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Monetary Conditions Index for Pakistan

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Abstract

The paper discusses how changes in interest rate and exchange rate, through Monetary Conditions Index (MCI), are used for assessing the overall monetary policy stance. The weights for construction of MCI are derived using the Johansen's cointegration techniques. The constructed MCI indicates that Pakistan has eight tight and six soft periods of monetary stance during March 1991 to April 2006. Exchange rate movements and interest rate changes together determined MCI before September 2001. However, MCI moved largely with the changes in interest rate after the September 2001 events, as rupee appreciated due to phenomenal surge in remittances and the incomplete sterilization of forex flows led to unprecedented reduction in interest rates–thus soft monetary stance. MCI reflects tightening of monetary stance from January 2004 after the bottoming out of interest rates due to inflationary concerns.

JEL Classification: C22, C52, E52, E58

Key Words: Monetary Conditions Index, Interest Rate Channel, Exchange Rate Channel.

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1. Introduction

The primary objective of monetary policy is to control inflation through interest rate and exchange rate management. Interest rate and exchange rate are the most important channels of monetary transmission mechanism through which monetary policy actions affect inflation and output in the economy. In interest rate channel, a rise (fall) in interest rate tends to decrease (increase) the aggregate demand which, in turn, recedes (increases) inflationary pressures thus results in a tight (easy) monetary policy stance. Exchange rate channel affects the general price level directly through changes in imported inputs and output prices and indirectly through aggregate demand by changing the pattern of spending in the economy. The extents to which exchange rate changes affect the inflation depend on many factors such as exchange rate pass-through, market structures, elasticities of imports, exports, consumption and investment with respect to exchange rate, etc. Monetary conditions index[1] (MCI), which is a weighted average of a short-term interest rate and exchange rate, provides a useful indicator to assess the monetary policy stance by combining these two channels of monetary transmission mechanism.

The Bank of Canada pioneered the use of MCI as an indicator of monetary policy stance in the late 1980s. Since then the use of an MCI has become popular in several other countries[2]. An MCI provides numeric information about the stance of monetary policy and the increase in MCI relative to the base year is interpreted as monetary tightening, and vice-a-versa. MCI captures, in a single number, the degree of pressure that monetary policy is exerting on the economy [Kesriyeli and Kocaker (1999)]. In order to compute MCI, one has to have relative weights of interest rate and exchange rate which can either be estimated from output equation or from CPI (price) equation. MCI is very sensitive to minor changes in weights, variables, and the assumptions of underlying theoretical models [Ericsson et al. (2000)], therefore, the usage of MCI as an operational target in monetary policy implementation is hazardous [Eika et al. (1996)].

[1] MCI is a measure of the degree of tightness (ease) of monetary policy compared to some base period. MCI takes into account both interest rate and exchange rate changes, assigning pre-determined (estimated) weights, and tracks the impact of these changes on monetary conditions.

Owing to the liberalization of financial markets in Pakistan, the role of interest rates and the exchange rate in the economy has risen over time which also makes it necessary to find out the combined effect of policy variables. Despite the aforementioned caveats, MCI is a valuable indicator for assessing the monetary stance which motivated us to construct the MCI for Pakistan. This paper aims at constructing an MCI for Pakistan in order to facilitate the monetary authorities to assess the monetary policy stance in a more complete way. While Qayyum (2002) constructed an MCI for Pakistan, it has various shortcomings: (i) arbitrary lag length selection for both unit-root and Johansen' cointegration tests; (ii) the usage of log interest rates that is contrary to convention; and (iii) incorrect coefficient sign in the long-term cointegrating equation. Keeping in view these shortcomings, we have not only extended the time series by including data till June 2005 but also removed the aforementioned weaknesses by using interest rate in levels and proper lags selection based on Final Prediction Error (FPE), Likelihood Ratio (LR), Akaike Information Criterion (AIC), Schwarz Criterion and Hannan-Quinn (HQ) Criterion. Besides call money rate, we have also used the 6-month T-bill rate in assessing monetary stance. In addition, we have derived the weights from CPI and output equation, separately. Using the estimated weights, we construct the MCI with different base years in order to assess monetary policy with reference to important events in the liberalization process.

Using the weights of exchange rate and interest rate computed from cointegrating equations of both prices and output, MCI is computed from March 1991 to April 2006. MCI, computed on the basis of price cointegrating equation, indicates fourteen distinct episodes (eight tight and six soft) of monetary stance for Pakistan. MCI moved in tandem with the changes in interest rate up to September 2001 as exchange rate had mostly moved in one-way direction (i.e. the Rupee depreciates overtime). Specifically, a decline in interest rates resulted in soft monetary policy and a rise in interest rates tightened the policy. After September 2001, the fall in interest rates led to the softening of monetary conditions till December 2003 which was slightly offset by the reversal in Rupee/Dollar parity. MCI

[2] The Reserve Bank of New Zealand has been using MCI as an operational target since 1996. Central Banks of Norway and Sweden use MCI only as an indicator for policy guidance while IMF, OECD, Goldman Sachs, JP Morgan and Merrill Lynch use MCIs for evaluating monetary conditions in those countries [Hataiseree (1998)].

reflects tightening of monetary stance from January 2004 after the bottoming out of interest rates due to inflationary concerns.

The rest of the paper is organized as follows. The next section presents some stylized facts. Section 3 gives a review of literature on MCI and section 4 describes the construction of MCI. The methodology adopted for the analysis is discussed in section 5. The empirical results are presented in section 6 and section 7 concludes the study.

2. Some stylized facts

Prior to the financial sector reforms of late 1980s, monetary and credit policies in Pakistan were conducted through direct quantitative controls within the framework of credit budgeting and credit ceilings.[3] Beside global and sectoral credit ceilings, various instruments such as direct credit control included budget subsidies, credit floors, refinancing facilities together with the imposition of cash reserves and liquidity requirements were used.

During that period, the money market comprised call money market, credit ceiling market and market for 3-month T-bills available on tap. Commercial banks covered their long and short position through lending and borrowing in the call market. In case, the interbank market could not square itself, rediscounting facility provided ready cash against the T-bills. Likewise, unutilized portions of the credit ceiling could be traded in the interbank market to help commercial banks avoid penalties for unutilized portions of their respective credit ceiling and SBP in achieving their global credit targets. The T-bills (tap) were sold to commercial banks and long-term instruments like market loans and GTDRs were subscribed by non-banks, at government administered interest rates. This resulted in segmentation in the market for government paper. Moreover, the returns on National Saving Schemes

[3] National Credit Consultative Council (NCCC), set up in 1972 under the auspices of the State Bank of Pakistan, formulates the annual Credit Plan and recommends monetary and credit expansion within safe limits and distribution of credit among various sectors in conformity with the socio-economic objectives and priorities and targets set out in the Annual Development Plan to the government. The NCCC determines the safe level limit of monetary expansion on the basis of projected growth rate, estimated rate of monetization of economy and likely changes in prices.

(NSS) were higher than the papers available to the commercial banks, which created disintermediation.

The financial sector reforms, started in the late 1980s, transformed Pakistan's direct controls to a market-based liberalized one. With the liberalization, money market gained prime importance in the transmission of monetary policy. During 1995, credit deposit ratio (CDR) was abolished and Open Markets Operations (OMO) were institutionalized as the indirect controls become the only option for conduct of monetary policy. In essence, the post-reform money market is crucial in the transmission mechanism.

The major tools for SBP to contain monetary growth and manage market liquidity are CRR and OMO, while the direction of monetary policy is indicated by changes in discount rate. The overall monetary stance is reflected in the assets prices, long-term interest rates and exchange rate. After the adoption of free floating exchange rate regime, Pak. Rupee exchange rate is also stabilized through the money market.

Rationalizing the rate of return structure has been another important reform measure, which was liberalized in different phases. As a major step towards the medium-term goal of market-based monetary management, the State Bank of Pakistan removed the cap on maximum lending rate of banks and financial institutions in March 1995. Accordingly, banks and other financial institutions received freedom to set their own lending rates keeping in view the demand and supply conditions in the market.[4]

3. Review of Literature

Although many countries (mainly developed countries) and international institutions and firms such as the IMF, OECD, Goldman Sachs, JP Morgan, Merrill Lynch, etc., are using MCI as an indicator of monetary stance, there is limited literature available on MCI. It mainly concentrates on the usefulness

[4] For more detail, see "Pakistan: Financial sector Assessment 1990-2000", State Bank of Pakistan, 2002.

of MCI as an indicator of monetary stance, it's construction–especially methods of computing relative weights–and hazards involved in using MCI as an operational target in monetary policy.

