, DumPRSTOP, and DumCOTAX. See Table A.5.
[10] The following two dummies enter as unrestricted variables: Apr.89 and Apr.97. See Table A.5.
[11] The following dummies were included as unrestricted variables: Nov.82, Dec.82,Dec.87, Jan.88, Nov.89, Dec.89, Jan.90, and Dec.92. See Table A.5.

TABLE 3 - Cointegration Results: External Sector

Country/ Vector Name	*Rank*	*Cointegrating Relations (standard error in parentheses)*
Chile[12]	1	
ChiECMrPPP		$(p\text{-}e) = -0.0506^{*}\Delta p + p^{*}$ (0.0083)
Colombia	3	
ColECMnPPP		$p = e + p^{*}$
ColECMIdom		I
ColECMIfor		I^{*}
Denmark[13]	2	
DenECMrPPP		$(p\text{-}e) = -0.0097^{*}\Delta p + p^{*}$ (0.0022)
DenECMuip		$I = I^{*} + \Delta p - 0.015^{*}t$ (0.006)
Japan[14]	2	
JapECMrPPP		$(p\text{-}e) = -0.1644^{*}\Delta p + p^{*} + 0.0046^{*}t$ (0.0178) (0.0005)
JapECMuip		$I = I^{*} + \Delta p + 0.0237^{*}t$ (0.005)
Kenya	2	
KenECMnPPP		$p = e + p^{*} + 4.016^{*}I - 4.016^{*}I^{*} - 0.337^{*}t$ (0.013) (0.062)
KenECMidiff		$I = 1.05^{*}I^{*} + 0.084^{*}t$ (0.016)
Malaysia[15]	1	
MysECMrPPP		$(p\text{-}e) = 0.2696^{*}\Delta p + p^{*}$ (0.0529)
Uruguay	2	
UruECMrPPP		$(p\text{-}e) = 0.0074^{*}\Delta p + p^{*} + 0.0058^{*}t$ (0.0026) (3.1293)
UruECMuip		$I = \Delta p + I^{*} - 0.0487^{*}t$ (0.0181)

This table reports the restricted cointegrating relations found for the external sector. Johansen's (1988) methodology was used to determine the number of cointegrating vectors and to test parameter restrictions on these vectors. Definition of Variables: p represents the log of CPI, e is the log of the exchange rate (usually expressed as units of national currency per US$), I is the domestic interest rate, I^* represents the foreign interest rate, p^* represents the log of the foreign price level (CPI), and t is a time trend.

[12] The following dummies were included in the cointegration analysis as unrestricted variables: Jun.82, Jul.82, Sep.84, and Oct.84. See Table A.5.

[13] A dummy for capital controls (dumcapcon) was allowed to enter as a restricted variable in the cointegration space. The following dummies were included unrestricted: DVAT, DPRSTOP, DCOTAX, D924, 83Q1, 83Q2, Dec.92, Jun.93, Jul.93, and Aug.93. See Table A.5.

[14] The following two dummies were included as unrestricted variables: Apr.89 and Apr.97. See Table A.5.

[15] The following dummies were included as unrestricted variables: Jan.84, Feb.84, Mar.84. See Table A.5.

TABLE 4 - CHILE: Single Equation for Money (Modeling $\Delta(m-p)$)*

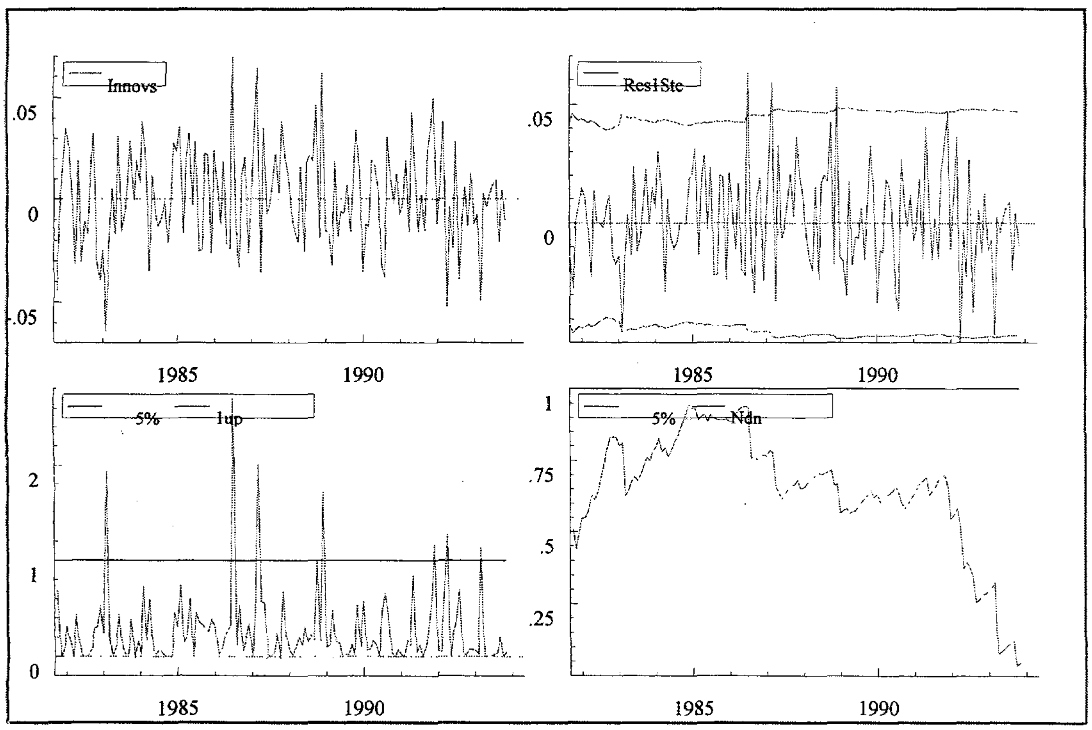
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	-0.069	0.103	-0.676	0.12
$\Delta(m-p)_{t-1}$	-0.130	0.069	-1.897	0.41
$\Delta^2 p_t$	-1.002	0.244	-4.103	0.08
Δy_t	0.085	0.041	2.089	0.04
ΔI_t^O	0.001	0.000	3.687	0.11
Δe_t	0.031	0.098	0.319	0.05
$chiECMrM2_{t-1}$	-0.050	0.009	-5.789	0.13
$chiECMytrend_{t-1}$	0.085	0.024	3.593	0.12
$chiECMIown_{t-1}$	0.007	0.000	3.697	0.15

Sample: 1978:10-1993:11
$R^2 = 0.593958$ F(24,157) = 9.5691 [0.0000] σ=0.0231

AR 1- 7 F(7,150) = 0.36271 [0.9226]
ARCH 7 F(7,143) = 0.3335 [0.9376]
Normality $Chi^2(2)$ = 1.0704 [0.5855]
HETERO F(32,124) = 0.57818 [0.9629]

Hansen Instability Test Results: **Variance:** 0.163305 **Joint (variance & coefficients):** 3.99966
F-CRISIS (80, 77) = 1.3427 [0.0975]

FIGURE 4 - CHILE: Recursive estimation for money demand



*For a list of and explanation for the dummies used in estimation, see Table A.5.

TABLE 5 - COLOMBIA: Single Equation for Money (Modeling Δm)*

Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.334	0.070	4.743	0.16
Δm_{t-1}	0.139	0.071	1.952	0.70*
Δp_{t-6}	-0.274	0.152	-1.806	0.09
Δy_t	0.032	0.023	1.356	0.35
ΔI^{o}_{t-10}	0.001	0.001	1.366	0.26
Δe_{t-3}	0.121	0.065	1.868	0.54*
Δe_{t-4}	-0.184	0.066	-2.765	0.54*
Δe_{t-12}	-0.136	0.066	-2.066	0.25
$colECMnM2_{t-1}$	-0.043	0.011	-3.891	0.17
$colECMIown_{t-1}$	-0.000	0.000	-0.529	0.15

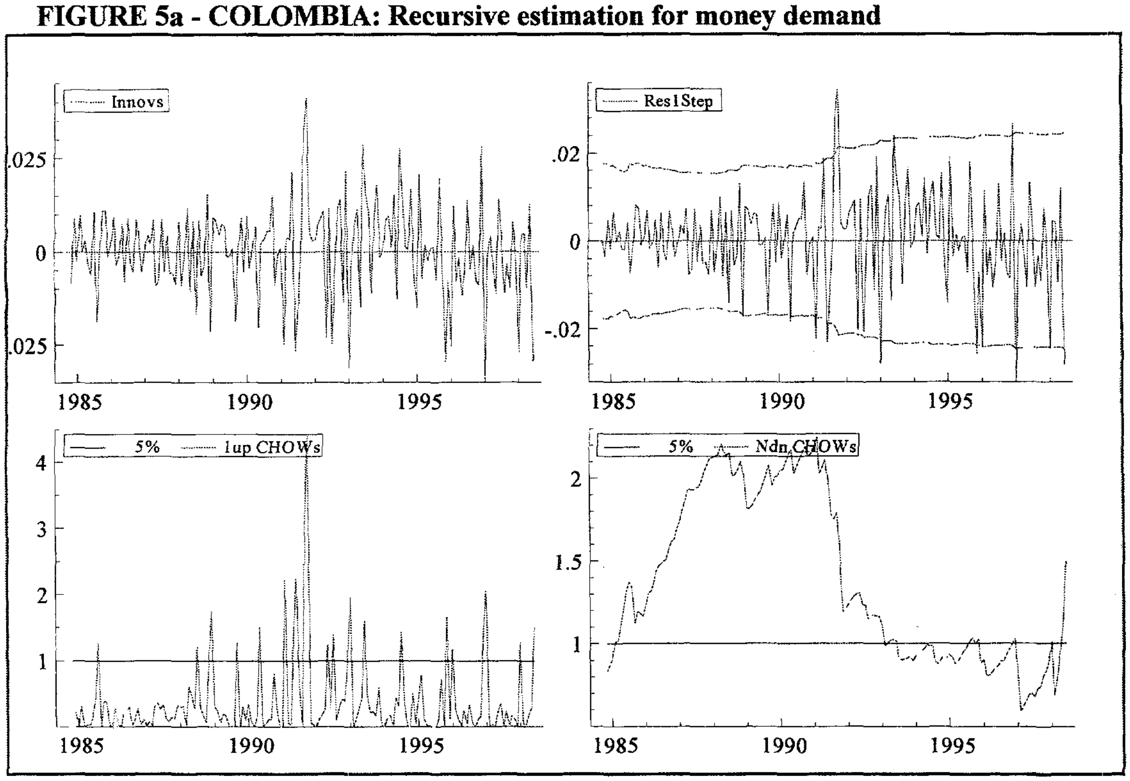
Sample: 1982:3-1998:6
$R^2 = 0.584623$ $F(20,175) = 12.315$ [0.0000] $\sigma=0.01223$

AR 1- 7 F(7,168) = 0.98872 [0.4412]
ARCH 7 F(7,161) = 0.88705 [0.5182]
Normality $Chi^2(2)$ = 5.9558 [0.0509]
HETERO F(29,145) = 1.4148 [0.0948]

Hansen Instability Test Results: Variance: 0.713604* **Joint (variance & coefficients):** 4.75832

F-CRISIS (70,105) = 0.57249 [0.9933]

FIGURE 5a - COLOMBIA: Recursive estimation for money demand



*For a list of and explanation for the dummies used in the estimation, see Table A.5.
* Denotes significance at 5%.

COLOMBIA: Single Equation for Money (Modeling Δm), continued

For Sub-sample: 1982 (3) to 1989 (12)

Hansen Instability Test Results: Variance: 0.0860424 **Joint (variance & coefficients):** 4.29042

FIGURE 5b – COLOMBIA: Recursive estimation for money demand

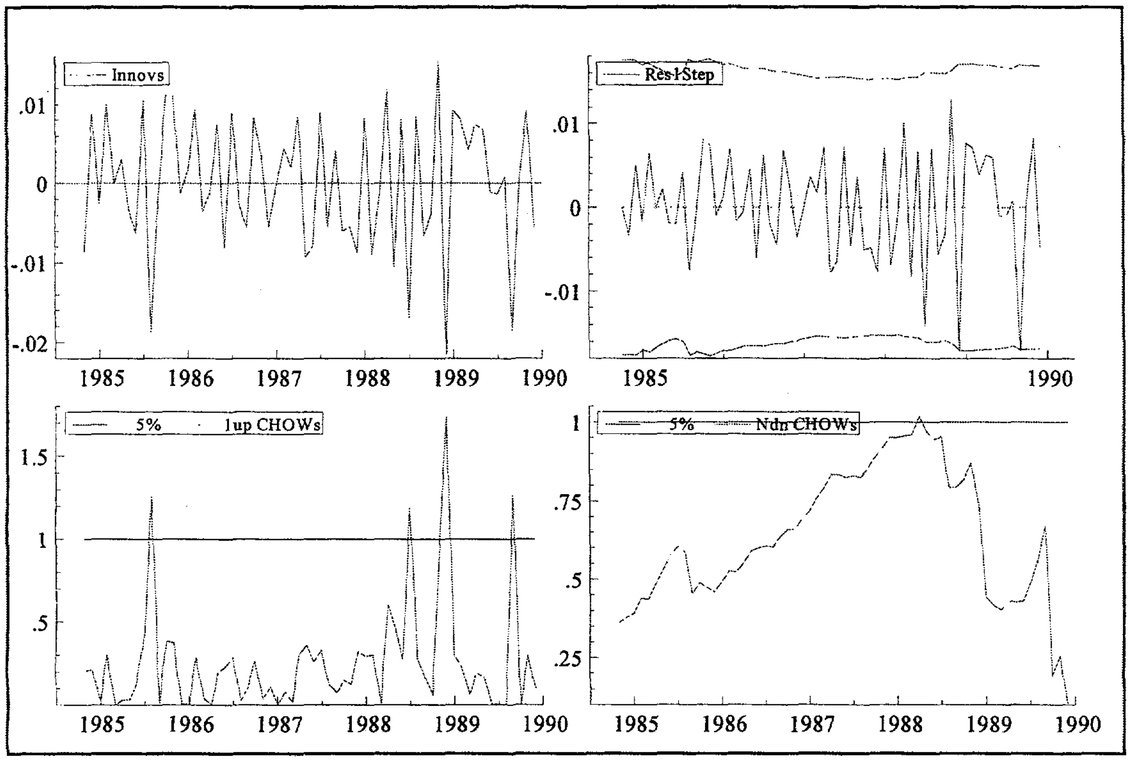


TABLE 6 - DENMARK: Single Equation for Money (Modeling $\Delta(m-p)$)*

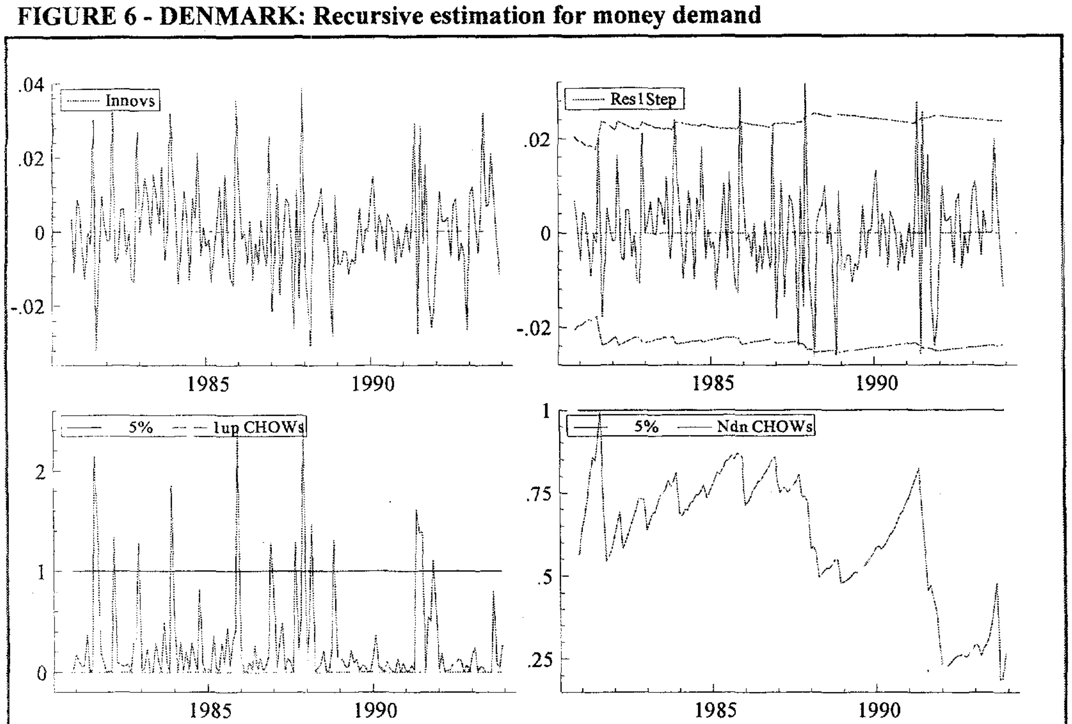
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.561	0.181	3.107	0.06
$\Delta(m-p)_{t-1}$	-0.410	0.062	-6.611	0.07
$\Delta(m-p)_{t-3}$	0.178	0.056	3.193	0.11
$\Delta(m-p)_{t-6}$	0.385	0.062	6.228	0.21
$\Delta(m-p)_{t-7}$	0.199	0.065	3.053	0.04
$\Delta^2 p_t$	-0.685	0.198	-3.456	0.1
$\Delta^2 p_{t-5}$	-0.288	0.160	-1.809	0.24
Δy_{t-1}	0.024	0.030	0.809	0.43
ΔI_t^O	-0.004	0.003	-1.262	0.06
ΔI_t^A	-0.005	0.002	-2.984	0.11
Δe_t	-0.301	0.133	-2.262	0.05
$denECMrM2_{t-1}$	-0.029	0.010	-2.842	0.06
$denECMinfl_{t-1}$	-0.002	0.006	-0.345	0.06

Sample: 1977:3-1993:12
$R^2 = 0.886042$ $F(33,168) = 39.583$ [0.0000] $\sigma=0.0116$

AR 1- 7 F(7,161) = 1.4047 [0.2068]
ARCH 7 F(7,154) = 1.383 [0.2162]
Normality $Chi^2(2)$ = 3.5022 [0.1736]
HETERO F(46,121) = 0.70941 [0.9070]

Hansen Instability Test Results: Variance: 0.101549 **Joint (variance & coefficients):** 4.23773
F-CRISIS (68,100) = 1.1544 [0.2544]

FIGURE 6 - DENMARK: Recursive estimation for money demand



* For a list of and explanation for the dummies used in the estimation, see Table A.5.

