MONETARY CONDITIONS INDEX*

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The purpose of this text is to discuss the interpretation of the co-called monetary conditions index (MCI). The MCI is a weighted average of changes in monetary and/or financial variables in which the weights are intended to reflect the effects of those changes on the growth of the economy or on the inflation rate. Notwithstanding the fact that the MCI is often used as an indicator of the monetary policy stance, this interpretation does not seem to be the most adequate, since other factors, apart from monetary policy, may be behind movements in the index. As an alternative, the MCI may be defined as a synthetic indicator of the impact of monetary and/or financial conditions on output growth or on the inflation rate. Even in this context, the developments of the MCI should always be considered in conjunction with an analysis of the origin of the movements in its components. The text is organised as follows: section 1 introduces the MCI concept, emphasising the major aspects underlying its construction; section 2 describes the applications of the index; section 3 presents the estimates for the weights obtained in different studies; section 4 makes reference to MCI limitations; and section 5 presents the conclusions.

1. DEFINITION

Inflation, in the long run, is a purely monetary phenomenon and therefore monetary aggregates are important to evaluate the effects of monetary policy on inflation. The process of transmission of monetary policy to activity and prices works through different channels (in particular the interest rate, the exchange rate, the relative price of assets and credit), which should be taken into account in the short- and medium-term analysis of monetary conditions of the economy.

The Monetary Conditions Index (MCI) is a synthetic measure of changes in monetary conditions affecting the economy, which combines changes in the variables that are relevant for the transmission mechanism in a single indicator. The MCI, although often defined as a measure of changes in the degree of tightness of monetary policy (i.e., the effect of monetary policy decisions on output and on inflation) is in fact not strictly a monetary policy indicator, since other factors may be behind changes in monetary conditions, such as policy decisions (either monetary or fiscal), exogenous shocks and/or the endogenous response of variables included in the index to fluctuations in the level of both prices and economic activity.

The MCI is calculated as a weighted average of changes, vis-à-vis values in a base period, in the variables that are considered relevant for the transmission mechanism. The weights are intended to reflect the relative importance of these variables in the economy. The variables included correspond typically to the short-term interest rate and to the effective exchange rate, meaning that the index is as follows:

$$ICM_t = \beta(r_t - r_0) + \gamma(q_t - q_0)$$

where: r is the short-term interest rate, q is the log of the exchange rate (defined so that an increase corresponds to an appreciation) and period 0 is the base period. The sum of the interest

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rate (β) and exchange rate (γ) weights is equivalent to one.

In a given moment, changes in the short-term interest rate and in the exchange rate may have an effect in the same direction, or in opposite directions, on monetary conditions. An increase (reduction) of the MCI corresponds to tighter (looser) monetary conditions. As can be seen in the previous expression, the MCI is usually defined as a change vis-à-vis a base period, in which the index will have a value equal to zero or to one hundred, depending on the manner in which it was constructed. Theoretically, the base period should reflect the period in which monetary conditions are neutral. However, the difficulty in identifying neutral levels for both the interest rate and the exchange rate, aggravated by the fact that these levels change over time with the structural conditions of the economy, makes the choice of the base period irrelevant in practice. Therefore, the MCI only reveals the time change in the degree of tightness of monetary conditions with no indication on its adequacy, i.e., the MCI level does not have any meaning.

The MCI weighs are frequently presented as the β/γ ratio, which represents the percentage of the exchange rate depreciation necessary to outweigh the effect on the MCI of a 100 basis points increase in the short-term interest rate(1). This ratio is therefore negatively related with the degree of openness of the economy.

The expression presented above for the construction of the MCI may be implemented in different ways. Since the appropriate interpretation of the index depends on the specification chosen, the choices made should be in line with the use intended for the MCI.

First, the weights used in the construction of the index are typically calculated in two manners, alternatively reflecting the effects of the changes in the index components on the growth of aggregate demand, or on the inflation rate(2). The selection of one of the approximations should reflect the variable on which the impact of changes on monetary conditions is to be evaluated. From the point of view of a central bank whose monetary policy objective is the maintenance of price stability, it seems more sensible to calculate an MCI based on the effects on the inflation rate. However, in a large part of the applications, the weights used reflect the effects of the components on output growth. The utilisation of indices constructed in such manner will only be appropriate for the analysis of a monetary policy directed towards price stability, should monetary policy influence inflation only through the output gap. There are, however, other transmission channels that may have a direct and non-negligible impact on the inflation rate, such as, for instance, the exchange rate via its direct effect on prices(3).