As mentioned earlier, MCI was pioneered by the Bank of Canada and naturally most of the literature on the usefulness of MCI as either an operational target or just an indicator of monetary stance was developed in the Bank of Canada. Charles Freedman (1996), Deputy Governor of the Bank of Canada, illustrated the usefulness of MCI as follows:

> *"….under a flexible exchange rate regime, monetary policy actions have their effect through both interest rates and the exchange rate. Indeed, the market response to a given central bank action can lead to quite different movements of the two variables in different circumstances. Another reason for the emphasis on monetary conditions is that there can be exogenous movements in the exchange rate (for example, because of a shock to confidence), and the monetary conditions index (MCI) clearly points out the need to take action to offset the effect of such movements on aggregate demand."*

Similarly, Hataiseree (1998), Kesriyeli and Kocaker (1999), and Korhonen (2002),[5] while computing MCI, highlighted the usefulness of MCI as an indicator in determining the monetary policy stance for Thailand,[6] Turkey and EU accession countries respectively.

On the other hand, many studies criticize MCI both on its conceptual and empirical foundations [see Eika et al. (1996); King (1997); and Ericsson, Jansen, Kerbeshian and Nymoen (2000)]. Specifically, since MCI is the weighted average index of changes in exchange rate and interest rate from the base period, the construction of MCI requires the derivation of relative weights of exchange rate and interest rate from either output or price equation. Empirically, there are many issues involved in the

[5] Korhonen (2002) constructed monetary conditions indices for three EU accession countries; the Czech Republic, Poland and Slovakia. The author found that the results for the Czech Republic are in line with related research on small OECD countries. In case of Poland, the results indicate a surprisingly large influence of exchange rate on output.

[6] The estimated weights for exchange rate and interest rate for Thailand is 3.3:1 as against the weights of 1:3 in case of Canadian economy.

construction of MCI such as the selection of variables,[7] aggregation[8] and assumptions of the underlying theoretical models[9] that underpin the estimation of weights. Due to these empirical issues, MCI is very sensitive to minor changes in weights, variables, and the assumptions of underlying theoretical models [Ericsson et al. (2000)], therefore, the usage of MCI as an operational target in monetary policy implementation is hazardous [Eika et al. (1996)]. In addition, Mishkin (2000), in his review of Canada's inflation targeting, argues that the cost of MCI outweighs its benefits, and MCI should be abandoned because it is flawed. Despite the aforementioned caveats, MCI is a valuable indicator for assessing the monetary stance which motivated us to construct MCI for Pakistan.

4. Construction of the Monetary Conditions Index (MCI)

The Monetary Conditions Index at time t, MCI_t, is defined as the weighted sum of changes in the exchange rate (ER in logs) and in the interest rate ($INTR$ in levels) from their levels in a chosen base year. The formula for MCI is as follows:

$$MCI_t = w_{INTR}\left[INTR_t - INTR_b\right] + w_{ER}\left[\log(ER_t) - \log(ER_b)\right] \quad (1)$$

Where $INTR_t$ and ER_t are interest rate (call money rate/6-month T-bill rate) and exchange rate at time t, respectively. $INTR_b$ and ER_b are interest rate and exchange rate at a given base year. The most important factor is weights, w, as the value of these weights provides useful information regarding the relative importance of interest rates and exchange rates in influencing the ultimate goal of either output or inflation.

As far as the derivation of relative weights of interest rate for MCI is concerned, the literature has suggested three approaches for estimating MCI weights, i.e. single equation approach by estimating either price or output equation [which has been used by IMF, OECD, Deutshe Bank, and Merrill

[7] Many possible exchange rates and interest rates are available (REER, NEER, and nominal exchange rate for exchange rate and weighted average lending rate (WALR), overnight interest rate, T-bills rates, etc. for interest rate), and using different variables in the MCI calculation can affect the magnitude and the sign of MCI weights.
[8] Aggregation of bilateral exchange rates and interest rates through NEER/REER and WALR respectively involve the loss of information so the MCIs implicitly assume that these information losses are not important for policy.
[9] This refers to dynamics, data non-stationarity, exogeneity and feed back, choice of variables, parameter constancy, etc.

Lynch; cited in Ericsson et al. (2000)]; trade share approach by estimating long-run exports to GDP ratio equation [which has been used by JP Morgan; cited in Ericsson et al. (2000)] and multiple equation approach by estimating the system of equations through cointegration method [which has been utilized by Kesriyeli and Kocaker (1999) for Turkey; Batini and Turnbull (2000) for UK]. The first two approaches for estimating MCI weights have omitted variables bias, dynamics (it refers to short term and long-term multipliers of the relationship), exogeneity and feedback problems while the cointegration approach is preferable because it takes care of the aforementioned problems. Therefore, we have utilized the cointegration approach in deriving the MCI weights in this paper.

The selection of a single interest rate and exchange rate is central in constructing the MCI index from many possible interest rates and exchange rates. If we are deriving the weight from aggregate demand equation, then trade-weighted effective exchange rate is more relevant in trade equation and hence in aggregate demand equation. On the other hand, nominal exchange rate is more appropriate in price equation as compared to trade-weighted effective exchange rate. Similarly, alternative short-term interest rate such as call/overnight rate and T-bills rates are available. It is appropriate to use benchmark short-term rate in the derivation of MCI weights and compare the derived MCI with call/overnight rate-based MCI.

The weightings of the two variables in MCI can be determined by employing various econometric techniques such as: (i) single equation of either price or output; (ii) trade elasticities approach; and (iii) Vector Autoregressive (VAR) and Johansen's cointegrating models. As discussed in the last section, the use of Vector Autoregressive (VAR) and Johansen's cointegrating models is preferable due to the shortcomings in the first two approaches which suffer from omitted variables bias, dynamics, exogeneity and feedback problems while the cointegration approach is preferable because it takes care of the aforementioned problems.

5. Empirical Preliminaries

In this paper, we employ Johansen's cointegration method to derive the weights of interest rate and exchange rate from four systems of equations with alternative definition of interest rate and exchange rate [(system 1: LCPI, LER, and CMR); (system 2: LCPI, LER and TBR); (system 3: LLSM, LNEER, and CMR); and (system 4: LLSM, LNEER, and TBR)].

The following steps are involved in this procedure: (i) Augmented Dickey Fuller (ADF) is used to test the stationarity of data; (ii) Before applying the Johansen co-integration test, optimal lag length[10] of the system is determined with the help of an unrestricted VAR model; (iii) Johansen co-integration test is applied in order to discover the long run relationships among the variables using the optimal lag length determined in unrestricted VAR model. The coefficients recovered from the long-term cointegrating vector are subsequently used as relative weights in MCI construction.

Unit Root Tests

The stationarity property of each data series is investigated by testing the presence of a unit root through the ADF test. Table 1 exhibits the results of the ADF test of one or more unit roots in the variables. The analysis is performed using monthly data from March 1991 to February 2006. The data was obtained from the State Bank of Pakistan (SBP) Monthly Statistical Bulletin and the Bank's in-house database. The ADF test is performed on levels as well as on first difference. The results suggest that the null hypothesis of the unit root for all of the variables can be rejected at
neither 1 percent nor 5 percent level of significance. It is concluded that the variables are integrated of order one which further expand the possibilities of long-term relationship in these variables.

Optimal Lag Length Selection

The selection of the appropriate lag length is crucial to estimate the cointegration equation due to the sensitivity of Johansen procedure to the choice of lag length. We have selected six lags as optimal lag length for system 1 based on the Likelihood Ratio (LR), Final Prediction Error (FPE), and Akaike Information Criterion (AIC) while for system 2 we have selected seventeen lags on the basis of LR. In

case of output equations, we have selected three lags as optimal lags for system 3 on the basis of LR, FPE, AIC, Schwarz Criterion (SC) and Hannan-Quinn (HQ) criterion and three lags for system 4 on the basis of HQ criterion.[11]

Johansen' Cointegration Test

After determining the lag length of the unrestricted VAR, the next step is to determine the rank of the cointegrating vectors. On the basis of Johansen's cointegration technique, which uses maximum eigenvalue (λ max) and trace statistics, we determine the rank of the cointegrating vectors (see Table 2). As reported, the trace and λ max test suggest two cointegrating vectors for both systems of equations pertaining to price equation. On the other hand, there is a unique cointegrating vector for system 3 and 4, output equations, as indicated by trace and max tests. The sign of nominal exchange rate coefficient in the identified cointegration vectors for price systems is as per expectation, i.e. exchange rate is positively related to inflation as suggested by theory (see Table 3). Specifically, the exchange rate has an important role in price adjustment in an open economy. The exchange rate influences price formation through direct and indirect channels. In case of direct channel, exchange rate depreciation (appreciation) can increase (decrease) the domestic prices of imported finished goods and imported inputs. While it affects aggregate demand indirectly via international competitiveness in export and import.