TABLE 7 - JAPAN: Single Equation for Money (Modeling $\Delta(m-p)$)*

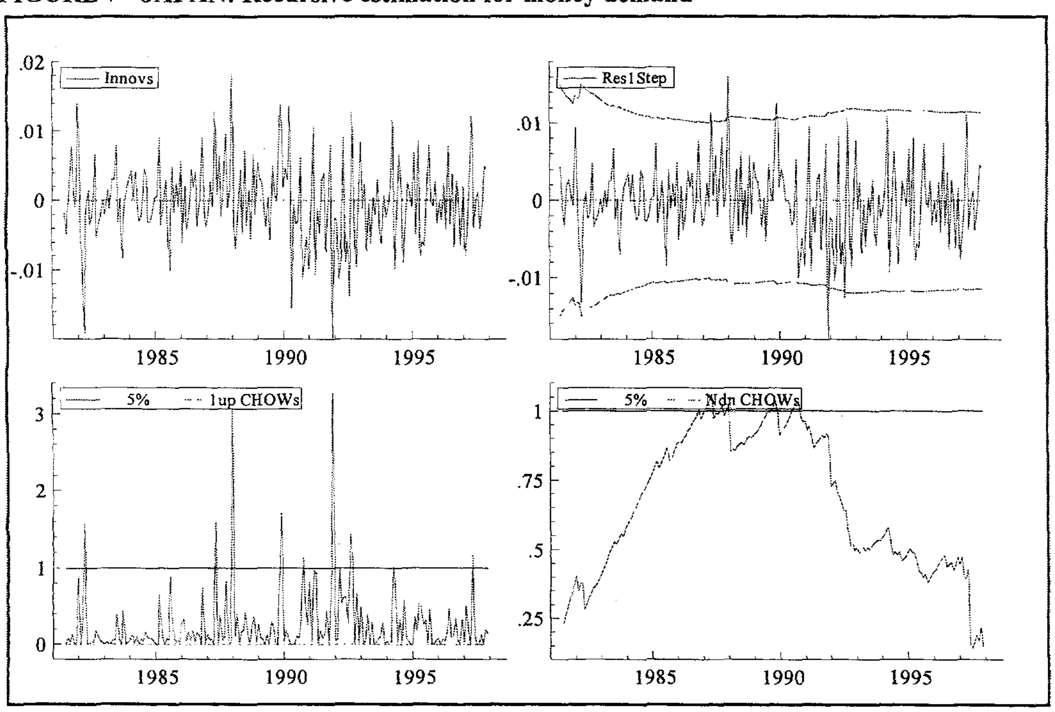
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.047	0.006	7.808	0.18
$\Delta(m-p)_{t-1}$	-0.251	0.058	-4.320	0.35
$\Delta(m-p)_{t-3}$	0.116	0.049	2.395	0.1
$\Delta(m-p)_{t-5}$	0.209	0.049	4.273	0.04
$\Delta(m-p)_{t-6}$	0.185	0.051	3.635	0.09
$\Delta(m-p)_{t-9}$	0.197	0.050	3.965	0.06
$\Delta(m-p)_{t-10}$	-0.119	0.051	-2.317	0.17
$\Delta^2 p_t$	-0.895	0.108	-8.254	0.23
$\Delta^2 p_{t-12}$	-0.190	0.075	-2.520	0.05
Δy_t	-0.079	0.026	-3.013	0.36
ΔI_t^A	-0.000	0.002	-0.130	0.23
ΔI_t^O	0.002	0.002	1.004	0.4
japECMrm2$_{t-1}$	-0.012	0.002	-7.595	0.15

Sample: 1978:4-1997:12
$R^2 = 0.681371$ F(27,209) = 16.553 [0.0000] σ=0.0056

AR 1- 7 F(7,202) = 3.4515 [0.0016] **
ARCH 7 F(7,195) = 0.47052 [0.8551]
Normality Chi^2(2) = 1.3498 [0.5092]
HETERO F(39,169) = 1.4382 [0.0608]

Hansen Instability Test Results: **Variance:** 0.188812 **Joint (variance & coefficients):** 3.49508
F-CRISIS (93,116) = 1.334 [0.0704]

FIGURE 7 - JAPAN: Recursive estimation for money demand



* For a list of and explanation for the dummies used in estimation, see Table A.5.
** Denotes significance at 1%.

TABLE 8 - KENYA: Single Equation for Money (Modeling Δm)*

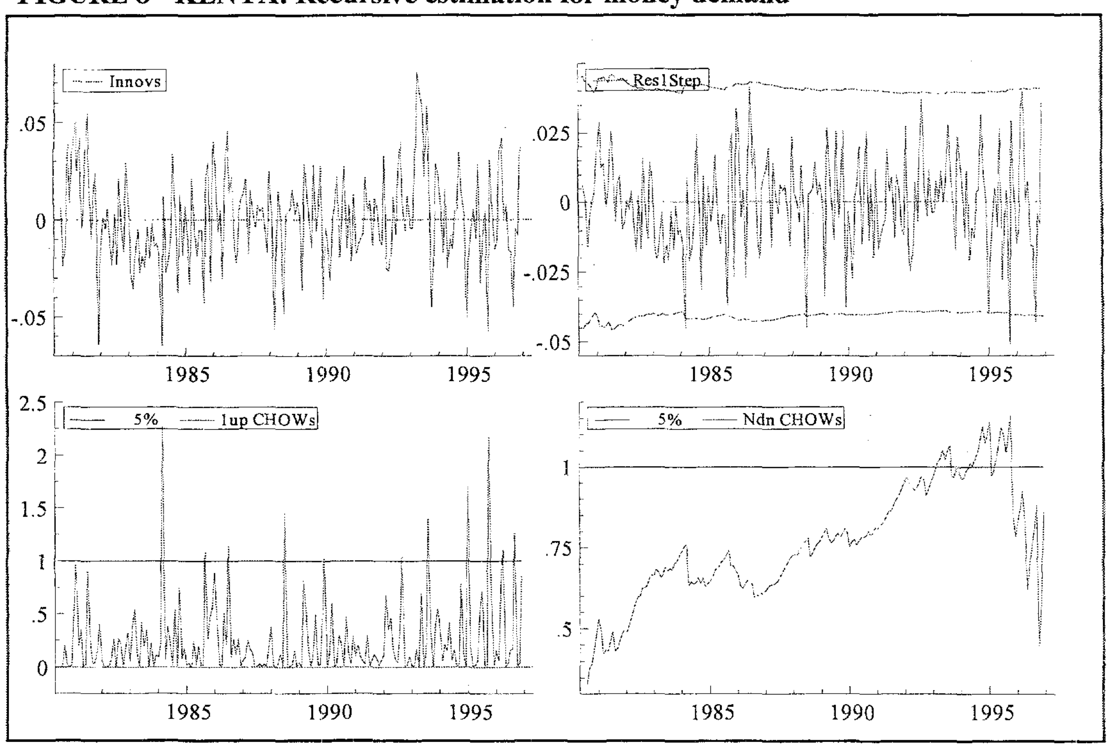
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	4.498	0.978	4.597	0.12
Δm_{t-1}	-0.168	0.058	-2.922	0.2
Δm_{t-3}	0.231	0.056	4.162	0.16
Δp_t	0.129	0.098	1.325	0.1
Δy_t	-1.522	0.870	-1.750	0.07
ΔI_t^A	-0.002	0.001	-3.813	0.1
ΔI_{t-2}^A	-0.002	0.001	-2.435	0.02
ΔI_{t-2}^O	0.010	0.002	4.762	0.11
Δe_{t-2}	-0.139	0.056	-2.495	0.05
Δe_{t-3}	-0.148	0.055	-2.663	0.39
$KenECMnM2_{t-1}$	-0.065	0.014	-4.616	0.08
$KenECMgdp_{t-1}$	-0.191	0.041	-4.580	0.12
$KenECMispr_{t-1}$	-0.016	0.003	-4.639	0.03

Sample: 1977:2-1996:12
$R^2 = 0.473089$ F(30,208) = 6.2251 [0.0000] σ=0.0201

AR 1- 7 F(7,201) = 1.2203 [0.2930]
ARCH 7 F(7,194) = 1.3342 [0.2360]
Normality $Chi^2(2)$ = 0.33438 [0.8460]
HETERO F(42,165) = 0.69782 [0.9141]

Hansen Instability Tests Results: **Variance:** 0.095519 **Joint (variance & coefficients)**: 3.70518
F-CRISIS (58,106) = 1.0628 [0.3873]

FIGURE 8 - KENYA: Recursive estimation for money demand



* For a list of and explanation for the dummies used in estimation, see Table A.5.

TABLE 9 - MALAYSIA: Single Equation for Money (Modeling $\Delta(m-p)$)*

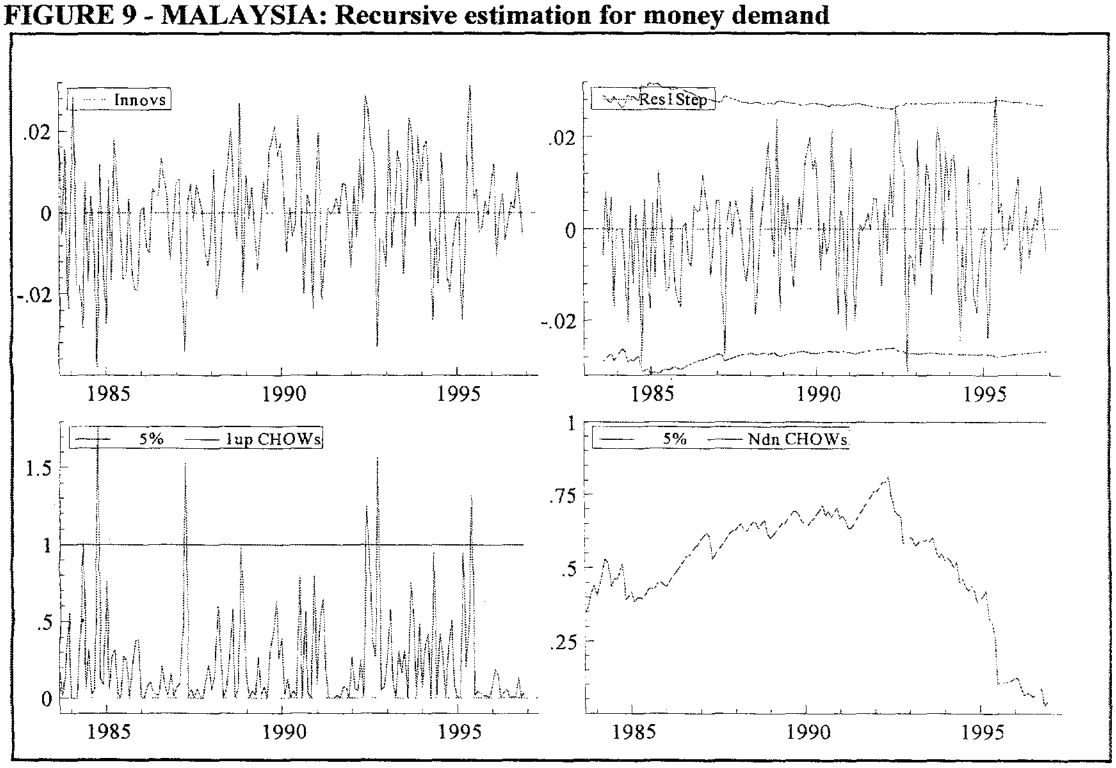
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	-0.088	0.073	-1.205	0.09
$\Delta(m-p)_{t-1}$	-0.206	0.075	-2.763	0.34
$\Delta^2 p_t$	-0.788	0.302	-2.614	0.14
$\Delta^2 p_{t-12}$	-0.478	0.203	-2.350	0.09
Δy_t	0.053	0.022	2.397	0.13
ΔI_t^O	-0.001	0.004	-0.165	0.1
ΔI_t^A	-0.004	0.003	-1.278	0.14
Δe_t	-0.034	0.093	-0.369	0.07
$MysECMrM2_{t-1}$	-0.003	0.001	-3.001	0.09
$MysECMytrend_{t-1}$	0.039	0.021	1.832	0.09
$MysECMIalt_{t-1}$	-0.002	0.003	-0.766	0.11
$MysECMIown_{t-1}$	0.004	0.003	1.406	0.11

Sample: 1980:8-1996:12
$R^2 = 0.447342$ $F(25,171) = 5.5365$ [0.0000] $\sigma=0.0132$

AR 1- 7 F(7,164) = 0.21144 [0.9825]
ARCH 7 F(7,157) = 1.881 [0.0760]
Normality $Chi^2(2)$ = 1.1753 [0.5556]
HETERO F(36,134) = 0.96657 [0.5303]

Hansen Instability Test Results: Variance: 0.221976 **Joint (variance and coefficients):** 4.65502
F-CRISIS(48,123) = 0.66033 [0.9483]

FIGURE 9 - MALAYSIA: Recursive estimation for money demand



* For a list of and explanation for the dummies used in estimation, see Table A.5.

TABLE 10 - URUGUAY: Single Equation for Money (Modeling $\Delta(m-p)$)*

Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.529	0.067	7.846	0.27
$\Delta(m-p)_{t-2}$	0.132	0.037	3.578	0.07
$\Delta(m-p)_{t-6}$	0.109	0.036	3.022	0.2
$\Delta(m-p)_{t-12}$	0.133	0.041	3.205	0.2
$\Delta^2 p_t$	-0.875	0.094	-9.313	0.07
$\Delta^2 p_{t-5}$	-0.187	0.068	-2.742	0.08
$\Delta^2 p_{t-8}$	-0.169	0.077	-2.191	0.02
$\Delta^2 p_{t-9}$	-0.238	0.084	-2.831	0.1
$\Delta^2 p_{t-10}$	-0.472	0.094	-4.998	0.04
$\Delta^2 p_{t-11}$	-0.351	0.092	-3.830	0.12
$\Delta^2 p_{t-12}$	-0.158	0.068	-2.322	0.07
Δy_t	0.066	0.042	1.565	0.28
ΔI^O_{t-7}	0.001	0.000	2.189	0.1
Δe_t	0.483	0.065	7.424	0.4
Δe_{t-1}	-0.382	0.032	-11.960	0.23
Δe_{t-2}	0.084	0.024	3.471	0.69*
Δe_{t-4}	-0.071	0.020	-3.493	0.12
Δe_{t-8}	-0.060	0.022	-2.777	0.19
$UruECMrM2_{t-1}$	-0.040	0.006	-7.064	0.27

Sample: 1982:9-1997:12

$R^2 = 0.897336$ F(37,146) = 34.49 [0.0000] σ=0.0147

AR 1- 7 F(7,139) = 1.2385 [0.2858]
ARCH 7 F(7,132) = 1.4988 [0.1730]
Normality $Chi^2(2)$ = 1.7613 [0.4145]
Xi^2 F(55, 90) = 1.2694 [0.1562]

Hansen Instability test results: Variance: 0.226654 **Joint (variance & coefficients):** 4.96548

F-CRISIS (38,108) = 2.2689 [0.0005] **

* For a list of and explanation for the dummies used in estimation, see Table A.5.
** Denotes significance at 1%.