Second, since monetary policy may have lagged effects on activity and prices, another important issue is the selection of the time horizon for which the MCI weights are estimated. Most applications select a period around 2 years, since this is the time horizon in which monetary policy is considered to reach its maximum effect over activity. The lagged effects of monetary policy on activity and prices differ, depending on the transmission channel considered; for instance, in open economies, the exchange rates seem to have a more immediate effect on prices than short-term interest rates. Therefore, a given movement of the MCI may have behind it for different combinations of component changes, different trends for output or for the inflation rate.

(1) While the change in the interest rate is included as percentage points, the change in the exchange rate is considered as a percentage change, since it is defined as a logarithm, as can be seen in the above expression. This distinction in the specification of both variables is due to the manner in which these are included in the econometric models typically used to estimate the weights.

(2) On an ad hoc basis, the exchange rate weight, in some applications, is approximated by the degree of openness of the economy. See, for instance, Verdelhan (1998).

(3) The utilisation of weights mirroring the effect on aggregate demand reflects the manner in which these were calculated in the studies initially suggesting the construction of the MCI (Duguay (1994) and Freedman (1994)). Indeed, according to Freedman (1994), in the case of Canada, inflationary pressures are to a large extent captured by the output gap and monetary policy affects the output gap chiefly through short-term interest-rate and exchange-rate effects. Freedman's work (1994), although recognising that the exchange-rate changes have a direct effect on prices, considers that, except for periods of high inflation (when temporary changes in inflation may have an effect on the agents' expectations), this should not affect the inflation rate in a permanent manner.

Third, the selection of the MCI components should be in line with the nature of the monetary transmission mechanism and with the structure of the relevant economy. The appropriate specification should vary among countries and over time[4]. In several countries of Continental Europe, in contrast with Anglo-Saxon countries, fixed long-term interest rates exert a larger influence on consumption and investment decisions than short-term or variable interest rates. In these cases, and particularly when the slope of the yield curve changes, it is important to additionally include the long-term interest rate in the computation of the MCI[5]. Recently, against a background in which several factors have contributed to higher attention being granted to stock market developments in monetary policy forecasts and analysis, some indices have been calculated additionally including prices of other financial assets, as well as stock prices. In fact, in some countries such as the United States, stock prices seem to play an important role in the monetary policy transmission mechanism, through wealth effects and effects on the structure of the balance-sheets of the households, corporations and financial intermediaries.

Although all variables relevant for the monetary policy transmission mechanism may be potentially included in the MCI, the selection of components should depend on the utilisation intended for the index. For instance, if it is intended that the MCI should capture monetary policy effects as strictly as possible, the interest rates to be included should then be those more directly controlled by the monetary authority. On the other hand, if the main purpose is that the MCI should contain advanced information regarding an objective-variable (the inflation rate, for instance) the index should then also include financial variables, which, to a large extent, are determined by other factors besides monetary policy.

Finally, the index may be defined on the basis of real, or nominal variables. In theoretical terms, monetary conditions should be expressed on the basis of real variables because, in principle, these determine the decisions of economic agents[6]. There are, however, other factors justifying that MCI components are defined in nominal terms, in a large part of the applications. For example, the difficulty in empirically measuring inflation expectations, the advantage of making the index available as updated as possible (data on the financial market are available more frequently than data on price developments), and the fact that the index weights are often determined on the basis of models whose variables were specified in nominal terms. Given that, in general, the inflation rate is less variable than exchange rates and nominal interest rates, the nominal MCI seems to be a reasonable approximation to the real MCI in the short run, thus justifying the computation of the index in nominal terms, whenever the short-run is the purpose of the analysis[7]. An important issue, not always complied with, is the existence of consistency between the (real or nominal) terms under which the components are incorporated in the computation of the MCI and the terms under which the weights have been estimated.

2. USES OF THE MCI

The MCI has the advantage of taking into account the exchange rate in the evaluation of monetary conditions, which is particularly important in the case of an open economy with flexible exchange rates and capital mobility. In fact, the relative changes in the interest rate and in the exchange rate, as a response to central bank initiatives, may differ depending on the circumstances. Additionally the exchange rate is subject to shocks not associated with monetary policy, whose impact on aggregate demand and on inflation the central bank may, or not, wish to cancel.