Another channel of monetary transmission mechanism is interest rate channel. The interest rate sign is negative in price systems in conformity with the theory. Both investment and consumption are affected by a change in the interest rate. An increase in interest rate adds to the capital costs of firms and lowers the present value of their future profit–thus a decline in investment. At the same time, consumption also tends to fall, leading to a decline in aggregate demand, and hence inflation to decrease. The signs of nominal effective exchange rate and interest rate are also correct in output or aggregate demand system (Table 3). The negative sign of NEER needs some explanation.

[10] The lag length should be high enough to ensure that the errors are approximately white noise but small enough to allow the estimation.

[11] Although FPE and AIC criterion suggest 4 lags as optimal, however, the coefficient of LNEER is insignificant in cointegrating equation.

Theoretically, the depreciation of NEER has either negative or positive impact on aggregate demand depending on the relative elasticities of exports and imports. If the elasticity of exports with respect to NEER is relatively stronger than import elasticity, the sign of NEER depreciation on aggregate demand would be positive and vice versa.

6. Computation of Monetary Conditions Index (MCI)

Finally, two indices have been constructed using a fixed base of 100 for March 1991, and January 1997 (see Appendix 1). The reason for choosing these periods is that, the SBP moved towards market-based auctions of T-bills from March 1991. In January 21, 1997, the government granted full autonomy to SBP in the conduct of monetary policy.

Using the estimated coefficients of interest rate and the exchange rate variables in cointegration vectors of price system, the ratios or weights of the MCI indices turn out to be 1: -0.35 which indicates that the interest rate channel into inflation is found to be more powerful than the exchange rate channel.[12] This is consistent with the empirical findings of low exchange rate pass-through to domestic prices in Pakistan [see Hyder and Shah (2004); Choudhri, Faruqee, and Hakura (2002); and Eatzaz and Saima (1999)]. As far as the relative weights from aggregate output systems are concerned, exchange rate channel is more powerful with relative weights of 1:3.8 and 1: 5.3 as compared to other open economies such as New Zealand, Sweden and Canada, where the interest rate channel is more powerful.[13]

The weights derived from the price systems are used to construct the MCI indices and further analysis from March 1991 to February 2006 as reflected by Figures 1 and 2.[14] An increase in MCI is interpreted as a tightening of the monetary condition while a decrease in MCI means that the monetary condition is easing relative to the base year. While the two indices exhibit similar trends, they only differ in constant value. In case of MCI (1) with March 1991 as a base, MCI fluctuates

[12] We also estimated the cointegrating vector with alternative interest rate (overnight interest rate). The weights of interest rate and exchange rate are 1: -1.03.

[13] The estimated values of the MCI ratio are reported approximately 2:1 for New Zealand (Nadal-De Simone et al. 1996); 2:1 for Sweden (Hansson and Lindberg 1994); and 3:1 for Canada (Freedman 1995).

above the base year as shown by Figure 1, indicating that monetary policy remained tight up to January 2002. After that, MCI index tended to decline continuously from the base period signaling a general loosening of monetary conditions. It is important to note that the MCI index was continuously declining from June 2001 primarily due to a sharp reduction in interest rate amid incomplete sterilization of money supply arising from the SBP intervention in the foreign exchange market which was slightly offset by the appreciation of rupee/dollar parity. However, MCI inched up slightly from January 2004, which reflects the tightening of monetary conditions.

As shown in Table 4, there are 14 distinct episodes[15] on the basis of MCI (1) during March 1991 to February 2006. Pakistan has eight tight and six soft periods of monetary stance. As shown in Figure 6, the historical trend of exchange rate up to September 2001 has two main features: (i) the movement has been mostly one-way (i.e. the Rupee depreciates overtime); and (ii) this has a stepwise pattern which suggests that the Rupee rate has witnessed a long period of stability before being interrupted by sharp phases of depreciation (see, SBP Annual Report 2001-2002). Therefore, the interest rate is the swing factor in the movement of MCI and hence in the monetary stance (Figure 5). Specifically, a decline in interest rates resulted in a soft monetary policy and a rise in interest rates tightened the policy.

The external shock of September 11 and the subsequent surge in workers' remittances into the formal banking channel led to continuous appreciation of the Rupee in the interbank market. Additional impetus to dollar liquidity in the interbank market also came from narrowing trade deficit. The consequent influx of huge Rupee liquidity in the money market due to partial sterilization of reserve money and better economic management also led to a sharp fall in interest rates across the board. Consequently, the monetary policy remained largely soft for 27 months up to December 2003 (barring some short patches of tight monetary stance in between when MCI edged up slightly; see Table 4 and

[14] Figure 3 and 4 exhibits the MCIs based on the system comprising output, NEER and interest rate.
[15] The decline or increase of MCI index in four or more than four months in a row is identified as an episode for analyzing monetary stance.

Figures 1 and 2). Since January 2004, monetary policy stance has tightened as reflected by MCI inching up due to a rise in interest rates in a bid to control a visible increase in inflationary pressures.

7. Conclusion

This paper discusses how both interest rates and exchange rates need to be taken into account, through MCI, when assessing the monetary policy stance. The weights used to construct MCI are derived from the Johansen's cointegration method and the sample covers the period from March 1991 to April 2006. Using the estimated coefficients of interest rate and the exchange rate variables in cointegration vectors of price and output systems, two indices have been constructed using a fixed base of 100 for March 1991 and January 1997. Both indices have shown co-movement. The subsequent analysis of MCI with base January 1997 indicates fourteen distinct episodes of monetary stance during March 1991 to April 2006. Pakistan has eight tight and six soft periods of monetary stance. The exchange rate has mostly moved one-way (i.e. the Rupee depreciates overtime) up to September 2001, and MCI moved in tandem with the changes in interest rate. Specifically, a decline in interest rates resulted in soft monetary policy and a rise in interest rates tightened the policy. After September 2001, the fall in interest rates led to the softening of monetary conditions till December 2003 which was slightly offset by the appreciation of Rupee/Dollar parity. Since January 2004, monetary policy stance has been tightened as reflected by the inching up of MCI as the SBP, in a bid to control inflationary pressures, raised the cut-off rate of 6-months T-bills rate sharply while the slight depreciation of exchange rate, to some extent, offset the impact on MCI.

Although MCI can serve as an important indicator of monetary stance, the use of MCI as an operational tool is limited due to its substantive limitations and caveats. In the first place, the selection of weights to the interest rate and exchange rate depend on their relative impact on inflation and aggregate demand (method of estimation). Moreover, the weights may not remain stationary and tend to change over-time. Secondly, MCI could vary on the choice of variable. Thirdly, the market expectation of a shift in policy is not captured by MCI. Therefore, while MCI can be a useful indicator of monetary policy stance, it should be used with caution alongside other indicators.

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Table 1. Unit Root Test

Variable	Augmented Dickey Fuller Test		Order of integration
	Level	First Diff.	
LCPI	-1.77(0)	-11.39** (11)	I(1)
LLSM	-0.03 (2)	-17.05** (1)	I(1)
TBR	-2.19 (1)	-10.61** (0)	I(1)
CMR	-0.97 (5)	-9.75** (4)	I(1)
LER	-0.81 (1)	-10.50** (0)	I(1)
LNEER	-1.57 (1)	-9.36** (0)	I(1)

**, * indicate significance at 1 % and 5 % respectively.

Figures in parenthesis are optimal lag length based on SIC criteria
Where LCPI: log of Consumer Price Index; LLSM; log of Large Scale Manufacturing Index; TBR: 6-month T.bill rate; CMR: Call money rate; LER: log of average exchange rate; and LNEER: log of nominal effective exchange rate .