URUGUAY: Single Equation for Money (Modeling $\Delta(m-p)$), continued

FIGURE 10 - URUGUAY: Recursive estimation for money demand

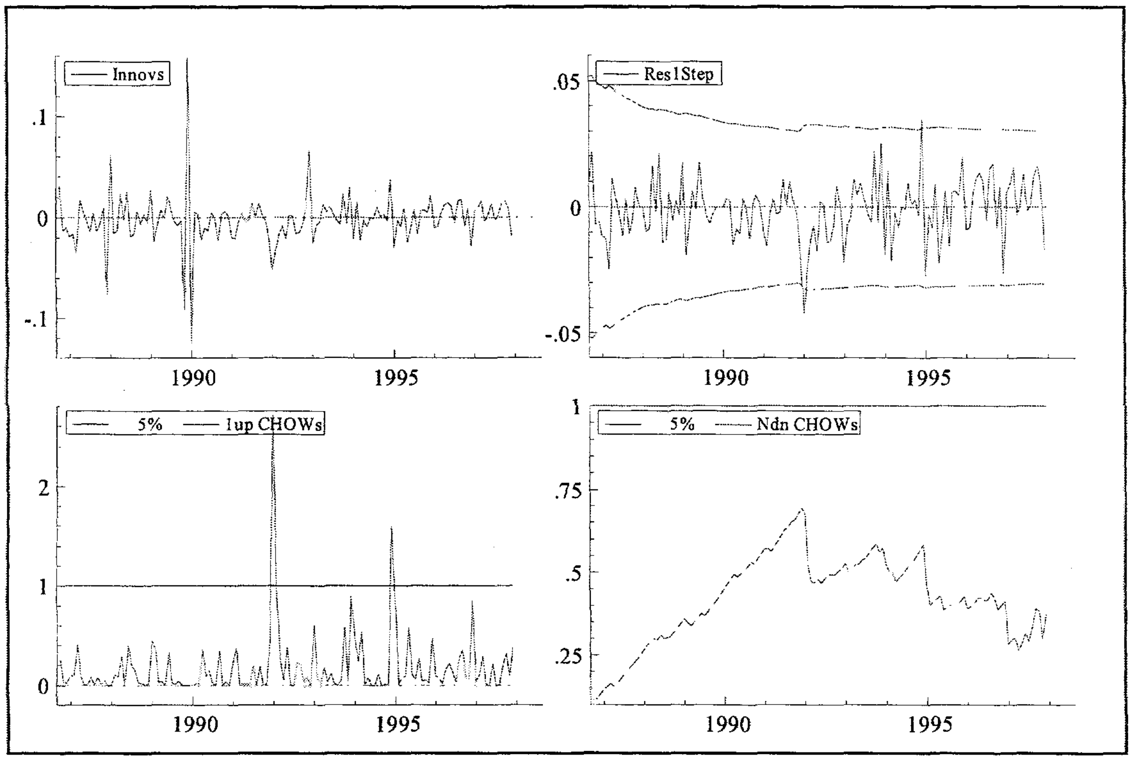


Table 11: Summary Table for Money Demand Stability Tests

Country	Recursive Least Squares Chow Tests	Hansen Test		F-Crisis	
		Variance	Joint	Statistic	p-value
Chile	stable[a]	0.163	3.999	1.343	[0.098]
Colombia					
Entire Sample	unstable	0.714*	4.758	0.572	[0.993]
1982:3-1989:12	stable[b]	0.086	4.29		
Denmark	stable	0.102	4.238	1.154	[0.254]
Japan	stable	0.189	3.495	1.334	[0.070]
Kenya	stable	0.096	3.705	1.063	[0.387]
Malaysia	stable	0.222	4.655	0.66	[0.948]
Uruguay	stable[a]	0.227	4.965	2.269	[0.001]**

[a] The recursive estimation does not include the crisis period.
[b] The overall instability in the sample comes from the period after the crisis.
*,** Denotes significance at 5% and 1%, respectively.

Table 12: Summary Table for Price Equation Stability Tests

Country	Recursive Least Squares Chow Tests	Hansen Test		F-Crisis	
		Variance	Joint	Statistic	p-value
Chile	Stable	0.298	5.674	0.963	[0.565]
Colombia	Stable[a]	1.035*	6.754	2.545	[0.000]**
Denmark	Stable	0.259	4.813	0.754	[0.888]
Japan	Stable	0.523*	7.961	0.855	[0.779]
Kenya					
Entire Sample	Unstable	0.491*	4.327	1.439	[0.037]*
1980s				0.748	[0.884]
1990s				2.163	[0.001]**
Malaysia	Stable	0.355	5.315	0.736	[0.886]
Uruguay	Stable[a]	0.21	5.568	2.142	[0.001]**

[a] The recursive estimation does not include the crisis period.
*, ** Denotes significance at 5% and 1%, respectively.

TABLE 13 - CHILE: Single Equation for Prices (Modeling $\Delta^2 p$)*

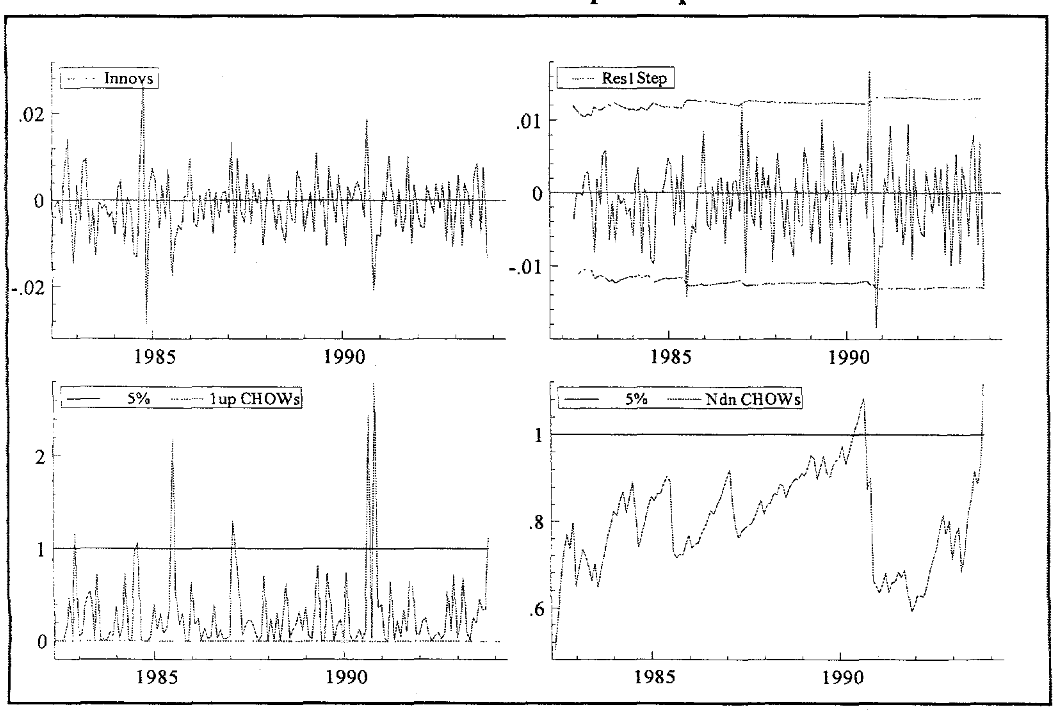
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	-0.077	0.072	-1.076	0.23
$\Delta^2 p_{t-2}$	-0.175	0.058	-2.996	0.03
$\Delta^2 m_{t-2}$	0.027	0.013	2.124	0.36
Δy_t	-0.016	0.012	-1.331	0.1
ΔI^O_{t-5}	-0.000	0.000	-2.438	0.1
ΔI^O_{t-6}	-0.000	0.000	-2.346	0.09
Δe_t	0.085	0.028	3.044	0.17
Δp_t^*	0.799	0.247	3.238	0.11
$\Delta^2 w_t$	-0.020	0.014	-1.427	0.05
Δu_t	-0.019	0.008	-2.383	0.06
Δsp_t	0.004	0.008	0.559	0.16
$ChiECMrM2_{t-1}$	-0.000	0.005	-0.068	0.27
$ChiECMytrend_{t-1}$	0.004	0.010	0.374	0.23
$ChiECMIown_{t-1}$	0.000	0.000	1.978	0.25
$ChiECMrPPP_{t-1}$	-0.009	0.003	-2.724	0.15
$ChiECMrwage_{t-1}$	0.005	0.010	0.471	0.31

Sample: 1978:3-1993:11
$R^2 = 0.724088$ $F(32,149) = 12.22$ [0.0000]

AR 1- 7 F(7,142) = 1.9657 [0.0638]
ARCH 7 F(7,135) = 0.72714 [0.6492]
Normality $Chi^2(2)$ = 2.4586 [0.2925]
HETERO F(47,101) = 0.63269 [0.9591]

Hansen Instability Tests: Variance: 0.297906 **Joint (variance & coefficients):** 5.67416
F-CRISIS (77, 72) = 0.96332 [0.5648]

FIGURE 13 - CHILE: Recursive estimation for price equation



* For a list of and explanation for the dummies used in estimation, see Table A.5.

TABLE 14 - COLOMBIA: Single Equation for Prices (Modeling Δp)*

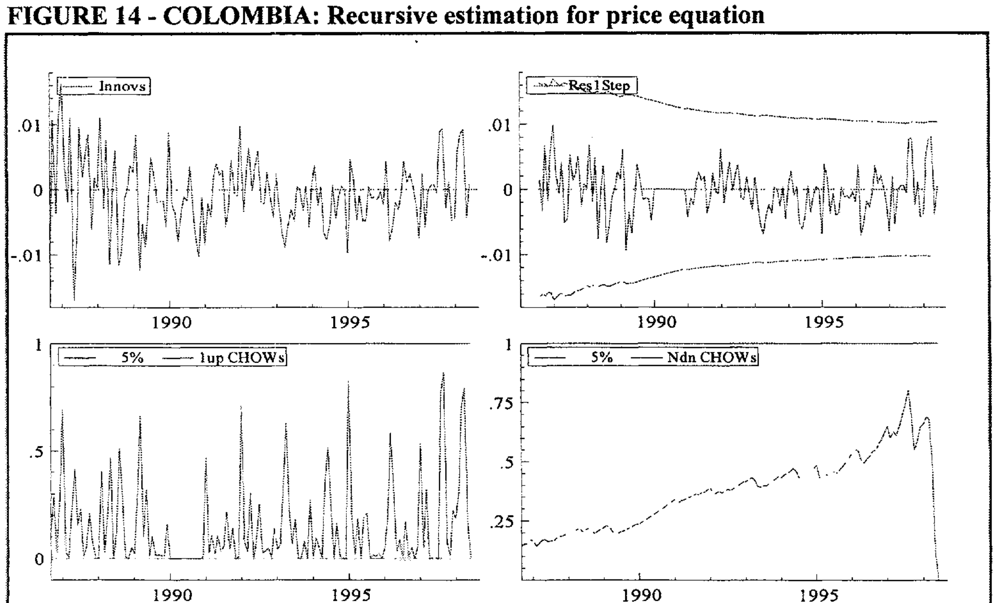
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	-0.017	0.072	-0.234	0.04
Δp_{t-1}	0.405	0.068	5.920	0.05
Δp_{t-11}	0.213	0.074	2.864	0.05
Δp_{t-12}	-0.263	0.074	-3.556	0.06
Δm_{t-1}	0.006	0.034	0.164	0.18
Δy_t	-0.000	0.011	-0.004	0.17
ΔI_t^o	0.000	0.000	1.398	0.27
ΔI_t^*	-0.003	0.001	-2.811	0.03
ΔI_{t-7}^*	-0.003	0.001	-2.706	0.22
Δp_{t-2}^*	0.389	0.247	1.572	0.12
Δp_{t-3}^*	0.743	0.295	2.514	0.09
Δp_{t-4}^*	-0.404	0.257	-1.569	0.07
Δe_t	0.003	0.028	0.122	0.03
Δw_t	0.089	0.042	2.144	0.22
Δu_t	-0.000	0.010	-0.032	0.06
Δsp_t	0.007	0.006	1.215	0.25
$ColECMnwage_{t-1}$	0.034	0.020	1.737	0.04
$ColECMnM2_{t-1}$	-0.002	0.009	-0.216	0.04
$ColECMIown_{t-1}$	0.000	0.000	1.102	0.04
$ColECMnPPP_{t-1}$	-0.006	0.003	-1.797	0.04
$ColECMIfor_{t-1}$	-0.000	0.000	-0.685	0.04

Sample: 1982:3-1998:6
$R^2 = 0.762338$
$F(42,153) = 11.685$ [0.0000]

AR 1- 7 F(7,146) = 1.8252 [0.0866]
ARCH 7 F(7,139) = 1.7248 [0.1079]
Normality $Chi^2(2)$ = 4.6588 [0.0974]
HETERO F(63, 89) = 1.3777 [0.0816]

Hansen Instability Test Results: Variance: 1.0347** **Joint (variance & coefficients)**: 6.754
F-CRISIS (70, 83) = 2.5448 [0.0000] **

FIGURE 14 - COLOMBIA: Recursive estimation for price equation



* For a list of and explanation for the dummies used in estimation, see Table A.5. ** Denotes significance at 1%.

TABLE 15 - DENMARK: Single Equation for Prices (Modeling $\Delta^2 p$) ♣

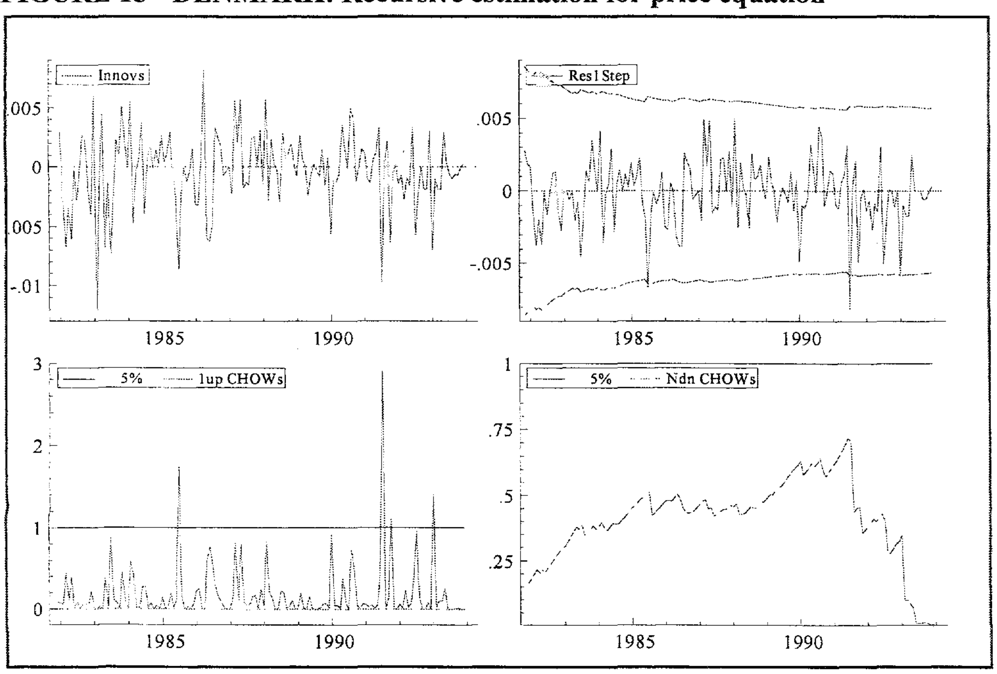
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.091	0.049	1.844	0.05
$\Delta^2 p_{t-1}$	0.208	0.065	3.215	0.26
$\Delta^2 m_{t-12}$	0.024	0.009	2.720	0.55*
Δy_{t-5}	0.014	0.007	1.949	0.19
ΔI^O_{t-1}	0.003	0.001	3.678	0.4
ΔI^A_t	-0.000	0.001	-0.524	0.14
Δe_t	0.008	0.035	0.218	0.1
Δp^*_t	0.330	0.088	3.738	0.26
ΔI^*_t	0.002	0.001	1.596	0.08
Δu_{t-5}	0.023	0.006	3.742	0.05
Δu_{t-6}	0.022	0.006	3.468	0.38
Δu_{t-12}	0.025	0.006	3.889	0.09
$\Delta^2 w_t$	0.035	0.020	1.718	0.07
$denECMrM2_{t-1}$	-0.007	0.003	-2.505	0.05
$denECMinfl_{t-1}$	-0.004	0.002	-2.408	0.06
$denECMrwage_{t-1}$	-0.005	0.001	-3.187	0.05
$denECMrPPP_{t-1}$	-0.025	0.008	-3.258	0.04
$denECMuip_{t-1}$	0.000	0.000	2.998	0.06

Sample: 1977:3-1993:12
$R^2 = 0.852827$
$F(45,156) = 20.088$ [0.0000]

AR 1- 7 F(7,149) = 0.94918 [0.4707]
ARCH 7 F(7,142) = 1.3522 [0.2303]
Normality $Chi^2(2)$ = 5.3779 [0.0680]
HETERO F(63, 92) = 1.0987 [0.3368]

Hansen Instability Test Results: Variance: 0.258881 **Joint (variance & coefficients)**: 4.81306
F-CRISIS(68, 88) = 0.75377 [0.8878]

FIGURE 15 - DENMARK: Recursive estimation for price equation



♣ For a list of and explanation for the dummies used in estimation, see Table A.5. * Denotes significance at 5%.

TABLE 16 - JAPAN: Single Equation for Prices (Modeling $\Delta^2 p$)

Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.005	0.010	0.459	0.22
$\Delta^2 p_{t-10}$	-0.083	0.048	-1.730	0.38
$\Delta^2 p_{t-11}$	-0.140	0.048	-2.897	0.39
$\Delta^2 m_{t-1}$	0.036	0.016	2.223	0.39
Δy_t	0.032	0.013	2.463	0.04
ΔI^A_{t-6}	0.002	0.001	2.919	0.06
ΔI^O_{t-2}	-0.001	0.001	-1.917	0.07
ΔI^O_{t-11}	-0.001	0.001	-2.345	0.19
ΔI^b_{t-1}	-0.001	0.001	-1.843	0.13
ΔI^b_{t-5}	-0.001	0.001	-2.187	0.13
Δe_{t-2}	0.018	0.007	2.558	0.25
Δe_{t-5}	0.013	0.007	1.769	0.19
Δe_{t-7}	0.015	0.007	2.005	0.44
Δp^*_{t-2}	0.493	0.099	4.976	0.14
Δp^*_{t-6}	-0.228	0.091	-2.500	0.05
Δp^*_{t-9}	0.296	0.086	3.437	0.07
ΔI^*_t	-0.000	0.001	-0.238	0.06
$\Delta^2 w_t$	0.008	0.005	1.621	0.22
Δu_t	-0.002	0.006	-0.322	0.36
Δsp_t	-0.001	0.005	-0.134	0.06
$japECMrm2_{t-1}$	-0.005	0.001	-3.587	0.22
$japECMrPPP_{t-1}$	-0.001	0.001	-1.684	0.26
$japECMuip_{t-1}$	0.000	0.000	3.106	0.08
$japECMrwage_{t-1}$	0.004	0.002	2.070	0.07

Sample: 1978:4-1997:12
$R^2 = 0.860978$
$F(40,196) = 30.346$ [0.0000]

AR 1- 7 F(7,189) = 1.5956 [0.1389]
ARCH 7 F(7,182) = 0.36205 [0.9232]
Normality $Chi^2(2)$ = 1.1212 [0.5709]
HETERO F(65,130) = 0.71114 [0.9365]

Hansen Instability Test Results: **Variance:** 0.523257* **Joint (variance & coefficients)**: 7.96058
F-CRISIS (93,103) = 0.85501 [0.7786]

FIGURE 16 - JAPAN: Recursive estimation for price equation

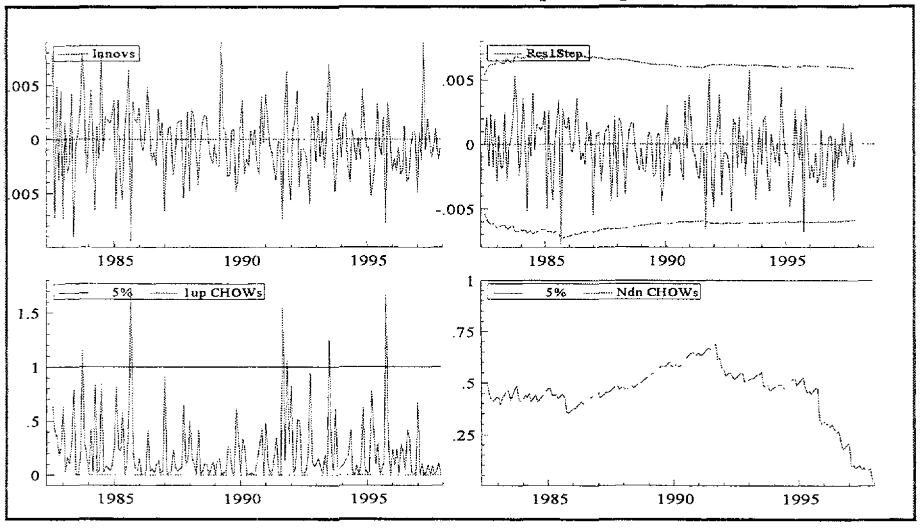


TABLE 17 - KENYA: Single Equation for Prices (Modeling Δp)*

Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	-0.982	0.477	-2.058	0.06
Δp_{t-3}	0.093	0.040	2.342	0.01
Δp_{t-4}	-0.107	0.038	-2.823	0.19
Δp_{t-8}	0.091	0.045	2.005	0.04
Δm_{t-3}	0.046	0.022	2.054	0.04
Δm_{t-4}	0.070	0.022	3.161	0.19
Δy_t	-0.034	0.391	-0.086	0.15
ΔI^{A}_{t-4}	0.001	0.000	2.108	0.02
ΔI^{A}_{t-5}	0.001	0.000	4.367	0.15
ΔI^{O}_{t-1}	0.002	0.001	2.350	0.02
ΔI^{O}_{t-2}	-0.003	0.001	-3.753	0.08
$\Delta I^{)}_{t-6}$	0.004	0.001	5.010	0.04
ΔI^{*}_{t}	0.001	0.001	1.265	0.07
Δe_t	0.047	0.019	2.411	0.01
Δp^{*}_{t-2}	0.656	0.234	2.807	0.06
$kenECMnM2_{t-1}$	0.009	0.007	1.441	0.08
$kenECMgdp_{t-1}$	0.040	0.020	2.017	0.06
$kenECMispr_{t-1}$	0.003	0.002	2.119	0.09
$kenECMnPPP_{t-1}$	-0.004	0.003	-1.603	0.02
$kenECMidiff_{t-1}$	-0.016	0.010	-1.568	0.03

Sample: 1977:2-1997:12

$R^2 = 0.833408$	AR 1- 7 F(7,188)	=	0.37837 [0.9142]
F(43,195) = 22.687 [0.0000]	ARCH 7 F(7,181)	=	0.82656 [0.5664]
	Normality $Chi^2(2)$	=	4.7828 [0.0915]
	HETERO F(62,132)	=	1.211 [0.1807]

Hansen Instability Test Results: **Variance:** 0.491027* **Joint (variance & coefficients)**: 4.32741

F-CRISIS-80s(58, 96) = 0.74783 [0.8841]

F-CRISIS-90s(41, 96) = 2.1629 [0.0011] **

FIGURE 17 - KENYA: Recursive estimation for price equation

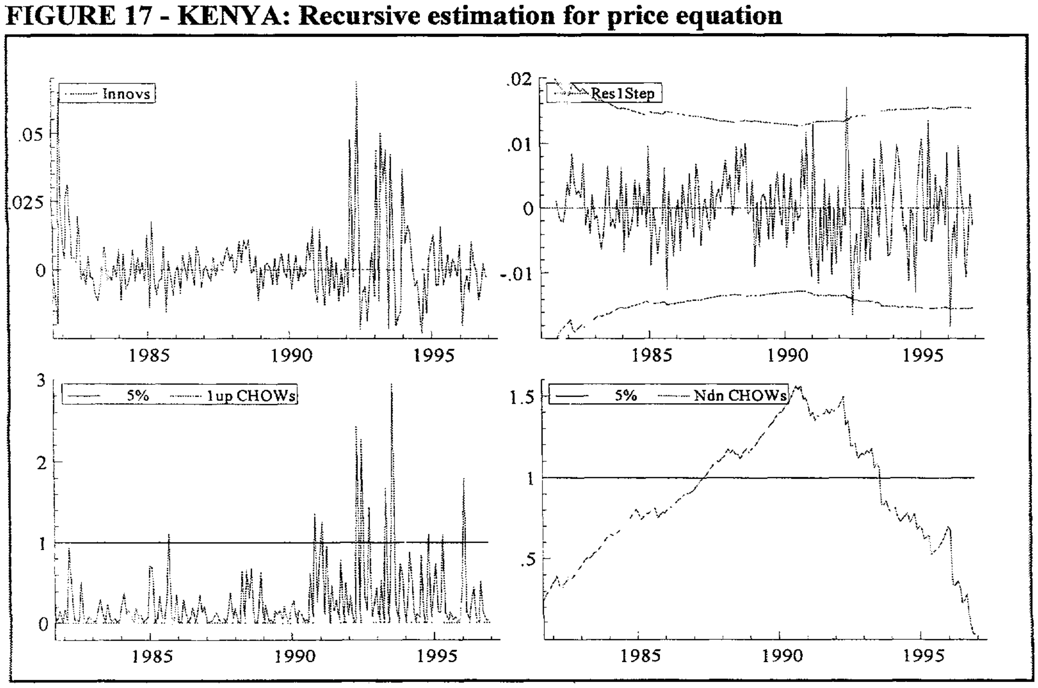


TABLE 18 - MALAYSIA: Single Equation for Prices (Modeling $\Delta^2 p$)*

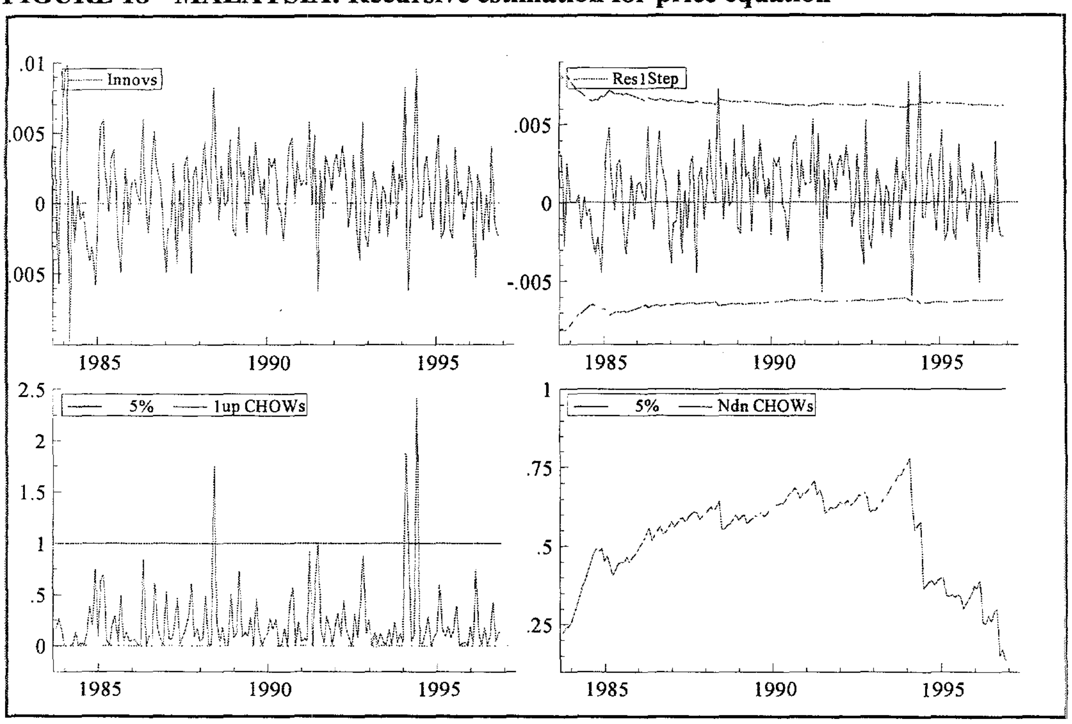
Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.009	0.027	0.337	0.27
$\Delta^2 p_{t-1}$	-0.164	0.063	-2.596	0.04
$\Delta^2 m_{t-1}$	0.008	0.011	0.762	0.45
Δy_t	-0.007	0.005	-1.378	0.04
ΔI_t^O	0.000	0.001	0.256	0.07
ΔI_{t-2}^A	-0.001	0.001	-2.679	0.06
Δe_t	0.050	0.022	2.283	0.21
Δe_{t-3}	-0.058	0.021	-2.841	0.3
Δe_{t-5}	0.065	0.020	3.302	0.31
Δp^*_{t-1}	0.399	0.108	3.704	0.16
$MysECMrM2_{t-1}$	-0.002	0.001	-1.213	0.23
$MysECMytrend_{t-1}$	0.004	0.005	0.832	0.27
$MysECMIalt_{t-1}$	0.000	0.001	0.250	0.3
$MysECMIown_{t-1}$	-0.000	0.001	-0.004	0.31
$MysECMrPPP_{t-1}$	0.001	0.001	0.559	0.09

Sample:1980:8-1996:12
$R^2 = 0.703996$ $F(26,170) = 15.551$ [0.0000]

AR 1- 7 F(7,163 = 0.80692 [0.5827]
ARCH 7 F(7,156) = 1.0472 [0.4006]
Normality $Chi^2(2)$ = 4.9951 [0.0823]
HETERO F(40,129) = 1.4135 [0.0761]

Hansen Instability Test Results: Variance: 0.354895 **Joint (variance & coefficients):** 5.31541
F-CRISIS (48,122) = 0.7358 [0.8858]

FIGURE 18 - MALAYSIA: Recursive estimation for price equation



* For a list of and explanation for the dummies used in estimation, see Table A.5

TABLE 19 - URUGUAY: Single Equation for Prices (Modeling $\Delta^2 p$) *

Variable	*Coefficient*	*Std. Error*	*t-value*	*Hansen Instability*
Constant	0.019	0.104	0.188	0.17
$\Delta^2 p_{t-1}$	-0.306	0.123	-2.491	0.16
$\Delta^2 p_{t-2}$	-0.385	0.098	-3.920	0.05
$\Delta^2 p_{t-3}$	-0.214	0.087	-2.473	0.04
$\Delta^2 p_{t-4}$	-0.190	0.069	-2.760	0.32
$\Delta^2 p_{t-5}$	-0.238	0.050	-4.733	0.03
$\Delta^2 p_{t-7}$	-0.168	0.039	-4.301	0.18
$\Delta^2 m_{t-5}$	0.093	0.022	4.175	0.12
$\Delta^2 m_{t-6}$	0.090	0.028	3.264	0.19
$\Delta^2 m_{t-7}$	0.105	0.028	3.691	0.09
$\Delta^2 m_{t-8}$	0.080	0.025	3.185	0.07
$\Delta^2 m_{t-9}$	0.050	0.020	2.446	0.07
Δy_{t-4}	0.039	0.017	2.365	0.69*
ΔI^O_t	0.001	0.000	2.877	0.05
ΔI^O_{t-3}	-0.001	0.000	-3.516	0.03
ΔI^O_{t-8}	-0.001	0.000	-2.880	0.13
Δu_{t-1}	-0.051	0.012	-4.158	0.1
Δu_{t-2}	0.053	0.013	4.125	0.1
Δu_{t-3}	-0.066	0.015	-4.430	0.08
Δu_{t-6}	-0.039	0.014	-2.775	0.15
Δu_{t-7}	0.031	0.012	2.568	0.09
$\Delta^2 w_t$	0.151	0.022	6.965	0.23
$\Delta^2 w_{t-1}$	0.110	0.020	5.578	0.56*
Δe_t	-0.107	0.048	-2.240	0.04
Δe_{t-1}	0.118	0.018	6.663	0.04
Δp^*_t	1.053	0.409	2.575	0.11
ΔI^*_{t-1}	0.008	0.002	3.726	0.1
ΔI^*_{t-9}	0.005	0.002	2.557	0.2
$uruECMrPPP_{t-1}$	-0.003	0.004	-0.774	0.1
$uruECMuip_{t-1}$	0.000	0.000	3.332	0.12
$uruECMrM2_{t-1}$	0.001	0.008	0.105	0.17
$uruECMrwage_{t-1}$	0.026	0.017	1.476	0.17

Sample: 1982:9-1997:12
$R^2 = 0.875851$ F(39,144) = 26.049 [0.0000]

AR 1- 7 F(7,137) = 0.95472 [0.4670]
ARCH 7 F(7,130) = 0.75209 [0.6284]
Normality $Chi^2(2)$ = 0.24055 [0.8867]
HETERO F(70, 73) = 1.1522 [0.2748]

Hansen Instability Test Results: **Variance:** 0.210029 **Joint (variance & coefficients):** 5.56761
F-CRISIS (38,106) = 2.1422 [0.0012] **

* For a list of and explanation for the dummies used in estimation, see Table A.5.
*,** Denotes significance at 5% and 1%, respectively.