Table 2. Cointegration Results Based on Johansen Test

	max rank tests Ho:			Trace tests Ho:		
	r = 0	r = 1	r = 2	r = 0	r = 1	r = 2
No deterministic trend in data						
System (1) [LCPI, CMR, LER]	33.35**	15.07**	2.06	50.48**	17.33*	2.06
Constant and no linear deterministic trend in data						
System (2) [LCPI, TBR, LER]	36.94**	20.32**	4.14	61.40**	24.47*	4.14
Constant and linear deterministic trend in data						
System (3) [LLSM, CMR, LNEER]	29.71*	6.80	1.51	22.92*	5.28	1.51
Constant and no linear deterministic trend in data						
System (4) [LLSM, TBR, LNEER]	44.85*	18.24	5.39	26.61*	12.86	5.59

** Denotes rejection of Ho at the 1 % significance level
* Denotes rejection of Ho at the 5 % significance level

Table 3. Long-Run Relationship: Cointegrating Vectors

	No. of Coint.	Cointegrating Vector
System (1) [LCPI, CMR, LER]	2	1.00 + 1.083 - 1.116
		(0.015) (0.730)
System (2) [LCPI, TBR, LER]	2	1.00 + 3.967 - 1.385 + 1.307
		(0.751) (0.109) (0.500)
System (3) [LLSM, CMR, LNEER]	1	1.00 + 0.063 + 0.237
		(0.010) (0.131)
System (4) [LLSM, TBR, LNEER]	1	1.00 + 0.038 + 0.200 - 6.080
		(0.006) (0.102) (0.470)

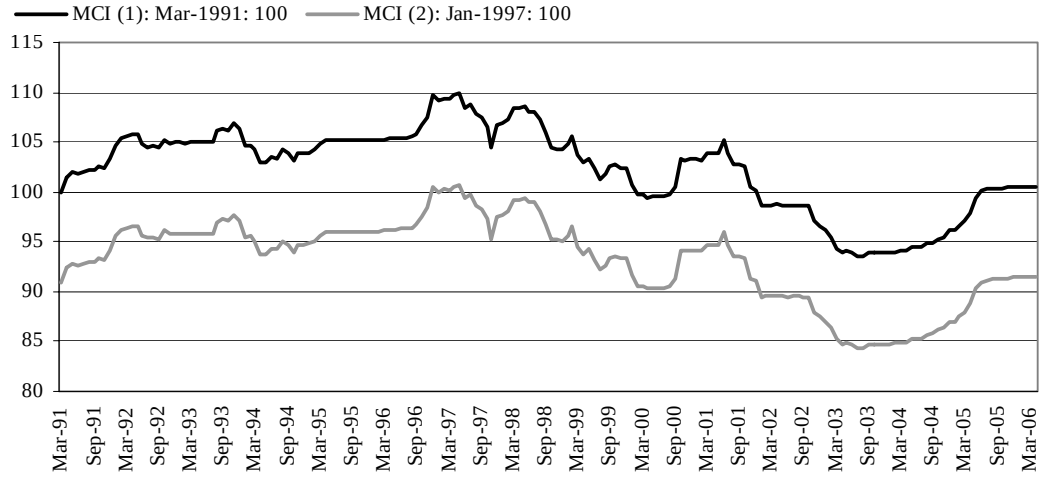
Figures in parentheses are standard error

Table 4: Stance of Monetary Policy during March 1991 to June 2005

Duration	MCI	Exchange Rate	6-months T.bills Rate	Monetary Stance	Remarks
1. Jul-91 to Oct-91 (4)	82.83-93.33	24.45-24.50	9.40-9.90	Tight	Tight liquidity condition in the money market due to increased government borrowing from the banking system for budgetary support. In addition, SBP increased the repo rate from 13 percent to 14 percent w.e.f. 01-02-1992.
2. Dec-91 to Apr-92 (5)	94.09-96.56	24.61-24.90	10.66-13.14	Tight	
3. Mar-94 to Jul-94 (5)	95.09-94.22	30.36-30.45	11.73-10.87	Soft	Interest on T-bills declined mainly due to SBP's decision to reduce the repo rate from 17.0 percent to 15.0 percent w.e.f. 01-03-1994.
4. Nov-94 to Apr-95 (6)	94.70-96.07	30.52-30.73	11.35-12.72	Tight	Tight monetary policy due to inflationary concern and SBP decided to eliminate interest rate subsidies to make it market determined following the financial sector reforms accompanied by exchange rate depreciation due to current account deficit. In addition, SBP pushed up the repo rate thrice during this period from 15.5 percent to 20 percent (15.5 percent w.e.f. 6-02-1995; 16.5 percent w.e.f. 29-10-1995; 17 percent w.e.f. 11-12-1995; and 20 percent w.e.f. 22-10-1996).
5. Jan-96 to Apr-96 (4)	96.06-96.21	34.09-34.48	12.74-12.90	Tight	
6. Aug-96 to Dec-96 (5)	96.40-100.48	35.32-39.93	13.10-17.22	Tight	
7. Jun-97 to Nov-97 (6)	99.31-95.33	40.21-43.84	16.05-12.10	Soft	In order to provide comfort from Asian Financial Crisis, SBP not only devalued the exchange rate but also reduced the repo rate and exports refinance rate. In addition, SBP also reduced the reserves requirement. In addition, SBP reduced the repo rate from 18.5 percent to 18 percent w.e.f. 29-10-1997.
8. Dec-97 to May-98 (6)	97.57-99.47	43.84-43.84	14.34-16.24	Tight	Tight liquidity position pushed the Interest rate up due to brisk revival of private sector credit while the SBP repo rate remained unchanged at 18 percent during this period.
9. Mar-99 to Jul-99 (5)	94.56-92.17	46.00-51.37	11.35-9.00	Soft	Major donors' countries imposed economic sanctions and IMF halted all it's assistance to Pakistan following the atomic detonation in May 1998. Increased government borrowing from the SBP for budgetary support eased the interest rate in the money market. In addition, SBP reduced the repo rate thrice from 16.5 percent to 13.0 percent during this period (15.5 percent w.e.f. 04-03-1999; 14.0 percent w.e.f. 03-04-1999; and 13.0 percent w.e.f. 19-05-1999).
10. Nov-99 to Apr-00 (6)	93.3-90.3	51.79-51.79	10.13-7.13	Soft	Following the change in government and with no binding targets on monetary management, interest rate declined despite the higher government borrowing's for budgetary support due to compositional shift of government borrowing from commercial banks to SBP. SBP also reduced the repo rate from 13 percent to 11 percent w.e.f. 05-01-2000.

11. May-00 to Oct-00 (6)	90.37-94.13	51.79-57.47	7.20-11.0	Tight	Free fall in exchange rate following the SBP's decision to abandon the fixed exchange rate regime in favor of flexible exchange rate. SBP adopted monetary instruments to quell the speculative activities in exchange rate, which include pushing up the discount rate three times from 11 percent to 14 percent (12 percent w.e.f. from 19-09-2000; 13 percent w.e.f. 05-10-2000; and 14 percent w.e.f. 07-06-2001) and the increase in the cash reserve requirement from 5 percent to 7 percent w.e.f. 7-10-2000.
12. Oct-01 to Jan-02 (4)	93.40-89.47	61.50-60.26	10.29-6.35	Soft	Surge in Workers' remittances through formal banking channels following the post-September 11 international crackdown on informal banking channels (hundi/hawala). These inflows not only helped SBP to build unprecedented forex reserves but also caused a sharp decline in interest rates due to ample rupee liquidity. In addition, SBP reduced the discount rate twice from 10 percent to 7.5 percent during these periods (9 percent w.e.f from 23-01-2002; and 7.5 percent w.e.f. 18-11-2002).
13. Sep-02 to Apr-03 (8)	89.49-84.77	59.17-57.81	6.37-1.64	Soft	
14. Jan-04 to April-06 (28)	84.77-91.41	57.43-60.05	1.68-8.2910	Tight	Higher trade deficit due to higher international oil prices and machinery imports depreciated the exchange rate. SBP tightened the monetary policy due to Inflationary concerns. With effective from 11-04-2005, SBP increased the discount rate from 7.5 percent to 9 percent.
Note: Figures in parenthesis are number of months					

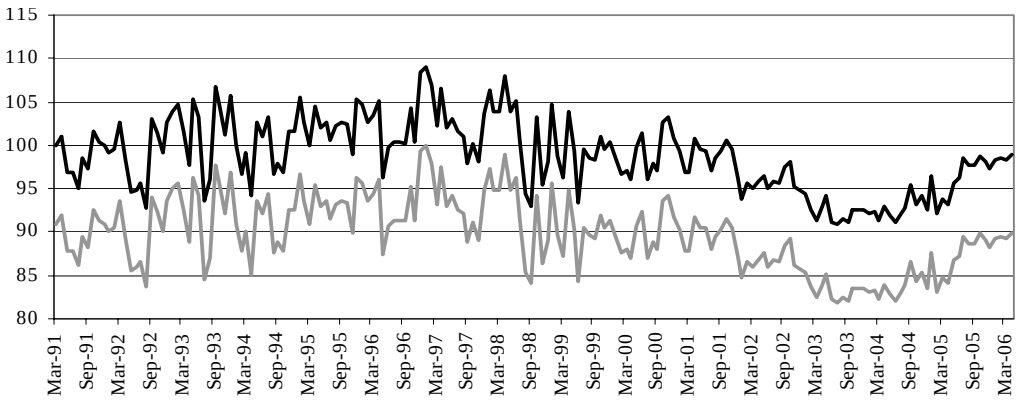
Figure 1: Monetary Condition Indicies (on the basis of system of equations 2: CPI, ER and TBR)