URUGUAY: Single Equation for Price (Modeling $\Delta^2 p$), continued

FIGURE 19 - URUGUAY: Recursive estimation for price equation

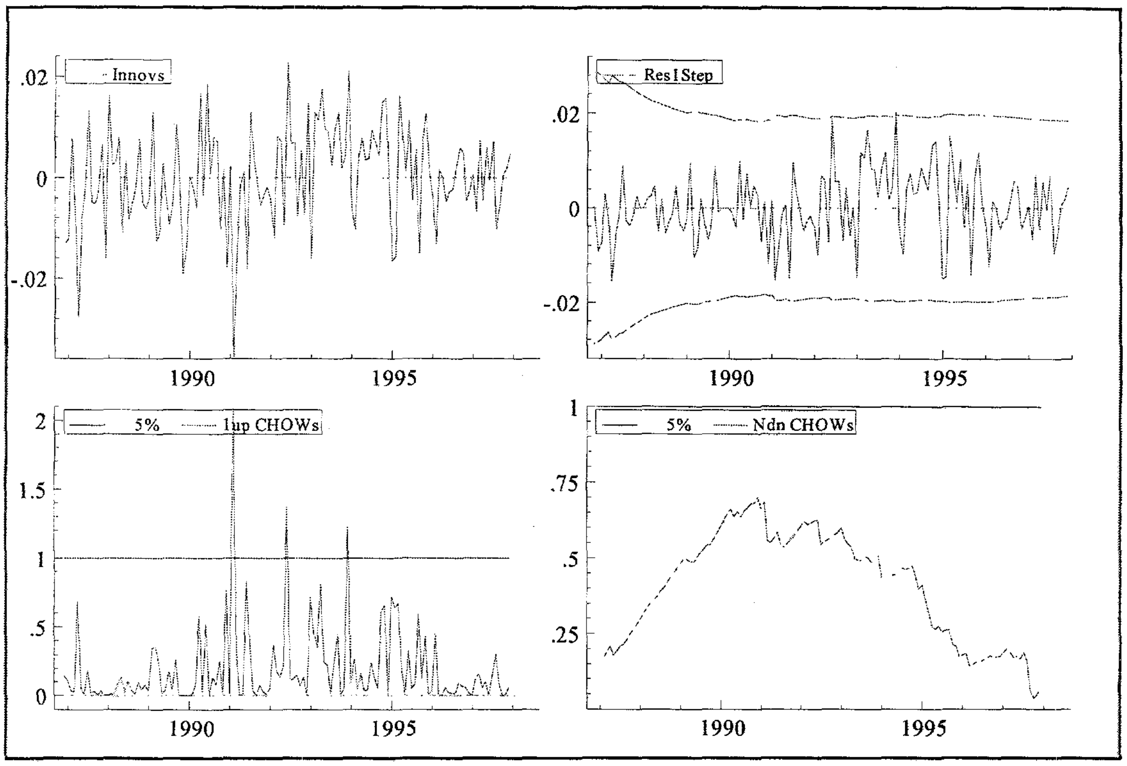


TABLE 20 – CHILE: Price equation with crisis interactions†

Variable	*Coefficient*	*Std.Error*	*Interacted Variable*	*Coefficient*	*Std.Error*
Constant	-0.123	0.099			
$\Delta^2 p_{t-2}$	-0.105	0.095	$\Delta^2 p_{t-2}$ *crisis dummy	-0.062	0.111
$\Delta^2 m_{t-2}$	0.036 *	0.017	$\Delta^2 m_{t-2}$ *crisis dummy	-0.017	0.025
Δy_t	-0.011	0.014	Δy_t *crisis dummy	-0.016	0.013
ΔI^O_{t-5}	-0.0001	0.0001	ΔI^O_{t-5} *crisis dummy	-0.0001	0.0001
ΔI^O_{t-6}	-0.0002 *	0.0001	ΔI^O_{t-6} *crisis dummy	0.0001	0.0001
Δe_t	0.09	0.057	Δe_t *crisis dummy	-0.026	0.068
Δp^*_t	0.978 **	0.316	Δp^*_t *crisis dummy	-0.167	0.413
$\Delta^2 w_t$	-0.032	0.018	$\Delta^2 w_t$ *crisis dummy	0.033	0.032
Δu_t	-0.019	0.012	Δu_t *crisis dummy	0.002	0.015
Δsp_t	-0.002	0.011	Δsp_t *crisis dummy	0.009	0.017
chiECMrM2$_{t-1}$	0.001	0.008	ChiECMrM2$_{t-1}$*crisis dummy	0.004	0.007
chiECMytrend$_{t-1}$	0.015	0.014	ChiECMytrend$_{t-1}$*crisis dummy	-0.016	0.009
chiECMIown$_{t-1}$	0.00002	0.0001	ChiECMIown$_{t-1}$*crisis dummy	0.0001	0.0001
chiECMrPPP$_{t-1}$	-0.009 *	0.004	ChiECMrPPP$_{t-1}$*crisis dummy	-0.005	0.003
chiECMrwage$_{t-1}$	-0.007	0.014	ChiECMrwage$_{t-1}$*crisis dummy	0.019	0.02

†Crisis dummy equals one for the period 1981(1) – 1987(12) and it is zero otherwise.

TABLE 21 – COLOMBIA: Price equation with crisis interactions†

Variable	*Coefficient*	*Std.Error*	*Interacted Variable*	*Coefficient*	*Std.Error*
Constant	-0.303*	0.119			
Δp_{t-1}	0.388**	0.099	Δp_{t-1} *crisis dummy	-0.023	0.121
Δp_{t-11}	0.143	0.109	Δp_{t-11} *crisis dummy	0.092	0.119
Δp_{t-12}	-0.258*	0.11	Δp_{t-12} *crisis dummy	-0.029	0.118
Δm_{t-1}	0.004	0.039	Δm_{t-1} *crisis dummy	-0.116	0.088
Δy_t	-0.013	0.013	Δy_t *crisis dummy	-0.004	0.017
ΔI^O_t	0.001	0.0004	ΔI^O_t *crisis dummy	-0.001	0.001
ΔI^*_t	-0.002	0.003	ΔI^*_t *crisis dummy	-0.000	0.003
ΔI^*_{t-7}	-0.003	0.002	ΔI^*_{t-7} *crisis dummy	-0.0004	0.002
Δp^*_{t-2}	-0.304	0.383	Δp^*_{t-2} *crisis dummy	0.967	0.519
Δp^*_{t-3}	0.588	0.399	Δp^*_{t-3} *crisis dummy	0.138	0.571
Δp^*_{t-4}	-0.341	0.37	Δp^*_{t-4} *crisis dummy	0.107	0.483
Δe_t	0.036	0.031	Δe_t *crisis dummy	-0.043	0.119
Δw_t	0.117 *	0.049	Δw_t *crisis dummy	-0.081	0.111
Δu_t	-0.009	0.012	Δu_t *crisis dummy	0.031	0.022
Δsp_t	0.013	0.007	Δsp_t *crisis dummy	-0.013	0.019
ColECMnwage$_{t-1}$	0.042	0.03	ColECMnwage$_{t-1}$ *crisis dummy	-0.005	-0.095
ColECMnM2$_{t-1}$	0.026 *	0.013	ColECMnM2$_{t-1}$*crisis dummy	0.006	0.010
ColECMIown$_{t-1}$	0.0001	0.001	ColECMIown$_{t-1}$*crisis dummy	0.001	0.001
ColECMnPPP$_{t-1}$	-0.025 **	0.009	ColECMnPPP$_{t-1}$*crisis dummy	0.010	0.011
ColECMIfor$_{t-1}$	-0.000	0.001	ColECMIfor$_{t-1}$*crisis dummy	0.001	0.001

†Crisis dummy equals one for the period 1982(1) – 1987(12) and it is zero otherwise.

* Denotes significance at the 5% level.** Denotes significance at the 1% level.

TABLE 22 – DENMARK: Price equation with crisis interactions†

Variable	*Coefficient*	*Std.Error*	*Interacted Variable*	*Coefficient*	*Std.Error*
Constant	0.108	0.056			
$\Delta^2 p_{t-1}$	0.233**	0.073	$\Delta^2 p_{t-1}$*crisis dummy	-0.003	0.132
$\Delta^2 m_{t-12}$	0.006	0.011	$\Delta^2 m_{t-12}$*crisis dummy	0.019	0.011
Δy_{t-5}	0.011	0.009	Δy_{t-5}*crisis dummy	0.015	0.019
ΔI^O_{t-1}	0.003 **	0.001	ΔI^O_{t-1}*crisis dummy	-0.001	0.002
ΔI^A_t	-0.001	0.001	ΔI^A_t*crisis dummy	0.001	0.002
Δe_t	0.014	0.039	Δe_t*crisis dummy	0.033	0.124
Δp^*_t	0.345 **	0.11	Δp^*_t*crisis dummy	0.060	0.173
ΔI^*_t	0.002 *	0.001	ΔI^*_t*crisis dummy	-0.004	0.002
Δu_{t-5}	0.02 **	0.007	Δu_{t-5}*crisis dummy	-0.0002	0.009
Δu_{t-6}	0.022 **	0.007	Δu_{t-6}*crisis dummy	-0.008	0.009
Δu_{t-12}	0.027 **	0.007	Δu_{t-12}*crisis dummy	-0.006	0.010
$\Delta^2 w_t$	0.048 *	0.022	$\Delta^2 w_t$*crisis dummy	0.004	0.022
DenECMrM2$_{t-1}$	-0.009 **	0.003	denECMrM2$_{t-1}$*crisis dummy	0.003	0.002
DenECMinfl$_{t-1}$	-0.005 *	0.002	denECMinfl$_{t-1}$*crisis dummy	-0.005	0.009
DenECMrwage$_{t-1}$	-0.003	0.002	denECMrwage$_{t-1}$*crisis dummy	0.001	0.005
DenECMrPPP$_{t-1}$	-0.041 **	0.011	denECMrPPP$_{t-1}$*crisis dummy	0.042	0.031
DenECMuip$_{t-1}$	0.0002 *	0.0001	denECMuip$_{t-1}$*crisis dummy	0.001	0.0005

†Crisis dummy equals one for the period 1987(1) – 1992(12) and it is zero otherwise.

TABLE 23 – JAPAN: Price equation with crisis interactions†

Variable	*Coefficient*	*Std.Error*	*Interacted Variable*	*Coefficient*	*Std.Error*
Constant	-0.005	0.012			
$\Delta^2 p_{t-10}$	-0.100 *	0.051	$\Delta^2 p_{t-10}$*crisis dummy	0.265 **	0.089
$\Delta^2 p_{t-11}$	-0.171 **	0.052	$\Delta^2 p_{t-11}$*crisis dummy	0.261 **	0.091
$\Delta^2 m_{t-1}$	0.079 **	0.024	$\Delta^2 m_{t-1}$*crisis dummy	-0.089 **	0.033
Δy_t	0.018	0.019	Δy_t*crisis dummy	0.013	0.026
ΔI^A_{t-6}	0.002 *	0.001	ΔI^A_{t-6}*crisis dummy	0.001	0.002
ΔI^O_{t-2}	-0.001 *	0.001	ΔI^O_{t-2}*crisis dummy	-0.003	0.002
ΔI^O_{t-11}	-0.001 *	0.001	ΔI^O_{t-11}*crisis dummy	-0.0001	0.002
ΔI^b_{t-1}	-0.002 *	0.001	ΔI^b_{t-1}*crisis dummy	0.002	0.001
ΔI^b_{t-5}	-0.002 **	0.001	ΔI^b_{t-5}*crisis dummy	0.002	0.001
Δe_{t-2}	0.024 **	0.009	Δe_{t-2}*crisis dummy	-0.019	0.016
Δe_{t-5}	0.022 *	0.009	Δe_{t-5}*crisis dummy	-0.019	0.015
Δe_{t-7}	0.016	0.009	Δe_{t-7}*crisis dummy	-0.009	0.015
Δp^*_{t-2}	0.516**	0.109	Δp^*_{t-2}*crisis dummy	-0.071	0.223
Δp^*_{t-6}	-0.279 *	0.107	Δp^*_{t-6}*crisis dummy	0.174	0.219
Δp^*_{t-9}	0.305 **	0.094	Δp^*_{t-9}*crisis dummy	-0.122	0.211
ΔI^*_t	-0.0001	0.001	ΔI^*_t*crisis dummy	0.001	0.002
$\Delta^2 w_t$	0.008	0.005	$\Delta^2 w_t$*crisis dummy	0.0002	0.001
Δu_t	-0.001	0.007	Δu_t*crisis dummy	-0.011	0.012
Δsp_t	-0.011	0.009	Δsp_t*crisis dummy	0.011	0.011
JapECMrm2$_{t-1}$	-0.003	0.002	japECMrm2$_{t-1}$*crisis dummy	0.001	0.002
JapECMrPPP$_{t-1}$	-0.002 *	0.001	japECMrPPP$_{t-1}$*crisis dummy	0.001	0.001
JapECMuip$_{t-1}$	0.001 **	0.0002	japECMuip$_{t-1}$*crisis dummy	0.0001	0.0004
JapECMrwage$_{t-1}$	0.006	0.003	japECMrwage$_{t-1}$*crisis dummy	-0.001	0.001

†Crisis dummy equals one for the period 1990(1) – 1997(12) and it is zero otherwise.

TABLE 24 – KENYA: Price equation with crisis interactions†

Variable	*Coefficient*	*Std.Error*	*Interacted Variable*	*Coefficient*	*Std.Error*
Constant	-0.496	0.694			
Δp_{t-3}	0.039	0.061	Δp_{t-3} *crisis dummy	0.081	0.082
Δp_{t-4}	0.012	0.063	Δp_{t-4} *crisis dummy	-0.114	0.083
Δp_{t-8}	0.144 *	0.059	Δp_{t-8} *crisis dummy	-0.128	0.094
Δm_{t-3}	0.036	0.025	Δm_{t-3} *crisis dummy	-0.022	0.055
Δm_{t-4}	0.049	0.026	Δm_{t-4} *crisis dummy	0.073	0.055
Δy_t	0.165	0.481	Δy_t *crisis dummy	-5.081 **	1.791
ΔI^A_{t-4}	0.001	0.001	ΔI^A_{t-4} *crisis dummy	-0.001	0.001
ΔI^A_{t-5}	0.0004	0.001	ΔI^A_{t-5} *crisis dummy	0.001	0.001
ΔI^O_{t-1}	0.001	0.001	ΔI^O_{t-1} *crisis dummy	0.002	0.002
ΔI^O_{t-2}	-0.002	0.002	ΔI^O_{t-2} *crisis dummy	-0.002	0.002
ΔI^O_{t-6}	0.003 *	0.001	ΔI^O_{t-6} *crisis dummy	0.002	0.002
ΔI^*_t	0.001	0.001	ΔI^*_t *crisis dummy	0.031 **	0.012
Δe_t	0.025	0.033	Δe_t *crisis dummy	0.047	0.044
Δp^*_{t-2}	0.633*	0.254	Δp^*_{t-2} *crisis dummy	0.379	1.098
kenECMnM2$_{t-1}$	0.005	0.009	kenECMnM2$_{t-1}$ *crisis dummy	-0.018	0.019
kenECMgdp $_{t-1}$	0.020	0.029	kenECMgdp $_{t-1}$*crisis dummy	-0.012	0.007
kenECMispr $_{t-1}$	0.003	0.002	kenECMispr $_{t-1}$*crisis dummy	-0.002	0.001
kenECMnPPP $_{t-}$	-0.002	0.003	kenECMnPPP $_{t-1}$ *crisis dummy	-0.054 *	0.022
kenECMidiff $_{t-1}$	-0.006	0.012	kenECMidiff $_{t-1}$*crisis dummy	-0.214 *	0.087

†Crisis dummy equals one for the period 1992(1) – 1995(12) and it is zero otherwise

TABLE 25 – MALAYSIA: Price equation with crisis interactions†

Variable	*Coefficient*	*Std. Error*	*Interacted Variable*	*Coefficient*	*Std. Error*
Constant	0.016	0.028			
$\Delta^2 p_{t-1}$	-0.153 *	0.068	$\Delta^2 p_{t-1}$ *crisis dummy	0.139	0.168
$\Delta^2 m_{t-1}$	0.002	0.011	$\Delta^2 m_{t-1}$ *crisis dummy	0.038	0.033
Δy_t	-0.009	0.006	Δy_t *crisis dummy	-0.002	0.011
ΔI^O_t	-0.001	0.001	ΔI^O_t *crisis dummy	0.002	0.001
ΔI^A_{t-2}	-0.002 **	0.001	ΔI^A_{t-2} *crisis dummy	0.001	0.001
Δe_t	0.061 *	0.025	Δe_t *crisis dummy	-0.029	0.053
Δe_{t-3}	-0.052 *	0.023	Δe_{t-3} *crisis dummy	-0.007	0.056
Δe_{t-5}	0.038	0.022	Δe_{t-5} *crisis dummy	0.127 *	0.053
Δp^*_{t-1}	0.399 **	0.124	Δp^*_{t-1} *crisis dummy	-0.149	0.277
mysECMrM2 $_{t-1}$	-0.001	0.001	mysECMrM2 $_{t-1}$*crisis dummy	0.001	0.003
mysECMytrend $_{t-1}$	0.001	0.005	mysECMytrend $_{t-1}$ *crisis dummy	-0.002	0.013
mysECMIalt $_{t-1}$	0.001	0.001	mysECMIalt $_{t-1}$*crisis dummy	-0.002	0.002
mysECMIown $_{t-1}$	-0.001	0.001	mysECMIown $_{t-1}$*crisis dummy	0.002	0.002
mysECMrPPP $_{t-1}$	0.001	0.001	mysECMrPPP $_{t-1}$*crisis dummy	0.001	0.003

†Crisis dummy equals one for the period 1985(1) – 1988(12) and it is zero otherwise

* Denotes significance at the 5% level.
** Denotes significance at the 1% level.

TABLE 26 – URUGUAY: Price equation with crisis interactions†

Variable	*Coefficient*	*Std. Error*	*Interacted Variable*	*Coefficient*	*Std. Error*
Constant	-0.13	0.119			
$\Delta^2 p_{t-1}$	-0.213	0.185	$\Delta^2 p_{t-1}$ *crisis dummy	-0.725 *	0.327
$\Delta^2 p_{t-2}$	-0.246	0.167	$\Delta^2 p_{t-2}$ *crisis dummy	-0.641 *	0.271
$\Delta^2 p_{t-3}$	-0.056	0.145	$\Delta^2 p_{t-3}$ *crisis dummy	-0.619 *	0.245
$\Delta^2 p_{t-4}$	0.038	0.115	$\Delta^2 p_{t-4}$ *crisis dummy	-0.685 **	0.197
$\Delta^2 p_{t-5}$	-0.044	0.071	$\Delta^2 p_{t-5}$ *crisis dummy	-0.521**	0.155
$\Delta^2 p_{t-7}$	-0.159 **	.0546	$\Delta^2 p_{t-7}$ *crisis dummy	-0.067	0.102
$\Delta^2 m_{t-5}$	0.061*	0.029	$\Delta^2 m_{t-5}$ *crisis dummy	0.155 *	0.062
$\Delta^2 m_{t-6}$	0.088 *	0.036	$\Delta^2 m_{t-6}$ *crisis dummy	0.169*	0.075
$\Delta^2 m_{t-7}$	0.065	0.036	$\Delta^2 m_{t-7}$ *crisis dummy	0.227**	0.072
$\Delta^2 m_{t-8}$	0.023	0.036	$\Delta^2 m_{t-8}$ *crisis dummy	0.137 *	0.06
$\Delta^2 m_{t-9}$	0.021	0.028	$\Delta^2 m_{t-9}$ *crisis dummy	0.053	0.05
Δy_{t-4}	0.025	0.018	Δy_{t-4} *crisis dummy	0.049	0.059
ΔI_t^O	0.001*	0.0003	ΔI_t^O *crisis dummy	0.001	0.001
ΔI_{t-3}^O	-0.001 **	0.0003	ΔI_{t-3}^O *crisis dummy	0.0004	0.001
ΔI_{t-8}^O	-0.0002	0.0003	ΔI_{t-8}^O *crisis dummy	-0.001	0.001
Δu_{t-1}	-0.04 **	0.013	Δu_{t-1} *crisis dummy	-0.145 *	0.063
Δu_{t-2}	0.052 **	0.014	Δu_{t-2} *crisis dummy	0.114	0.065
Δu_{t-3}	0.041 *	0.017	Δu_{t-3} *crisis dummy	-0.007	0.064
Δu_{t-6}	-0.017	0.015	Δu_{t-6} *crisis dummy	-0.125 *	0.052
Δu_{t-7}	0.033 **	0.012	Δu_{t-7} *crisis dummy	0.109	0.064
$\Delta^2 w_t$	0.131 **	0.032	$\Delta^2 w_t$ *crisis dummy	0.049	0.055
$\Delta^2 w_{t-1}$	0.069 *	0.027	$\Delta^2 w_{t-1}$ *crisis dummy	0.131 *	0.051
Δe_t	-0.184	0.094	Δe_t *crisis dummy	0.205	0.127
Δe_{t-1}	0.002	0.099	Δe_{t-1} *crisis dummy	0.090	0.108
Δp_t^*	1.555 **	0.449	Δp_t^* *crisis dummy	-0.997	1.857
ΔI_{t-1}^*	0.006	0.003	ΔI_{t-1}^* *crisis dummy	-0.0001	0.005
ΔI_{t-9}^*	-0.000	0.003	ΔI_{t-9}^* *crisis dummy	0.004	0.005
uruECMrPPP$_{t-1}$	-0.001	0.009	uruECMrPPP$_{t-1}$*crisis dummy	-0.009	0.013
uruECMuip$_{t-1}$	0.001 **	0.0002	uruECMuip$_{t-1}$ *crisis dummy	-0.001 *	0.0003
uruECMrM2$_{t-1}$	0.013	0.009	uruECMrM2$_{t-1}$ *crisis dummy	0.004	0.0053
uruECMrwage$_{t-1}$	0.022	0.029	uruECMrwage$_{t-1}$*crisis dummy	0.036	0.041

†Crisis dummy equals one for the period 1981(7) – 1985(12) and it is zero otherwise.

* Denotes significance at the 5% level.
** Denotes significance at the 1% level.

Data appendix

CHILE

Data Sample: August 1977- November 1993

List of variables:

m=log of broad money (M2)
p=log of CPI prices
y=log of industrial production
I^{o}= interest rate on deposits from 30 to 89 days
p*=log of US prices
i*=US 6 months CD rate
e= Peso/Dollar exchange rate
w=log of wage index
u= log of unemployment rate
sp=share price index

Data frequency and data sources:

Monthly: -exchange rate (Pesos/US$), M2, Chilean consumer price Index, US consumer price index, US 6 months CD rate, interest rate on deposits from 30 to 89 days, and share price index. Source: *International Financial Statistics (IMF)*.
-unemployment rate. Source: *UN Monthly Bulletin.*

Quarterly: -industrial production and wage index. Source *Central Bank of Chile.*

COLOMBIA

Data sample: January 1981-June 1998

List of variables:

m=log of broad money (M2)
p=log of CPI prices
y=log of industrial production
I^{o}= average interest rate for 90 day certificates of deposits
p*=log of US prices
i*=US 6 months CD rate
e= Peso/Dollar exchange rate
w=log of wage index
u= log of unemployment rate
sp=share price index

Data frequency and data sources:

Monthly: -exchange rate (Pesos/US$), Colombian consumer price index, US consumer prices index, US 6 months CD rate, and share price index. Source: *International Financial Statistics (IMF).*
- M2 and interest rate for 90 day certificates of deposit. Source: *Central Bank Monthly Bulletin.*
-industrial production and wage index. Source: *Central Bank sources and DANE monthly bulletin.*

Quarterly: -unemployment rate. Source: *Central Bank and DANE monthly bulletin.*

DENMARK

Data sample: January 1976-December 1993

List of variables:

m=log of broad money (M2)
p=log of CPI prices
y=log of industrial production
I^{o}= average deposit rate
I^{a}= bond rate
p*=log of German prices
i*= German bond rate.
e= Krone/Deutsche Mark exchange rate
w=log of wage index
u= log of unemployment rate

Data frequency and data sources:

Monthly: -exchange rate (Krone/Deutsche Mark), M2, industrial production, Danish consumer price index, German Consumer Prices Index, Danish deposit interest rate, Danish government bond yield, and German government bond yield. Source: *International Financial Statistics (IMF).*
-unemployment rate and wage index. Source: *OECD Main Economic Indicators.*

JAPAN

Data sample: February 1977-December 1997

List of variables:

m=log of broad money
p=log of CPI prices
y=log of industrial production
I^{o}= average CD rate
I^{a}= gensaki rate
I= 10 year bond rate
I*= US bond rate
p*=log of US prices
I*= US bond rate.
e= Yen/Dollar exchange rate
w=log of wage index
u= log of unemployment rate

sp=share price index

Data frequency and data sources:

Monthly: -exchange rate (Yen/US$), Japanese consumer price index, US consumer price index, industrial production, US government bond yield, and share price index. Source: *International Financial Statistics (IMF).*

-M2+CDs, Gensaki rate, CD rate, 10-year government bond, and nominal wage. Source: *OECD Main Economic Indicators.*

KENYA

Data sample: December 1975-December 1997

List of variables:

m= log of broad money

p= log of CPI prices

y= log of annually interpolated GDP

I^o= average rate on deposits from 2 to 6 months

I^a= 90 day t-bill rate

I*= US 6 months CD rate

p*= log of US prices

e= Shilling/Dollar exchange rate

Data frequency and data sources:

Monthly: -exchange rate (Shillings/US$), M2, Kenyan consumer price index, US consumer price index, interest rate on deposits from 2 to 6 months, and 90-day treasury bill rate. Source: *International Financial Statistics (IMF).*

Annual: -GDP. Source: *International Financial Statistic (IMF).*

MALAYSIA

Data sample: June 1979-December 1996

List of variables:

m=log of broad money

p=log of CPI prices

y=log of industrial production

I^o= 3-month deposit interest rates for commercial banks

I^a= 3-month deposit interest rates for financial institutions

I*= US 6 months CD rate

p*=log of US prices

e= Ringgit/Dollar exchange rate

Data frequency and data sources:

Monthly: -exchange rate (Ringgit/US$), M2, Malaysian consumer price index, US consumer price index, industrial production, and 3-month deposit interest rates for commercial banks. Source: *International Financial Statistics* (IMF)

- 3-month deposit interest rates for financial institutions. Source: *Central Bank monthly bulletin.*

URUGUAY

Data sample: August 1981-December 1997

List of variables:

m=log of broad money

p=log of CPI prices

y=log of industrial production

I^o= interest rate on one to six months deposits:

I*= US 6 months CD rate

p*=log of US prices

e= Peso/Dollar exchange rate

w= log of wages

u= log of the unemployment rate

Monthly: -exchange rate (Pesos/US$), M2, Uruguayan consumer price index, and interest rate on 1 to 6 months deposits.Source: *International Financial Statistics (IMF).*

-wage index. Source: *Central bank bulletin.*

Quarterly: -unemployment rate. Source: *CEPAL "Economic Survey".*

-industrial production. Source: *Central bank bulletin.*

TABLE A.1 – Description of the Causes and Consequences of Banking Crises

Country	*Crisis period*	*Causes*	*Scope of crisis*	*Total loss*	*Consequences for monetary policy*
Chile	1981-87	• deep recession in 1981 • exchange rate crisis in 1982 • deficient financial organization of the oligopolistic banking system • unsustainable private financial deficits	In period 1981-83, the authorities intervened in 13 banks and 6 nonbank financial institutions (with 78% of outstanding loans). 19% of loans were nonperforming at the end of 1983.	Central bank's operational losses reached 18% of GDP in 1985.	• Significant rise in inflation (from 9.5% in 1981 to 26.5% in 1985), due to unsterilized financing of massive support programs. Inflation remained above 10% until 1994. • Increase in level and volatility of money multiplier at the beginning of crisis.
Colombia	1982-88	• banking system suffering from structural weaknesses • strong deterioration in terms of trade in 1981	The authorities intervened in 6 banks and 8 finance companies. 15% of loans were nonperforming in 1984-85. In 1985-86, some insolvent banks were nationalized.	Estimated loss is approximately 5% of GDP	n.a.
Denmark	1987-92	• deep recession in the latter part of the 1980s • rapid increase in monetary aggregates due to financial liberalization.	Loan losses over 1990-92 represented 9% of loans. 40 of the 60 problem banks were merged.	n.a.	n.a.
Japan	1992-present	• Uncontrolled financial liberalization fostering sharp asset price inflation • Expansionary monetary policy reflected in low interest rates, followed by significant tightening in the proximity of crisis • Sharp economic slowdown and falling asset prices at the beginning of crisis	Problem loans represented 9% of GDP in 1996.	Rescue costs probably higher than US$100bn.	• Rise in bank intermediation spreads • Easing of monetary policy prompted by the necessity to foster economic growth

n.a. means that the information is not available.

TABLE A.1 – Description of the Causes and Consequences of Banking Crises, Continued

Country	*Crisis period*	*Causes*	*Scope of crisis*	*Total loss*	*Consequences for monetary policy*
Kenya	1985-89 1993-95	• Extremely high growth in the number of financial institutions in the 1980s, with very low regulatory barriers to entry and low minimum capital requirements • Extensive insider lending, often to politicians; gross mismatch between maturities of assets and liabilities • Huge frauds in 1993, involving 3 Kenyan banks • Heavy reliance on deposits from parastatals • Reliance on deposits from construction companies working on government projects which receive their money all at once after the budget is approved.	66% of loans of one third of the commercial banks were nonperforming. Between 1984 and 1989, 2 local banks and 10 non-bank financial institutions (NBFIs) were closed or taken over. In 1993/4, an additional 5 banks and 10 NBFIs were taken over by the Central Bank of Kenya, with 2 more local banks in 1996.	Approximate losses of failed local banks estimated at Ksh 9 bln or $158 million. The 1993 frauds cost the Central Bank of Kenya total of Ksh 10.2 bn or 3.2% of 1993 GDP.	• Provision of large amounts of credit to distressed banks was a major source of monetary expansion and inflation, undermining macroeconomic stability in Kenya in 1992/3. • Depositors moved their money to more established banks, which have had to lower their interest rates to absorb the sudden excess liquidity.
Malaysia	1985-88	• Financial liberalization in the early 80s, spurring credit growth and price bubble • Terms of trade deterioration in 1985-86, which induced the bubble burst • Annual growth plummeted from 7% to negative 1% in 1985 and 0% in 1986; collateral shrunk in value below the loan amount it is meant to secure • Declining deposits, shrinking loan demand, sporadic and chockingly-tight liquidity • Almost all Malaysian banks overexposed to the country's weakest sector: real estate	Nonperforming loans represented 32% of total loans in 1988. As of August 1986, 24 deposit taking cooperatives were suspended; depositors have been able to recover just 1/5 of their deposits.	Reported losses equivalent to 4.7% of GNP.	• Re-imposition of controls on interest rates during 1985-87. • Flight to quality and cash • Rise in money multiplier at the beginning of the crisis • Decrease in reserve and liquidity requirements with the purpose of reducing banks cost of funds
Uruguay	1981-87	• Deep world economy recession starting in 1980s • Collapse of the existing exchange rate system, and sharp devaluation • High levels of debt in foreign currency and soaring international interest rates	11% of loans were nonperforming in 1986.	Estimated costs of recapitalizing banks estimated at US$350 million (7% of GNP).	n.a.

n.a. means that the information is not available.

Sources: Brownbridge(1998), Caprio and Klingebiel (1996), Dominioni and Licandro (1989), Geraghty (1987), Hausmann and Rojas-Suarez. (1996), Koskenkyla (1994), Lindgren, Garcia, and Saal (1996), Machua (1986), Mbitiru (1986), Sheng, (1996), and Sundararajan and Balino (1991).

TABLE A.2 – Review of Money Demand and Inflation Studies

COUNTRY / AUTHORS	*DESCRIPTION*
CHILE	
Matte and Rojas (1989)	This study estimates a reduced form money demand equation for a modified measure of M1 commonly used in Chile, M1A, for the period 1978-86. The purpose of this exercise is to explain the sudden drop in money demand experienced by Chile in 1984. This study does not use cointegration analysis. The demand for real M1A is modeled as a function of prices, output, and the average deposit rate (the outside rate of money). Lags of money, output, and the deposit rate are significant in explaining money demand.
Apt and Quiroz (1992)	Using cointegration analysis and error correction modeling, this paper estimates a monthly money demand function for M1A in Chile during 1983:1-1992:8. The demand for real M1A is modeled as a function of prices, output, and the average deposit rate (the outside rate of money). The change in the exchange rate is also included as a determinant of money demand. The final dynamic equation obtained is stable.
Herrera and Vergara (1992)	Using cointegration analysis and error correction modeling, this study finds a stable long-run money demand function (M1A) for the period 1978:1-1991:1.
Martner and Titleman (1993)	This study analyzes the relationship between the real money demand (M1A), short-term interest rates (on deposits from 30 to 89 days), the price level (CPI), and real income (GDP) for the period 1975-1991. The cointegration analysis based on Johansen's method shows the existence of a stable long-run relationship for money (one cointegrating vector).
COLOMBIA	
Kamas (1995)	This paper investigates monetary policy effects under crawling peg in Colombia, during 1975-89. A five variable VAR is estimated. The variables included are: domestic credit, foreign reserves, exchange rate, prices, and income (proxied by industrial production). The results reveal that neither domestic credit nor the exchange rate appear to have played much of a role in determining inflation. Inflation seems to be largely inertial and the result of demand shocks.
Rennhack and Mondino(1988)	This paper estimates a money demand equation for the period 1977-1985. The variables included in this study are: narrow money, interest rate on 90 day certificate of deposit, exchange rate, CPI, and real GDP.
Reinhart and Reinhart (1991)	The authors estimate a VAR of output (real GDP), prices (cpi), monetary aggregates, interest rates on 90 day deposits, the exchange rate, general and minimum wages for manufacturing employees, and export coffee prices. Results indicate that money is exogenous, and past fluctuations in inflation, money growth, and exchange rate help predict the exchange rate. In the end, authors settle for a 6 variable system using growth rates of narrow money, real income (GDP), consumer prices (CPI), average wages in manufacturing, nominal exchange rate, and the level of nominal interest rate. According to this model, monetary policy explains a large share of the variability in inflation, wages, and the exchange rate.
Herrero and Julio (1993)	This study finds evidence of cointegration between M1, CPI, GDP, and interest rates during 1955-91 and 1970-92. The results show that money demand is stable. Tests are performed with annual and quarterly data, respectively.
Fullerton (1993)	This paper uses an ARMA process to study inflation in Colombia during 1967-1990. The variables used are: M1, exchange rate, and CPI. The paper provides evidence that M1 and exchange rates can affect inflation.