MCI (1): Initiation of T.Bills Auction

MCI (2): SBP Autonomy of Janurary 1997

Figure 2: Monetary Condition Indicies (on the basis of system of equations 1: CPI, ER and CMR)



MCI (1): Initiation of T.Bills Auction
MCI (2): SBP Autonomy of Janurary 1997

Figure 3: Monetary Condition Indices (on the basis of system of equations 3: LLSM, LNEER, and CMR: Jan 1997=100)

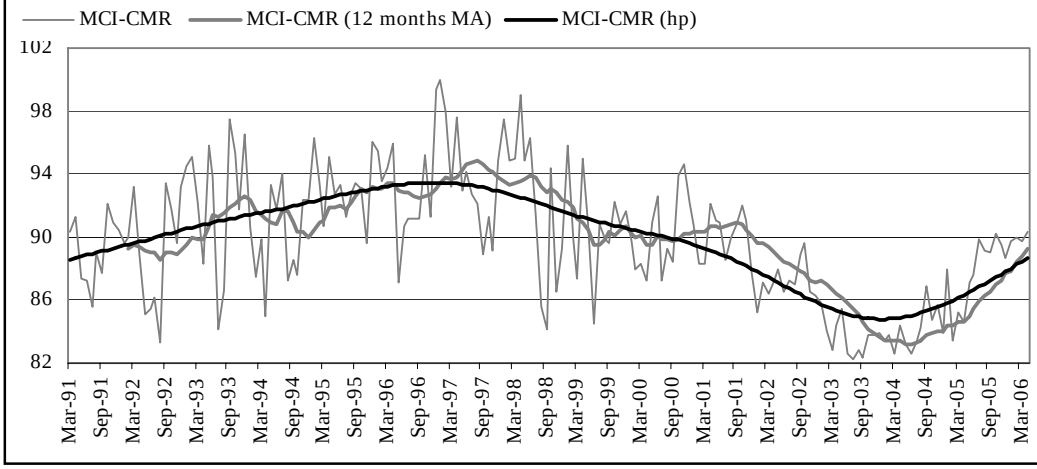


Figure 4: Monetary Condition Indices (on the basis of system of equations 4: LLSM, LNEER, and TBR: Jan 1997=100)

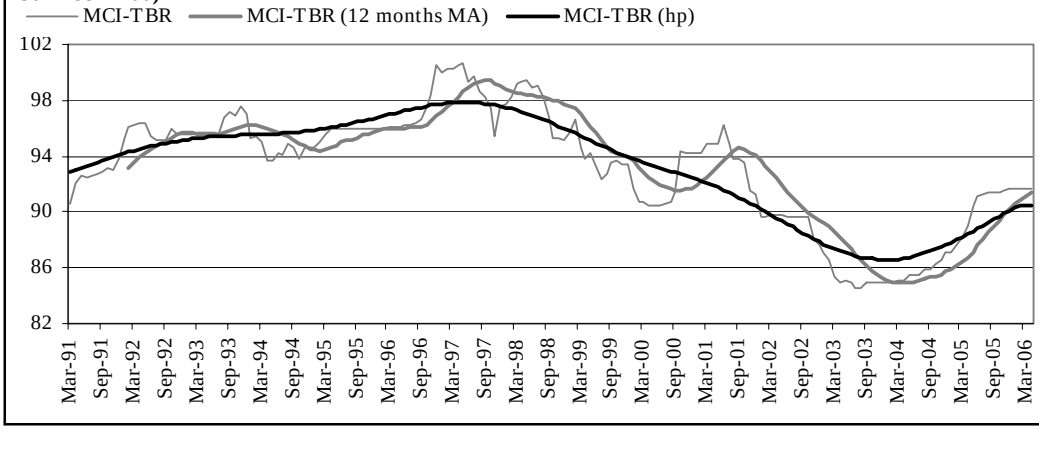


Figure 5: 6-months T.bill Rates, Call Money Rates, Inflation and MCIs (computed from systems of equation comprising prices)

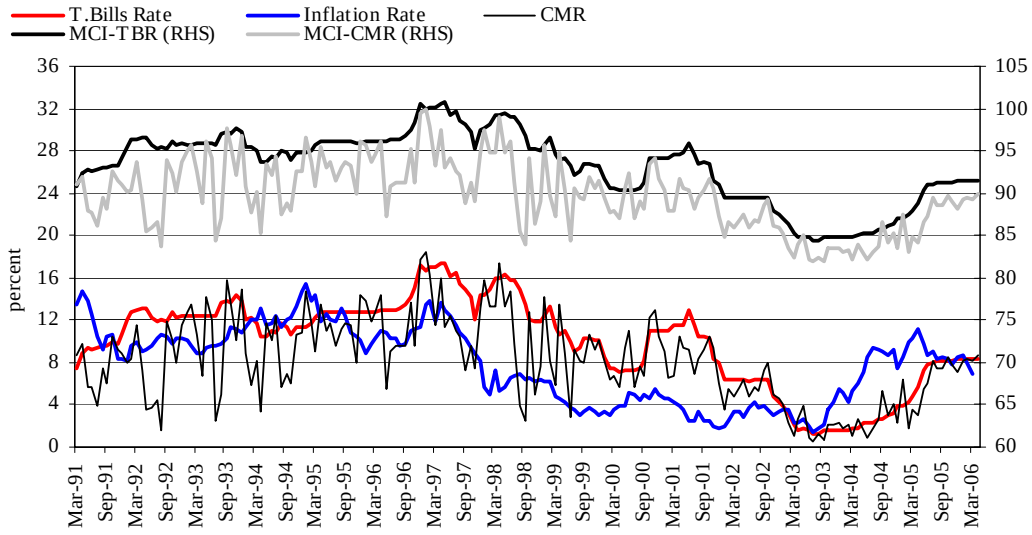
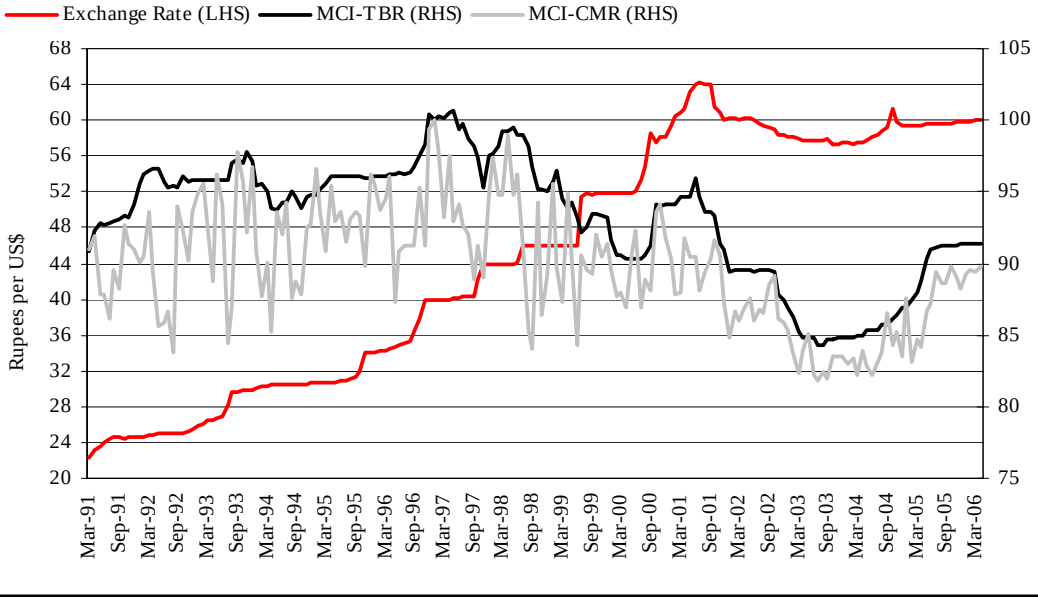


Figure 6: Exchange Rate and MCIs (computed from systems of equations comprising prices)



Appendix: Monetary Condition Indices

System of Equations (1): [LCPI, LER and CMR]

	MCI (1)	MCI (2)		MCI (1)	MCI (2)		MCI (1)	MCI (2)
Mar-91	100.0	91.0	Apr-96	105.1	96.1	May-01	99.5	90.5
Apr-91	100.9	91.9	May-96	96.3	87.3	Jun-01	99.4	90.4
May-91	96.9	87.9	Jun-96	99.8	90.8	Jul-01	97.1	88.1
Jun-91	96.8	87.8	Jul-96	100.3	91.3	Aug-01	98.5	89.4
Jul-91	95.1	86.1	Aug-96	100.3	91.3	Sep-01	99.4	90.3
Aug-91	98.5	89.5	Sep-96	100.3	91.2	Oct-01	100.6	91.6
Sep-91	97.3	88.2	Oct-96	104.3	95.3	Nov-01	99.6	90.6
Oct-91	101.7	92.7	Nov-96	100.3	91.3	Dec-01	96.3	87.3
Nov-91	100.4	91.4	Dec-96	108.4	99.4	Jan-02	93.8	84.8
Dec-91	100.0	91.0	Jan-97	109.0	100.0	Feb-02	95.7	86.7
Jan-92	99.1	90.1	Feb-97	107.0	98.0	Mar-02	95.0	86.0
Feb-92	99.5	90.5	Mar-97	102.2	93.2	Apr-02	95.9	86.9
Mar-92	102.7	93.6	Apr-97	106.6	97.6	May-02	96.5	87.5
Apr-92	98.4	89.4	May-97	102.0	93.0	Jun-02	95.1	86.0
May-92	94.6	85.6	Jun-97	103.1	94.1	Jul-02	95.8	86.8
Jun-92	94.9	85.9	Jul-97	101.7	92.7	Aug-02	95.6	86.5
Jul-92	95.7	86.6	Aug-97	101.1	92.1	Sep-02	97.5	88.5
Aug-92	92.8	83.8	Sep-97	97.9	88.9	Oct-02	98.2	89.2
Sep-92	103.0	94.0	Oct-97	100.2	91.2	Nov-02	95.2	86.1
Oct-92	101.3	92.3	Nov-97	98.1	89.0	Dec-02	94.9	85.8
Nov-92	99.2	90.1	Dec-97	103.7	94.7	Jan-03	94.4	85.4
Dec-92	102.7	93.6	Jan-98	106.4	97.4	Feb-03	92.6	83.6
Jan-93	104.0	94.9	Feb-98	103.8	94.8	Mar-03	91.4	82.4
Feb-93	104.6	95.6	Mar-98	103.8	94.8	Apr-03	93.0	84.0
Mar-93	101.7	92.7	Apr-98	108.0	98.9	May-03	94.1	85.1
Apr-93	97.8	88.8	May-98	103.8	94.8	Jun-03	91.2	82.2
May-93	105.2	96.2	Jun-98	105.2	96.2	Jul-03	90.9	81.8
Jun-93	103.2	94.2	Jul-98	100.3	91.3	Aug-03	91.5	82.5
Jul-93	93.5	84.5	Aug-98	94.4	85.4	Sep-03	91.0	82.0
Aug-93	96.0	86.9	Sep-98	93.1	84.0	Oct-03	92.5	83.5
Sep-93	106.8	97.8	Oct-98	103.2	94.2	Nov-03	92.5	83.5
Oct-93	104.7	95.6	Nov-98	95.4	86.4	Dec-03	92.5	83.5
Nov-93	101.1	92.1	Dec-98	98.1	89.1	Jan-04	92.1	83.1
Dec-93	105.8	96.8	Jan-99	104.6	95.6	Feb-04	92.4	83.4
Jan-94	99.9	90.9	Feb-99	98.7	89.7	Mar-04	91.3	82.3
Feb-94	96.8	87.7	Mar-99	96.3	87.3	Apr-04	93.0	84.0
Mar-94	99.1	90.1	Apr-99	103.9	94.9	May-04	91.9	82.9
Apr-94	94.2	85.2	May-99	99.4	90.4	Jun-04	91.2	82.1
May-94	102.6	93.5	Jun-99	93.3	84.3	Jul-04	92.1	83.1
Jun-94	101.1	92.0	Jul-99	99.6	90.6	Aug-04	92.8	83.8
Jul-94	103.3	94.3	Aug-99	98.6	89.6	Sep-04	95.5	86.5
Aug-94	96.6	87.6	Sep-99	98.3	89.3	Oct-04	93.3	84.2
Sep-94	97.8	88.8	Oct-99	101.0	92.0	Nov-04	94.3	85.3
Oct-94	96.9	87.9	Nov-99	99.5	90.5	Dec-04	92.5	83.5
Nov-94	101.6	92.6	Dec-99	100.4	91.4	Jan-05	96.5	87.5
Dec-94	101.7	92.6	Jan-00	98.5	89.5	Feb-05	92.1	83.1
Jan-95	105.6	96.6	Feb-00	96.7	87.7	Mar-05	93.8	84.7
Feb-95	102.7	93.6	Mar-00	97.0	88.0	Apr-05	93.2	84.2
Mar-95	99.9	90.9	Apr-00	96.0	87.0	May-05	95.7	86.7
Apr-95	104.4	95.4	May-00	99.7	90.7	Jun-05	96.3	87.2
May-95	102.0	92.9	Jun-00	101.3	92.3	Jul-05	98.4	89.4
Jun-95	102.6	93.6	Jul-00	96.0	87.0	Aug-05	97.7	88.7
Jul-95	100.5	91.5	Aug-00	98.0	88.9	Sep-05	97.7	88.6
Aug-95	102.2	93.1	Sep-00	97.1	88.1	Oct-05	98.8	89.8
Sep-95	102.7	93.7	Oct-00	102.6	93.6	Nov-05	98.1	89.1
Oct-95	102.4	93.4	Nov-00	103.2	94.2	Dec-05	97.2	88.2
Nov-95	98.9	89.8	Dec-00	100.8	91.8	Jan-06	98.3	89.3
Dec-95	105.3	96.2	Jan-01	99.4	90.3	Feb-06	98.5	89.5
Jan-96	104.6	95.6	Feb-01	96.9	87.8	Mar-06	98.4	89.4
Feb-96	102.7	93.7	Mar-01	96.9	87.9	Apr-06	98.9	89.9
Mar-96	103.5	94.5	Apr-01	100.7	91.7			

System of Equations (2): [LCPI, LER and TBR]