TABLE A.2 – Review of Money Demand and Inflation Studies

DENMARK	
Juselius (1988)	This paper finds one cointegrating vector reflecting a long-run money demand function for period the 1974:1 to 1985:4. The variables used are real M2, domestic real demand for goods and services, bond rate, and the deposit rate.
Juselius (1998)	Using recently developed statistical tools for analyzing cointegrated I(2) data, this article models money (M2), income, prices, and interest rates in Denmark. The final model describes the dynamic adjustment to short-run changes of the process, to deviations from long-run steady states, and to several political interventions. The error correction model obtained for real M2 is stable.
JAPAN	
Corker (1990)	This paper estimates a demand function for broad money in Japan that explains secular trends in the income velocity of broad money during the 1970s and 1980s and the acceleration in the decline of velocity during 1986-1988. The paper concludes that wealth effects and the opportunity cost of holding broad money can explain the developments in velocity.
Frowen and Buscher (1990)	This paper estimates money demand functions for three alternative monetary aggregates: M1, M2, and M2C (which includes CDs in addition to M2). All monetary aggregates are deflated using CPI. The sample period is 1973:1 to 1987:4. Other variables included are: Real GDP, call money rate, Gensaki rate, and Kokusai-rate. The authors implement both a partial adjustment as well as a cointegration and error correction modeling framework. For M1 there is evidence of cointegration, while for M2 the evidence is ambiguous.
Hsiao and Fujiki (1998)	This study compares results from a cointegration analysis with those from a structural modeling of money demand. The data covers the period 1963:3-1993:1. The variables used are: M2+CDs, real GNP, and nominal call rate. The monetary aggregate and income measure appear to be cointegrated. The error-correction model does not improve on the ADL approach.
Arize and Shwiff (1993)	The authors estimate a money demand function for Japan for the period 1973:1-1988:4 using M2, real GNP, 3-month Gensaki, weighted average of the interest rate on three-month certificates of deposits, the guideline three month deposit rate, real wealth, and the real exchange rate. The variables are I(1) and the results show the existence of one cointegrating vector. Money demand appears stable.
Yoshida (1990)	This paper estimates an error correction money demand function for the period: 1968:1-1989:1. The variables used in this study are: real M2+CDs, real GNP, the coupon rate on 5-year debentures, and the coefficient of variation of Nikkei stock average. One cointegrating relation is found between money and real income. Money demand appears stable.
Soejima (1996)	Using data from the period 1957:3 to 1994:1, the author studies whether there is a long-run relationship between real GDP, money supply (M1), and the price level. This study concludes that real and nominal GDP series can be seen as stationary processes around a deterministic trend with structural change, while M1 is non-stationary. The study indicates that the cointegration between the three variables, which previous studies found, arises from a mispecification of the time series model, and that the instability in the demand function arises from the non-stationarity of M1.

TABLE A.2 – Review of Money Demand and Inflation Studies, Continued

Arize (1990)	This study estimates a money demand function for the periods 1973:2-1981:4 and 1973:2-1986:4 using OLS in a setup of real adjustment analysis. The variables used are: real M1, domestic real income, bond yield rate, and a number of dummy variables. The split in the sample is used to determine the stability of the model after the financial innovation period. No evidence of structural change is found.
Hoffmaister and Schinasi (1994)	This paper estimates a VAR of call money rate, growth of M2, real output gap, land price inflation, and the CPI over the period 1986-1993. The study finds monetary factors are the most important variables behind asset price inflation. With respect to the CPI, it seems that the capacity of monetary factors to influence the consumer price level has decreased due to structural changes.
Sekine (1998)	This paper examines the demand for broad money in Japan from 1975 to 1994. In spite of the large shocks due to the process of financial liberalization and the subsequent "bubble" economy of the 1990s, the paper confirms that a stable money demand function can be found by taking proper account of the financial liberalization and the wealth effects.
MALAYSIA	
Habibulla (1990)	This study tests whether wealth is a better proxy for the scale variable than current income for the Malaysian money demand. The sample period analyzed is: 1960-1984. The variables employed in this study are: M1, M2, M3, GNP deflated by CPI, 3-month T-bill rate, rate of return on the monetary aggregates of interest, and the growth rate of CPI. After using a partial adjustment mechanism to specify the models, the authors conclude that the scale variable should be defined in terms of permanent income rather than current income.
Dhakal and Kandil (1993)	This paper tests the hypothesis that inflation is a monetary phenomenon for a group of Asian countries. The model includes the following variables: CPI, M1, industrial production index, money market interest rates, unit value of imports, and foreign nominal interest rates. The results of OLS estimations for Malaysia show that changes in money supply are important and significant in predicting prices.
Abdullah and Yusop (1996)	This paper investigates the causal relationship between money supply and inflation during the period 1970-92. The variables used are: M1, M2 and the inflation rate(CPI). After applying Granger methodology, results reveal that money supply causes inflation independently of the monetary aggregate used.
Yusoff (1988)	This paper estimates six behavioral equations with the purpose of analyzing the effects of monetary policy on inflation, balance of payments (BOP), and real output. The sample covers the period 1960-1981. The method of estimation is 2SLS and non-linear 3SLS. The equation for inflation posits that inflation is a function of changes in money and changes in foreign prices. Both factors appear to be significant in the model.
Chye and Semudram	The objective of this study is to appraise the monetarist and neo-keynesian hypotheses in their ability to predict inflation in Malaysia. The paper covers the period: 1960-1986. The models employed were estimated by OLS and showed support for the monetarist view of inflation.
KENYA	
Page (1993)	This study estimates an equation relating inflation to income and money supply (M2) and an equation representing money demand as a function of past income, expected inflation, and the T-bill rate. The money demand function for M1 appears to be stable.

TABLE A.2 – Review of Money Demand and Inflation Studies, Continued

Ndung'u (1997)	This paper estimates a VAR with money, the domestic price level, the exchange rate index, foreign price index, real output, and the interest rate. The period analyzed is 1970-1993. One cointegration relationship is found among the exchange rate, CPI, and foreign prices. Causality tests indicate that exchange rate changes and domestic rate of inflation changes predict each other. The world rate of inflation does not predict the domestic rate of inflation. Tests for inflation show a structural break in 1982, when the crawling peg exchange rate was adopted.
Chakrabarti (1992)	This study aims at investigating the influence of various factors on inflation in Kenya. The sample period is: 1972-1989, and the variables employed are: CPI, World Bank's manufacturing unit value index (as a proxy for world price), exchange rate, money per unit of output, nominal interest rate on savings deposits, wage variables, lagged CPI, oil price, and the government budget deficit. The empirical framework is OLS. The monetary aggregate used is M2. Aside from other results, this study verifies that both the stock of money and exchange rate changes influence prices.
Adam (1992)	This paper studies money demand in the period 1973-1990. The variables included are: GNP adjusted for changes in terms of trade, GNP adjusted for changes in total final expenditures, CPI, T-bill rate, official exchange rate vis a vis the US dollar, and narrow money. Using a general to specific modeling approach with the ECM term included, the study finds one cointegrating vector between income and money.
Adam (1992)	This study covers the period: 1972-1990. VAR is estimated for each of 5 monetary aggregates, plus income, inflation, T-bill interest, and exchange rate depreciation. The results indicate the existence of two cointegration vectors, one representing a money demand function and the other a relationship between interest rates and inflation. Using recursive estimation, the author confirms money demand stability.
Ndung'u (1993)	This paper investigates the determinants of inflation in the period 1970-91. The variables used are: monetary base, real gross national income, and the annualized treasury discount rate. Two cointegrating vectors are found and the estimation of an ECM model shows that money supply affects inflation, but not money demand. In the second stage, the model employed allows for an open economy. The variables added are the nominal exchange rate and the foreign price index. Three cointegrating relationships are found: a money demand function, a purchasing power parity function, and a third vector, which is not identifiable.
Mwega and Killick (1990)	This study performs OLS regressions of changes in the CPI on the growth of real income, changes in money supply (M2), changes in import prices, and changes in previous year's inflation rate. The estimation periods are 1971-82 and 1971-88, respectively. The authors also estimate a short-run money demand function for 1973:3-1988:4, using M1, M2 and M3 as monetary aggregates. The results show that the government may be able to influence demand for money by shifting interest rates. Money demand functions were found to be stable, but more so for narrow money that for broader aggregates.
Darrat (1985)	This paper estimates money demand equations for M1 and M2 during 1969-78 using as variables: real GNP, CPI, and an average of quarterly short-term interest rates in major OECD countries. Money demand functions are found to be stable.
URUGUAY	
Graziani (1988)	This paper tests an inflation model where inflation is modeled as a function of lagged money, output, interest rates, export, and import prices. The sample period considered is 1952-1981 and the method of estimation is OLS. Money and import prices seem to have the largest effect on inflation.

Table A.3: Unit Root Tests

Country	*Variable*	*t-adf*	*beta*	*sigma*	*lag*	*t-prob*	*F-prob*
Chile	m	-2.724	0.966	0.029	3.000	0.001	0.079
	p	-2.061	0.976	0.008	1.000	0.000	0.386
	y	-2.071	0.919	0.039	12.000	0.063	0.081
	w	-4.374**	0.899	0.022	10.000	0.001	0.1189
	u	-1.557	0.975	0.070	0.000	-	0.5223
	e	-0.889	0.993	0.022	1.000	0.000	0.3969
	i^o	-5.495**	0.705	8.805	0.000	-	0.3034
	m-p	-2.109	0.974	0.029	3.000	0.000	0.194
	w-p	-2.532	0.928	0.026	1.000	0.006	0.187
	p-e	-1.223	0.990	0.021	1.000	0.000	0.577
	dm	-5.288**	0.392	0.029	2.000	0.001	0.223
	dp	-7.596**	0.488	0.008	0.000	-	0.465
	dy	-2.918	-0.423	0.038	13.000	0.002	-
	dw	-2.508	0.387	0.022	9.000	0.028	0.140
	du	-12.982**	-0.003	0.071	0.000	-	0.666
	de	-7.037**	0.543	0.022	0.000	-	0.507
	di^o	-12.680**	-0.365	9.175	1.000	0.000	0.199
	d(m-p)	-9.953**	-0.180	0.027	1.000	0.781	0.056
	d(w-p)	-17.310**	-0.223	0.024	0.000	-	0.346
	d(p-e)	-7.467**	0.499	0.021	0.000	-	0.764
	d^2m	-8.735**	-3.821	0.029	6.000	0.012	0.317
	d^2p	-8.589**	-1.801	0.009	5.000	0.012	0.727
Colombia	m	-2.103	0.971	0.013	12.000	0.007	0.198
	p	-2.100	0.983	0.006	11.000	0.017	0.213
	y	-2.336	0.869	0.033	2.000	0.001	0.389
	e	-0.426	0.998	0.014	1.000	0.000	0.204
	i^o	-3.423	0.913	1.119	3.000	0.002	0.181
	w	-1.437	0.961	0.014	13.000	0.001	-
	u	-1.456	0.917	0.074	0.000	-	0.569
	m-p	-1.751	0.975	0.015	1.000	0.001	0.252
	w-p	-2.223	0.919	0.016	12.000	0.000	0.139
	p-e	-1.062	0.995	0.014	1.000	0.000	0.578
	dm	-3.848*	0.281	0.013	11.000	0.014	0.155
	dp	-3.005	0.578	0.006	9.000	0.079	0.082
	dy	-15.794**	-0.942	0.033	1.000	0.000	0.157
	de	-9.59**	0.326	0.014	0.000	-	0.259
	di^o	-9.769**	0.274	1.161	0.000	-	0.140
	dw	-2.580	-0.306	0.014	12.000	0.001	0.053
	du	-8.539**	-0.078	0.073	0.000	-	0.827
	d(m-p)	-10.519**	0.230	0.015	0.000	-	0.356
	d(w-p)	-3.452*	-0.518	0.016	11.000	0.000	0.410
	d(p-e)	-9.221**	0.360	0.015	0.000	-	0.656

For each variable the columms report the augmented Dickey Fuller (ADF) statistic on the final equation (t-adf), the estimated coefficient on the lagged level that is being tested for a unit value (beta), the estimated equation standard error (sigma), the lag length of the ADF regression (lag), the tail probability on the longest lag of the final regression (t-prob), and the tail probability of the F-statistic for the lags dropped (F-prob).

Rejection of the null hypothesis of a unit root is denoted by * and ** for the 5% and 1% levels.

Definition of variables: *m* is a measure of broad money, *p* refers to the CPI, *y* is a measure of output, *w* is a measure of wages, *u* is a measure of the unemployment rate, e is the exchange rate (usually in terms of domestic currency per US$), i^o represents the own rate of *m2*, i^A represents the alternative (outside) rate, i^* represents the foreign interest rate. All variables except interest rates are in logs.

Notation: d refers to the change in the variable. d^2 refers to the second difference of a variable.

Table A.3: Unit Root Tests, continued

Country	*Variable*	*t-adf*	*beta*	*sigma*	*lag*	*t-prob*	*F-prob*
Denmark	m	-1.739	0.981	0.013	12.000	0.005	0.198
	p	-1.304	0.995	0.004	0.000	-	0.644
	y	-2.787	0.881	0.028	1.000	0.000	0.127
	e(kr/dm)	-2.076	0.980	0.007	1.000	0.001	0.2445
	p^*(german)	-1.284	0.993	0.003	1.000	0.000	0.0576
	i^o	-1.484	0.978	0.327	0.000	-	0.082
	i^A	-2.770	0.951	0.543	12.000	0.005	0.489
	i^*(german i^b)	-2.773	0.963	0.231	11.000	0.008	0.395
	w	-1.294	0.988	0.007	12.000	0.008	0.894
	u	-3.749*	0.935	0.030	12.000	0.000	0.066
	m-p	-2.357	0.971	0.014	12.000	0.005	0.469
	w-p	-0.855	0.983	0.008	11.000	0.033	0.162
	p-e	-1.527	0.969	0.009	0.000	-	0.591
	dm	-2.378	0.450	0.013	11.000	0.010	0.545
	dp	-12.090**	0.123	0.004	0.000	-	0.842
	dy	-13.628**	-0.618	0.028	1.000	0.005	0.153
	de(kr/dm)	-10.710**	0.232	0.008	0.000	-	0.274
	dp^* (german)	-9.408**	0.358	0.003	0.000	-	0.180
	di^o	-11.774**	0.195	0.317	0.000	-	0.687
	di^A	-4.408**	0.112	0.553	11.000	0.002	0.227
	di^*(german)	-9.314**	0.392	0.236	0.000	-	0.286
	dw	-3.787*	-0.336	0.007	11.000	0.005	0.347
	du	-2.688	0.479	0.030	12.000	0.003	0.796
	d(m-p)	-2.350	0.484	0.014	11.000	0.005	0.777
	d(w-p)	-5.675**	-1.110	0.008	10.000	0.026	0.196
	d(p-e)	-11.974**	0.125	0.009	0.000	-	0.709
	d^2m2	-6.669**	-6.516	0.014	10.000	0.000	0.466
	d^2p	-8.265**	-5.683	0.004	10.000	0.003	0.651

Table A.3: Unit Root Tests, continued

Country	*Variable*	*t-adf*	*beta*	*sigma*	*lag*	*t-prob*	*F-prob*
Japan	m	-0.593	0.997	0.006	13.000	0.001	-
	p	-2.611	0.980	0.004	12.000	0.008	0.720
	y	-1.904	0.973	0.013	9.000	0.000	0.597
	e	-2.466	0.964	0.029	11.000	0.035	0.856
	sp	-0.656	0.995	0.039	9.000	0.027	0.348
	i^A	-2.882	0.968	0.286	3.000	0.000	0.109
	i^o	-2.518	0.969	0.315	2.000	0.064	0.068
	i^b(10yrOECD)	-3.150	0.925	0.373	0.000	-	0.164
	w	-2.127	0.917	0.018	13.000	0.004	-
	u	-0.852	0.986	0.033	2.000	0.000	0.434
	m-p	-0.934	0.993	0.007	13.000	0.020	-
	w-p	-1.855	0.838	0.019	13.000	0.005	-
	p-e	-2.279	0.962	0.029	11.000	0.037	0.839
	dm	-2.474	0.508	0.006	13.000	0.009	-
	dp	-2.525	0.514	0.004	11.000	0.014	0.370
	dy	-3.209	0.276	0.013	8.000	0.001	0.320
	de	-10.513**	0.336	0.029	0.000	-	0.377
	dsp	-4.279**	0.293	0.039	11.000	0.048	0.624
	di^A	-4.815**	0.560	0.288	4.000	0.020	0.108
	di^o	-9.341**	0.452	0.324	0.000	-	0.062
	di^b(10yrOECD)	-14.481**	0.053	0.382	0.000	-	0.130
	dw	-3.997*	-2.657	0.018	13.000	0.009	-
	du	-15.957**	-0.527	0.033	1.000	0.000	0.422
	d(m-p)	-2.489	0.551	0.007	13.000	0.004	-
	d(w-p)	-4.214**	-3.212	0.018	13.000	0.022	-
	d(p-e)	-10.679**	0.322	0.029	0.000	-	0.330
	d^2m	-5.893**	-7.453	0.006	12.000	0.002	0.961
	d^2p	-8.242**	-7.059	0.004	10.000	0.002	0.722
Kenya	m	-0.694	0.992	0.024	12.000	0.007	0.860
	p	-1.462	0.990	0.015	3.000	0.000	0.619
	y	-2.015	0.980	0.007	0.000	-	0.937
	e	-3.276	0.965	0.028	5.000	0.005	0.238
	i^o	-3.420	0.947	0.783	2.000	0.000	0.211
	i^A	-4.334**	0.893	2.093	11.000	0.003	0.871
	i* (US)	-2.838	0.954	0.552	13.000	0.004	-
	m-p	-2.502	0.945	0.027	12.000	0.004	0.365
	p-e	-2.567	0.917	0.034	12.000	0.007	0.449
	dm	-3.796*	0.162	0.024	11.000	0.011	0.411
	dp	-3.208	0.545	0.016	13.000	0.047	-
	dy	-16.378**	-0.023	0.007	0.000	-	0.876
	de	-4.525**	0.574	0.029	4.000	0.019	0.131
	di^o	-4.647**	0.259	0.794	13.000	0.028	-
	di^A	-5.719**	0.274	2.195	8.000	0.002	0.090
	di* (US)	-4.160**	0.100	0.561	12.000	0.009	0.297
	d(m-p)	-7.026**	0.200	0.028	2.000	0.001	0.066
	d(p-e)	-6.466**	-0.618	0.034	13.000	0.028	-