	MCI (1)	MCI (2)		MCI (1)	MCI (2)		MCI (1)	MCI (2)
Mar-91	100.0	90.8	Apr-96	105.4	96.2	May-01	103.9	94.7
Apr-91	101.5	92.3	May-96	105.3	96.2	Jun-01	105.1	96.0
May-91	102.0	92.8	Jun-96	105.5	96.3	Jul-01	103.8	94.7
Jun-91	101.8	92.7	Jul-96	105.4	96.3	Aug-01	102.7	93.6
Jul-91	102.0	92.8	Aug-96	105.6	96.4	Sep-01	102.8	93.6
Aug-91	102.1	93.0	Sep-96	105.9	96.7	Oct-01	102.6	93.4
Sep-91	102.2	93.0	Oct-96	106.7	97.5	Nov-01	100.5	91.4
Oct-91	102.5	93.3	Nov-96	107.5	98.4	Dec-01	100.2	91.0
Nov-91	102.4	93.3	Dec-96	109.6	100.5	Jan-02	98.6	89.5
Dec-91	103.2	94.1	Jan-97	109.2	100.0	Feb-02	98.7	89.5
Jan-92	104.7	95.5	Feb-97	109.4	100.2	Mar-02	98.7	89.6
Feb-92	105.4	96.3	Mar-97	109.4	100.2	Apr-02	98.7	89.6
Mar-92	105.6	96.4	Apr-97	109.7	100.6	May-02	98.7	89.5
Apr-92	105.7	96.6	May-97	109.8	100.7	Jun-02	98.6	89.4
May-92	105.7	96.6	Jun-97	108.5	99.3	Jul-02	98.7	89.5
Jun-92	104.8	95.6	Jul-97	108.9	99.7	Aug-02	98.7	89.5
Jul-92	104.5	95.3	Aug-97	107.8	98.7	Sep-02	98.7	89.5
Aug-92	104.6	95.4	Sep-97	107.4	98.2	Oct-02	98.6	89.5
Sep-92	104.5	95.3	Oct-97	106.5	97.4	Nov-02	97.0	87.9
Oct-92	105.3	96.1	Nov-97	104.5	95.3	Dec-02	96.6	87.4
Nov-92	104.9	95.7	Dec-97	106.7	97.6	Jan-03	96.1	87.0
Dec-92	105.0	95.8	Jan-98	106.8	97.7	Feb-03	95.5	86.3
Jan-93	105.0	95.8	Feb-98	107.3	98.1	Mar-03	94.4	85.2
Feb-93	104.9	95.8	Mar-98	108.3	99.2	Apr-03	93.9	84.8
Mar-93	105.0	95.8	Apr-98	108.4	99.2	May-03	94.0	84.9
Apr-93	105.0	95.8	May-98	108.6	99.5	Jun-03	93.9	84.8
May-93	105.0	95.9	Jun-98	108.1	98.9	Jul-03	93.5	84.3
Jun-93	105.0	95.8	Jul-98	108.1	99.0	Aug-03	93.5	84.3
Jul-93	105.0	95.8	Aug-98	107.3	98.2	Sep-03	93.9	84.7
Aug-93	106.1	97.0	Sep-98	105.9	96.8	Oct-03	93.9	84.7
Sep-93	106.4	97.3	Oct-98	104.4	95.2	Nov-03	94.0	84.8
Oct-93	106.2	97.1	Nov-98	104.3	95.2	Dec-03	93.9	84.8
Nov-93	106.9	97.8	Dec-98	104.2	95.1	Jan-04	93.9	84.8
Dec-93	106.3	97.2	Jan-99	104.8	95.7	Feb-04	94.0	84.8
Jan-94	104.6	95.5	Feb-99	105.7	96.5	Mar-04	94.1	84.9
Feb-94	104.7	95.5	Mar-99	103.7	94.6	Apr-04	94.1	85.0
Mar-94	104.2	95.1	Apr-99	103.0	93.8	May-04	94.5	85.4
Apr-94	103.0	93.8	May-99	103.4	94.2	Jun-04	94.5	85.4
May-94	102.9	93.8	Jun-99	102.4	93.2	Jul-04	94.5	85.4
Jun-94	103.5	94.3	Jul-99	101.3	92.2	Aug-04	94.9	85.7
Jul-94	103.4	94.2	Aug-99	101.8	92.6	Sep-04	94.9	85.8
Aug-94	104.2	95.1	Sep-99	102.6	93.4	Oct-04	95.3	86.1
Sep-94	103.9	94.7	Oct-99	102.7	93.5	Nov-04	95.5	86.4
Oct-94	103.1	93.9	Nov-99	102.5	93.3	Dec-04	96.1	87.0
Nov-94	103.9	94.7	Dec-99	102.4	93.3	Jan-05	96.1	87.0
Dec-94	103.9	94.8	Jan-00	100.8	91.6	Feb-05	96.6	87.4
Jan-95	103.9	94.8	Feb-00	99.8	90.6	Mar-05	97.1	88.0
Feb-95	104.3	95.1	Mar-00	99.8	90.6	Apr-05	98.0	88.8
Mar-95	104.8	95.6	Apr-00	99.5	90.3	May-05	99.5	90.3
Apr-95	105.2	96.1	May-00	99.5	90.4	Jun-05	100.2	91.0
May-95	105.2	96.1	Jun-00	99.5	90.4	Jul-05	100.3	91.1
Jun-95	105.2	96.1	Jul-00	99.5	90.4	Aug-05	100.4	91.2
Jul-95	105.2	96.1	Aug-00	99.7	90.5	Sep-05	100.4	91.3
Aug-95	105.2	96.0	Sep-00	100.4	91.3	Oct-05	100.4	91.3
Sep-95	105.2	96.0	Oct-00	103.3	94.1	Nov-05	100.5	91.3
Oct-95	105.2	96.0	Nov-00	103.2	94.0	Dec-05	100.6	91.4
Nov-95	105.2	96.0	Dec-00	103.2	94.1	Jan-06	100.6	91.4
Dec-95	105.2	96.0	Jan-01	103.2	94.1	Feb-06	100.6	91.4
Jan-96	105.2	96.1	Feb-01	103.2	94.1	Mar-06	100.6	91.4
Feb-96	105.2	96.1	Mar-01	103.8	94.7	Apr-06	100.6	91.4
Mar-96	105.3	96.1	Apr-01	103.8	94.7			

System of Equations (3): [LLSM, LNEER and CMR]

	MCI (1)	MCI (2)		MCI (1)	MCI (2)		MCI (1)	MCI (2)
Mar-91	100.0	90.4	Apr-96	105.6	95.9	May-01	100.6	91.0
Apr-91	100.9	91.3	May-96	96.8	87.2	Jun-01	100.5	90.9
May-91	97.0	87.3	Jun-96	100.3	90.6	Jul-01	98.2	88.6
Jun-91	96.9	87.3	Jul-96	100.8	91.1	Aug-01	99.6	89.9
Jul-91	95.2	85.6	Aug-96	100.8	91.1	Sep-01	100.5	90.8
Aug-91	98.6	89.0	Sep-96	100.8	91.1	Oct-01	101.7	92.0
Sep-91	97.4	87.7	Oct-96	104.9	95.3	Nov-01	100.6	91.0
Oct-91	101.8	92.1	Nov-96	100.9	91.3	Dec-01	97.4	87.7
Nov-91	100.5	90.9	Dec-96	109.0	99.4	Jan-02	94.9	85.2
Dec-91	100.1	90.5	Jan-97	109.6	100.0	Feb-02	96.7	87.1
Jan-92	99.2	89.6	Feb-97	107.6	98.0	Mar-02	96.0	86.4
Feb-92	99.6	89.9	Mar-97	102.8	93.2	Apr-02	96.9	87.3
Mar-92	102.8	93.1	Apr-97	107.2	97.6	May-02	97.6	87.9
Apr-92	98.5	88.9	May-97	102.6	93.0	Jun-02	96.1	86.5
May-92	94.7	85.1	Jun-97	103.8	94.1	Jul-02	96.9	87.2
Jun-92	95.0	85.4	Jul-97	102.3	92.7	Aug-02	96.6	87.0
Jul-92	95.8	86.1	Aug-97	101.7	92.1	Sep-02	98.6	88.9
Aug-92	92.9	83.3	Sep-97	98.6	88.9	Oct-02	99.2	89.6
Sep-92	103.1	93.5	Oct-97	100.9	91.2	Nov-02	96.2	86.5
Oct-92	101.4	91.8	Nov-97	98.8	89.1	Dec-02	95.9	86.2
Nov-92	99.3	89.7	Dec-97	104.5	94.8	Jan-03	95.4	85.8
Dec-92	102.8	93.2	Jan-98	107.1	97.5	Feb-03	93.6	84.0
Jan-93	104.1	94.5	Feb-98	104.5	94.9	Mar-03	92.4	82.8
Feb-93	104.8	95.2	Mar-98	104.6	94.9	Apr-03	94.0	84.3
Mar-93	101.9	92.2	Apr-98	108.7	99.0	May-03	95.1	85.5
Apr-93	98.0	88.3	May-98	104.5	94.9	Jun-03	92.2	82.6
May-93	105.4	95.8	Jun-98	105.9	96.3	Jul-03	91.9	82.2
Jun-93	103.4	93.7	Jul-98	101.1	91.4	Aug-03	92.5	82.9
Jul-93	93.8	84.1	Aug-98	95.2	85.5	Sep-03	92.0	82.4
Aug-93	96.3	86.6	Sep-98	93.8	84.2	Oct-03	93.5	83.8
Sep-93	107.1	97.5	Oct-98	104.0	94.3	Nov-03	93.5	83.8
Oct-93	105.0	95.3	Nov-98	96.2	86.6	Dec-03	93.5	83.9
Nov-93	101.4	91.8	Dec-98	98.9	89.2	Jan-04	93.1	83.4
Dec-93	106.1	96.5	Jan-99	105.4	95.8	Feb-04	93.4	83.7
Jan-94	100.2	90.6	Feb-99	99.5	89.8	Mar-04	92.3	82.6
Feb-94	97.1	87.4	Mar-99	97.0	87.4	Apr-04	94.0	84.3
Mar-94	99.5	89.8	Apr-99	104.7	95.0	May-04	92.9	83.2
Apr-94	94.6	84.9	May-99	100.2	90.5	Jun-04	92.2	82.5
May-94	102.9	93.3	Jun-99	94.1	84.5	Jul-04	93.1	83.5
Jun-94	101.4	91.8	Jul-99	100.5	90.8	Aug-04	93.8	84.2
Jul-94	103.7	94.0	Aug-99	99.5	89.9	Sep-04	96.6	86.9
Aug-94	96.9	87.3	Sep-99	99.2	89.6	Oct-04	94.3	84.7
Sep-94	98.1	88.5	Oct-99	101.9	92.3	Nov-04	95.3	85.7
Oct-94	97.2	87.6	Nov-99	100.4	90.8	Dec-04	93.5	83.9
Nov-94	101.9	92.3	Dec-99	101.3	91.7	Jan-05	97.6	87.9
Dec-94	102.0	92.4	Jan-00	99.4	89.8	Feb-05	93.1	83.5
Jan-95	105.9	96.3	Feb-00	97.6	87.9	Mar-05	94.8	85.2
Feb-95	103.0	93.4	Mar-00	97.9	88.3	Apr-05	94.3	84.6
Mar-95	100.3	90.6	Apr-00	96.9	87.2	May-05	96.7	87.1
Apr-95	104.8	95.1	May-00	100.6	91.0	Jun-05	97.3	87.6
May-95	102.3	92.7	Jun-00	102.2	92.6	Jul-05	99.5	89.8
Jun-95	102.9	93.3	Jul-00	96.9	87.3	Aug-05	98.7	89.1
Jul-95	100.9	91.2	Aug-00	98.9	89.3	Sep-05	98.7	89.1
Aug-95	102.5	92.9	Sep-00	98.1	88.5	Oct-05	99.8	90.2
Sep-95	103.0	93.4	Oct-00	103.6	93.9	Nov-05	99.1	89.5
Oct-95	99.3	93.1	Nov-00	104.2	94.6	Dec-05	98.3	88.6
Nov-95	99.3	89.7	Dec-00	101.8	92.2	Jan-06	99.4	89.7
Dec-95	105.7	96.1	Jan-01	100.4	90.8	Feb-06	99.5	89.9
Jan-96	105.0	95.4	Feb-01	97.9	88.3	Mar-06	99.4	89.8
Feb-96	103.1	93.5	Mar-01	98.0	88.3	Apr-06	99.9	90.3
Mar-96	104.0	94.3	Apr-01	101.8	92.2			

System of Equations (4): [LLSM, LNEER and TBR]

	MCI (1)	MCI (2)		MCI (1)	MCI (2)		MCI (1)	MCI (2)
Mar-91	100.0	90.6	Apr-96	105.6	96.1	May-01	104.4	94.9
Apr-91	101.5	92.1	May-96	105.6	96.1	Jun-01	105.6	96.2
May-91	102.0	92.6	Jun-96	105.7	96.3	Jul-01	104.3	94.9
Jun-91	101.9	92.4	Jul-96	105.7	96.2	Aug-01	103.2	93.8
Jul-91	102.0	92.6	Aug-96	105.8	96.3	Sep-01	103.3	93.8
Aug-91	102.2	92.7	Sep-96	106.1	96.6	Oct-01	103.0	93.6
Sep-91	102.3	92.8	Oct-96	107.0	97.5	Nov-01	101.0	91.6
Oct-91	102.5	93.1	Nov-96	107.8	98.4	Dec-01	100.7	91.2
Nov-91	102.5	93.0	Dec-96	109.9	100.5	Jan-02	99.1	89.7
Dec-91	103.3	93.9	Jan-97	109.4	100.0	Feb-02	99.1	89.7
Jan-92	104.7	95.3	Feb-97	109.7	100.2	Mar-02	99.2	89.8
Feb-92	105.5	96.0	Mar-97	109.6	100.2	Apr-02	99.2	89.8
Mar-92	105.6	96.2	Apr-97	110.0	100.6	May-02	99.2	89.7
Apr-92	105.8	96.3	May-97	110.1	100.7	Jun-02	99.0	89.6
May-92	105.8	96.3	Jun-97	108.7	99.3	Jul-02	99.2	89.7
Jun-92	104.9	95.4	Jul-97	109.2	99.7	Aug-02	99.2	89.7
Jul-92	104.6	95.1	Aug-97	108.1	98.7	Sep-02	99.1	89.7
Aug-92	104.6	95.2	Sep-97	107.7	98.2	Oct-02	99.1	89.7
Sep-92	104.5	95.1	Oct-97	106.8	97.4	Nov-02	97.5	88.1
Oct-92	105.3	95.9	Nov-97	104.8	95.4	Dec-02	97.1	87.6
Nov-92	105.0	95.5	Dec-97	107.0	97.6	Jan-03	96.6	87.2
Dec-92	105.0	95.6	Jan-98	107.1	97.7	Feb-03	95.9	86.5
Jan-93	105.0	95.6	Feb-98	107.6	98.2	Mar-03	94.8	85.4
Feb-93	105.0	95.6	Mar-98	108.7	99.2	Apr-03	94.4	84.9
Mar-93	105.1	95.6	Apr-98	108.7	99.3	May-03	94.5	85.0
Apr-93	105.1	95.6	May-98	108.9	99.5	Jun-03	94.4	85.0
May-93	105.1	95.7	Jun-98	108.4	99.0	Jul-03	94.0	84.5
Jun-93	105.1	95.6	Jul-98	108.5	99.0	Aug-03	94.0	84.5
Jul-93	105.1	95.6	Aug-98	107.7	98.2	Sep-03	94.4	84.9
Aug-93	106.2	96.8	Sep-98	106.3	96.8	Oct-03	94.4	84.9
Sep-93	106.6	97.1	Oct-98	104.7	95.3	Nov-03	94.4	85.0
Oct-93	106.4	96.9	Nov-98	104.7	95.2	Dec-03	94.4	84.9
Nov-93	107.0	97.6	Dec-98	104.6	95.1	Jan-04	94.4	84.9
Dec-93	106.5	97.0	Jan-99	105.2	95.7	Feb-04	94.4	85.0
Jan-94	104.8	95.4	Feb-99	106.0	96.6	Mar-04	94.5	85.1
Feb-94	104.9	95.4	Mar-99	104.1	94.6	Apr-04	94.6	85.2
Mar-94	104.4	95.0	Apr-99	103.3	93.9	May-04	95.0	85.5
Apr-94	103.1	93.7	May-99	103.7	94.3	Jun-04	95.0	85.5
May-94	103.1	93.7	Jun-99	102.7	93.3	Jul-04	95.0	85.5
Jun-94	103.6	94.2	Jul-99	101.7	92.3	Aug-04	95.3	85.9
Jul-94	103.5	94.1	Aug-99	102.2	92.7	Sep-04	95.4	86.0
Aug-94	104.4	94.9	Sep-99	103.0	93.5	Oct-04	95.8	86.3
Sep-94	104.0	94.6	Oct-99	103.1	93.7	Nov-04	96.0	86.6
Oct-94	103.2	93.8	Nov-99	102.9	93.4	Dec-04	96.6	87.2
Nov-94	104.0	94.6	Dec-99	102.8	93.4	Jan-05	96.6	87.2
Dec-94	104.1	94.6	Jan-00	101.2	91.7	Feb-05	97.1	87.6
Jan-95	104.1	94.7	Feb-00	100.2	90.7	Mar-05	97.6	88.2
Feb-95	104.4	95.0	Mar-00	100.2	90.7	Apr-05	98.4	89.0
Mar-95	104.9	95.5	Apr-00	99.9	90.4	May-05	99.9	90.5
Apr-95	105.4	95.9	May-00	99.9	90.5	Jun-05	100.6	91.2
May-95	105.4	95.9	Jun-00	100.0	90.5	Jul-05	100.7	91.3
Jun-95	105.4	96.0	Jul-00	100.0	90.5	Aug-05	100.9	91.4
Jul-95	105.4	95.9	Aug-00	100.1	90.7	Sep-05	100.9	91.5
Aug-95	105.4	95.9	Sep-00	100.9	91.5	Oct-05	100.9	91.5
Sep-95	105.4	95.9	Oct-00	103.7	94.3	Nov-05	100.9	91.5
Oct-95	105.4	95.9	Nov-00	103.7	94.2	Dec-05	101.0	91.6
Nov-95	105.4	95.9	Dec-00	103.7	94.3	Jan-06	101.0	91.6
Dec-95	105.4	95.9	Jan-01	103.7	94.3	Feb-06	101.0	91.6
Jan-96	105.4	96.0	Feb-01	103.7	94.3	Mar-06	101.0	91.6
Feb-96	105.4	96.0	Mar-01	104.3	94.9	Apr-06	101.0	91.6
Mar-96	105.5	96.0	Apr-01	104.3	94.9			