Table A.3: Unit Root Tests, continued

Country	*Variable*	*t-adf*	*beta*	*sigma*	*lag*	*t-prob*	*F-prob*
Malaysia	m	0.424	1.004	0.014	0.000	-	0.733
	p	-1.909	0.982	0.004	4.000	0.011	0.087
	y	-4.253**	0.748	0.045	1.000	0.000	0.265
	e	-1.463	0.974	0.010	13.000	0.011	-
	i^o	-2.197	0.969	0.386	2.000	0.016	0.123
	i^A	-2.825	0.944	0.481	10.000	0.001	0.401
	i^* (US 6m cd)	-2.920	0.934	0.496	13.000	0.000	-
	m-p	-0.231	0.997	0.015	0.000	-	0.828
	p-e	-0.858	0.989	0.010	13.000	0.004	-
	dm	-15.361**	-0.129	0.014	0.000	-	0.891
	dp	-2.187	0.674	0.004	13.000	0.018	-
	dy	-23.614**	-0.510	0.047	0.000	-	0.078
	de	-4.378**	-0.116	0.010	12.000	0.010	0.378
	di^o	-11.584**	0.184	0.392	0.000	-	0.142
	di^A	-3.679*	0.300	0.491	9.000	0.005	0.435
	di^*(US 6m cd)	-3.802*	0.263	0.501	12.000	0.001	0.947
	d(m-p)	-15.631**	-0.145	0.015	0.000	-	0.966
	d(p-e)	-3.731*	0.211	0.010	12.000	0.003	0.151
	d^2m	-7.824**	-4.958	0.015	8.000	0.046	0.560
	d^2p	-6.601**	-5.783	0.004	12.000	0.009	0.178
Uruguay	m	-0.533	0.995	0.031	6.000	0.013	0.100
	p	0.066	1.000	0.016	8.000	0.000	0.572
	y	-2.938	0.758	0.045	0.000	-	0.326
	e	-1.439	0.979	0.057	0.000	-	0.948
	i^o	-2.162	0.971	2.958	4.000	0.021	0.086
	i^*(US cd rate)	-2.491	0.958	0.328	5.000	0.034	0.128
	w	-0.668	0.994	0.028	8.000	0.000	0.735
	u	-2.814	0.648	0.099	0.000	-	0.071
	m-p	-2.634	0.926	0.038	0.000	-	0.315
	w-p	-3.747*	0.894	0.024	4.000	0.000	0.389
	p-e	-5.666**	0.853	0.053	0.000	-	0.627
	dm	-3.657*	0.463	0.032	4.000	0.016	0.079
	dp	-2.608	0.752	0.016	7.000	0.000	0.653
	dy	-10.690**	-0.352	0.045	0.000	-	0.979
	de	-13.792**	-0.059	0.058	0.000	-	0.819
	di^o	-7.063**	0.260	2.981	3.000	0.012	0.102
	di^*(US cd)	-8.905**	0.388	0.332	0.000	-	0.202
	dw	-2.586	0.678	0.027	7.000	0.000	0.797
	du	-9.967**	-0.452	0.098	0.000	-	0.136
	d(m-p)	-13.846**	-0.062	0.039	0.000	-	0.236
	d(w-p)	-4.842**	0.172	0.025	3.000	0.000	0.304
	d(p-e)	-14.772**	-0.128	0.057	0.000	-	0.982
	d^2m2	-6.717**	-7.383	0.031	10.000	0.043	0.900
	d^2p	-10.483**	-3.628	0.016	6.000	0.000	0.483

Table A.4- Cointegration Results: Lag Length Selection and Eigenvalue Statistics - MONETARY SECTOR

			Maximal Eigenvalue			*Eigenvalue Trace*		
	Selected System Lag Length	*Ho: Rank=p*	*Statistic*	*Statistic, adjusted for degrees of freedom*	*95% critical value*	*Statistic*	*Statistic, adjusted for degrees of freedom*	*95% critical value*
Chile	3	p==0	70.46**	65.81**	31.5	125.6**	117.3**	63.0
		p<=1	27.95*	26.11*	25.5	55.12**	51.48**	42.4
		p<=2	16.46	15.37	19.0	27.16*	25.37*	25.3
		p<=3	10.71	10.00	12.3	10.71	10.00	12.3
Colombia	13	p==0	29.66	21.79	31.5	74.98**	55.09	63.0
		p<=1	26.04*	19.13	25.5	45.32*	33.3	42.4
		p<=2	13.52	9.93	19.0	19.29	14.17	25.3
		p<=3	5.771	4.24	12.3	5.771	4.24	12.3
Denmark	12	p==0	96**	67.49**	37.5	191**	134.3**	87.3
		p<=1	61.35**	43.13**	31.5	94.98**	66.77*	63.0
		p<=2	20.09	14.212	25.5	33.63	23.64	42.4
		p<=3	10.84	7.622	19.0	13.54	9.515	25.3
		p<=4	2.692	1.893	12.3	2.692	1.893	12.3
Japan	7	p==0	54.74**	46.66**	37.5	119.9**	102.2**	87.3
		p<=1	30.65	26.13	31.5	65.21*	55.58	63.0
		p<=2	22.39	19.09	25.5	34.56	29.45	42.4
		p<=3	9.67	8.242	19	12.16	10.37	25.3
		p<=4	2.493	2.125	12.3	2.493	2.125	12.3
Kenya	11	p==0	41.12*	32.42	37.5	117.2**	92.41*	87.3
		p<=1	32.79*	25.85	31.5	76.08**	59.98	63
		p<=2	27.11*	21.38	25.5	43.29*	34.13	42.4
		p<=3	12.43	9.798	19	16.18	12.75	25.3
		p<=4	3.749	2.956	12.3	3.749	2.956	12.3
Malaysia	3	p==0	56.78**	52.46**	37.5	163**	150.6**	87.3
		p<=1	46.42**	42.88**	31.5	106.3**	98.16**	63.0
		p<=2	31.84**	29.41*	25.5	59.83**	55.28**	42.4
		p<=3	21.92*	20.25*	19.0	28*	25.86*	25.3
		p<=4	6.074	5.611	12.3	6.074	5.611	12.3
Uruguay	4	p==0	43.22**	39.46**	31.5	76.18**	69.56*	63
		p<=1	20.19	18.44	25.5	32.96	30.09	42.4
		p<=2	10.75	9.818	19	12.77	11.66	25.3
		p<=3	2.016	1.84	12.3	2.016	1.84	12.3

Table A.4 - Cointegration Results: Lag Length Selection and Eigenvalue Statistics - EXTERNAL SECTOR

	Selected System Lag Length	Ho: Rank=p	Maximal Eigenvalue: Statistic	Maximal Eigenvalue: Statistic, adjusted for degrees of freedom	Maximal Eigenvalue: 95% critical value	Eigenvalue Trace: Statistic	Eigenvalue Trace: Statistic, adjusted for degrees of freedom	Eigenvalue Trace: 95% critical value
Chile	5	p==0	43.49**	39.9**	25.5	68.51**	62.86**	42.4
		p<=1	23.12*	21.21*	19	25.02	22.96	25.3
		p<=2	1.905	1.748	12.3	1.905	1.748	12.3
Colombia	5	p==0	57.93**	50.54**	37.5	129.9**	113.3**	87.3
		p<=1	27.35	23.86	31.5	71.98**	62.8	63
		p<=2	21.24	18.53	25.5	44.63	38.94	42.4
		p<=3	17.03	14.86	19.0	23.38	20.4	25.3
		p<=4	6.355	5.545	12.3	6.355	5.545	12.3
Denmark	12	p== 0	58.94**	41.43*	37.5	140.5**	98.74**	87.3
		p<= 1	32.74*	23.01	31.5	81.52**	57.31	63.0
		p<= 2	29.03*	20.4	25.5	48.78*	34.29	42.4
		p<= 3	17.83	12.54	19	19.76	13.89	25.3
		p<= 4	1.923	1.352	12.3	1.923	1.352	12.3
Japan	6	p== 0	79.87**	69.76**	37.5	167**	145.9**	87.3
		p<= 1	51.43**	44.92**	31.5	87.17**	76.13**	63.0
		p<= 2	22.23	19.41	25.5	35.74	31.21	42.4
		p<= 3	9.764	8.528	19.0	13.51	11.8	25.3
		p<= 4	3.747	3.273	12.3	3.747	3.273	12.3
Kenya	12	p== 0	46.41**	35.7	37.5	123.8**	95.22*	87.3
		p<= 1	36.45*	28.04	31.5	77.38**	59.52	63.0
		p<= 2	22.31	17.16	25.5	40.93	31.48	42.4
		p<= 3	13.46	10.36	19.0	18.62	14.32	25.3
		p<= 4	5.161	3.97	12.3	5.161	3.97	12.3
Malaysia	6	p== 0	42.77**	39.19**	25.5	64.94**	59.51**	42.4
		p<= 1	18.58	17.02	19	22.17	20.32	25.3
		p<= 2	3.592	3.291	12.3	3.592	3.291	12.3

Table A.4 - Cointegration Results: Lag Length Selection and Eigenvalue Statistics - WAGES

	Selected System Lag Length	Ho: Rank=p	Maximal Eigenvalue			Eigenvalue Trace		
			Statistic	Statistic, adjusted for dof	95% critical value	Statistic	Statistic, adjusted for dof	95% critical value
Chile	4	p == 0	46.82**	43.73**	25.5	68.42**	63.91**	42.4
		p <= 1	15.15	14.15	19	21.6	20.18	25.3
		p <= 2	6.457	6.032	12.3	6.457	6.032	12.3
Colombia	2	p == 0	29.18*	28.29*	25.5	45.24*	43.85*	42.4
		p <= 1	11.12	10.78	19	16.05	15.56	25.3
		p <= 2	4.939	4.787	12.3	4.939	4.787	12.3
Denmark	13	p == 0	26.88*	21.69	25.5	50.59**	40.82	42.4
		p <= 1	23.31*	18.81	19	23.71	19.13	25.3
		p <= 2	0.392	0.3163	12.3	0.392	0.3163	12.3
Japan	13	p == 0	94.87**	79.26**	25.5	120.8**	100.9**	42.4
		p <= 1	19.45*	16.25	19	25.89*	21.63	25.3
		p <= 2	6.441	5.381	12.3	6.441	5.381	12.3

TABLE A.5 - Dummy Variables Used in the Cointegration Analysis and Single Equation Estimations

Country	*Dummy Variable*	*Explanation for including the dummy*	*Dummy is included in...*
Chile	December-79	Dummy controls for redefinition of money.	Monetary sector (MCI), labor sector (WCI), and external sector (ECI) cointegration analysis and the money (M) and price (P) equations (eqn.)
	June-82	Dummy controls for exchange rate depreciation.	MCI, WCI, ECI, M, and P eqn.
	July-82	Dummy controls for exchange rate depreciation.	MCI, WCI, ECI, M, and P eqn.
	September-84	Dummy controls for exchange rate depreciation.	MCI, WCI, ECI, M, and P eqn.
	October-84	Dummy controls for exchange rate depreciation.	MCI, WCI, ECI, M, and P eqn.
	November-84	Following the September 1984 devaluation, the Central Bank transferred significant amount of resources to commercial banks.	P eqn.
Colombia	Centered Seasonals	Needed to control for changes in wage seasonality occuring after 1990.	WCI and P eqn.
	Interacted Centered Seasonals	Needed to control for changes in wage seasonality occuring after 1990.	WCI and P eqn.
Denmark	DVAT	DVAT=3 for 1977Q4, 2.25 for 1978Q4, and 1.75 for 1980Q3. This dummy controls for three increases in the value-added tax rate.	MCI, WCI, ECI, M, and P eqn.
	DPRSTOP	DPRSTOP= 1 for 1978Q4, for 1979Q1, for 1979Q4, and for 1980Q1. This dummy controls for 4 periods of price controls.	MCI, WCI, ECI, M, and P eqn.
	DCOTAX	DCOTAX= 1 for 1979Q3, and for 1986Q2. This dummy controls for two cases of special commodity taxes.	MCI, WCI, ECI, M, and P eqn.
	DUMCAPCON	DUMCAPCON=1 for 1983(1) through 1998(2); zero otherwise; it controls for the removal of capital controls.	MCI and ECI
	Oct-77	Controls for unidentified data outlier.	P eqn.
	April-78	Controls for unidentified data outlier.	P eqn.
	May-78	Controls for unidentified data outlier.	P eqn.
	October-78	Controls for unidentified data outlier.	P eqn.
	August-80	Controls for unidentified data outlier.	P eqn.
	January-83	Controls for unidentified data outlier.	P eqn.
	1983Q1	Controls for the time it takes for country to adjust to lifting of capital controls.	MCI, ECI, M, and P eqn.
	1983Q2	Controls for the time it takes for country to adjust to lifting of capital controls.	MCI, ECI, M, and P eqn.
	April-86	Controls for pressures in the foreign exchange market which led to a rise in long- and medium-term interest rates, starting in the second quarter of 1986.	P eqn.
	1992Q4	Controls for speculative attacks in the last quarter of '92.	MCI, ECI, M, and P eqn.
	December-92	Controls for speculative attacks.	MCI, ECI, M, and P eqn.
	June-93	Controls for speculative attacks.	MCI, ECI, M, and P eqn.
	July-93	Controls for speculative attacks.	MCI, ECI, M, and P eqn.
	August-93	Controls for speculative attacks.	MCI, ECI, M, and P eqn.
Japan	Dmay	Dummy for May 1990, controlling for a shift from postal savings into M2.	MCI, M, and P eqn.
	Dapril	Dummy for April 1990, controlling for a shift from postal savings into M2.	MCI, M, and P eqn.
	April-89	Dummy controls for VAT increase.	MCI, WCI, ECI, M, and P eqn.
	April-97	Dummy controls for VAT increase.	MCI, WCI, ECI, M, and P eqn.
	DjulyT	Dummy controls for bonus payments.	WCI and P eqn.
	DJuneT	Dummy controls for bonus payments.	WCI and P eqn.

Notation: MCI, WCI, and ECI indicate that the corresponding dummy was allowed to enter unrestrictedly in the money, labor, and external sectors cointegration analysis, respectively. M and P indicate that the dummy entered the money and price equations, respectively.

TABLE A.5 - Dummy Variables Used in the Cointegration Analysis and Single Equation Estimations

Country	*Dummy Variable*	*Explanation*	*Dummy is included in...*
Kenya	February-77	Controls for peak of M2 growth.	MCI, M, and P eqn.
	March-77	Controls for peak of M2 growth.	M and P eqn.
	February-80	Controls for unidentified data outlier.	MCI
	July-81	Dummy controls for drought.	MCI
	December-81	Controls for sharp increases in prices due both to the drought and to the upward adjustment in various administered prices.	P eqn.
	March-85	Controls for first in a series of four adjustments in the central exchange rate.	M and P eqn.
	March-88	Dummy controls for tight monetary policy; Central Bank launches an aggressive treasury bond sale program.	MCI and M eqn.
	May-91	Controls for unidentified data outlier.	P eqn.
	March-92	Controls for unidentified data outlier.	P eqn.
	June-92	Controls for unidentified data outlier.	P eqn.
	February-93	Controls for unidentified data outlier.	P eqn.
	March-93	Dummy controls for devaluation.	MCI
	April-93	Controls for sharp devaluation in the exchange rate as part of a macroeconomic policy adopted in April 93.	M and P eqn.
	June-93	Controls for unidentified data outlier.	M and P eqn.
	October-93	Controls for strong foreign exchange inflows around October 1993; also, exchange rate was unified on October 17, 1993.	M and P eqn.
	January-94	Controls for accelerating inflation due to surge in monetary aggregates, drought, and price liberalization.	P eqn.
	September-94	Controls for unidentified data outlier.	P eqn.
Malaysia	January-84	Dummy controls for withdrawal of subsidies for fuel.	MCI, ECI, M and P eqn.
	February-84	Dummy controls for withdrawal of subsidies for fuel.	MCI, ECI, M and P eqn.
	March-84	Dummy controls for withdrawal of subsidies for fuel.	MCI, ECI, M and P eqn.
Uruguay	November-82	Dummy controls for peso float in late November 1982.	MCI, WCI, M, and P eqn.
	December-82	Dummy controls for sharp fall in peso value; as a result of the float, the banking system experienced massive withdrawals of foreign currency deposits.	MCI, WCI, M, and P eqn.
	December-87	Controls for debt-to-debt conversion scheme.	MCI, WCI, M, and P eqn.
	January-88	Controls for debt-to-debt conversion scheme.	MCI, WCI, M, and P eqn.
	November-89	Controls for unidentified data outlier.	MCI, WCI, M, and P eqn.
	December-89	Controls for unidentified data outlier.	MCI, WCI, M, and P eqn.
	January-90	Controls for unidentified data outlier.	MCI, WCI, M, and P eqn.
	December-92	Controls for unidentified data outlier.	MCI, WCI, M, and P eqn.

Notation: MCI, WCI, and ECI indicate that the corresponding dummy was allowed to enter unrestrictedly in the money, labor, and external sectors cointegration analysis, respectively. M and P indicate that the dummy entered the money and price equations, respectively.

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