(4) For an analysis of the transmission mechanism in the euro area, see ECB (2000).

(5) The indices including capital market indicators, in addition to monetary variables, although frequently denominated as financial conditions indices (FCI), are called MCI in the present text, for simplicity reasons.

(6) Gerlach and Smets (1996) and Peeters (1998) pointed out, however, that in the short run economic agents sometimes react to nominal interest rates due, for instance, to the existence of liquidity constraints.

(7) Freedman's work (1994) on the use of the MCI in Canada supports the evaluation of short-term changes in monetary conditions on the basis of a nominal MCI, given that the latter is considered to have, in the short run, a behaviour similar to that of real MCI. Indeed, in the 1980-1993 period, the correlation coefficient of quarterly changes of both series is equal to 0.88.

Some central banks, in particular the Bank of Canada and the Reserve Bank of New Zealand, that follow inflation targeting strategies conferred the MCI the role of operational target[8]. The use of the MCI as an operational target has created, however, communication problems, since the markets started to anticipate automatic monetary policy responses when the MCI deviates from its desired level, thus increasing interest-rate volatility. Reflecting this situation, both the Bank of Canada and the Reserve Bank of New Zealand have been assigning less importance to the MCI as a reference indicator for the definition of monetary policy[9].

Following the precursory experience of the Bank of Canada, other central banks of smaller open economies have published MCIs (such as Sweden, Norway and Finland). In these cases, however, the MCI is only used as an additional indicator for the orientation of monetary policy (ex-post indicator), or as a leading indicator for inflation. The analysis thus focus on the MCI's current trend and not on its comparison with a target path.

In addition to central banks, several international organisations and private financial institutions calculate and publish MCI, using them in the analysis of monetary policy issues[10].

3. ESTIMATION OF MCI WEIGHTS: SOME RESULTS

The estimation of MCI weights has been chiefly based on three types of alternative methodologies: small structural models, VAR models and large-scale macro-econometric models[11]. In the first case, an equation is usually estimated for aggregate demand, the growth rate of which depends on a range of variables, including the interest rate and the exchange rate, defined in real terms. Therefore, the MCI weights correspond to elasticities implicit in the estimated relationship. In the second case, the weights of the MCI components are calculated from response/impulse functions of shocks in these variables. In the third case, the models are simulated for the effect of shocks on the relevant variables. The three methodologies reveal advantages and disadvantages. The estimation of reduced forms is simple and little demanding in terms of data. However, important relationships between the variables are frequently ignored, thus biasing the estimates[12]. VAR models are particularly useful when the lag structure is important, but also denote some problems, such as the difficulty in identifying which shocks on interest rates and exchange rates are the result of monetary policy. Finally, structural macro-econometric models allow the inclusion of more variables and relationships, but are more demanding in terms of data, require several identification hypothesis and, given their complexity, are subject to specification errors which are sometimes difficult to detect.

In practise, given that uncertainty around the weights estimates is very high and that, as can be

(8) An operational target differs from an intermediate target, since it is almost immediately affected by changes in the policy instrument (the desired behaviour for the MCI is defined for a short-term time horizon, since it changes with the behaviour of the economy) and because it cannot be considered a nominal anchor for the system (there are no theoretical justifications for a long-term stable relationship between the MCI and the level or the growth rate of prices). In practise, the Bank of Canada defined a (desirable) path for the MCI, which should be consistent with the maintenance of the inflation-rate trend within its target range over a pre-determined time horizon. This procedure corresponded to the establishment of a desirable behaviour for the short-term interest rate instrument, conditional to the exogenous behaviour of the exchange rate and to the inflation target. Therefore, in response to shocks leading inflation to deviate from its target, the central bank could take the decision of adjusting the MCI path to that consistent with the inflation target, through interest rate changes. The Bank of Canada and the Reserve Bank of New Zealand calculate the MCI, in nominal terms, taking as components a short-term interest rate and an effective exchange rate. The value of the relative weights used is 3, in the case of Canada, and 2 in the case of New Zealand.

(9) On 17 March 1999, the Reserve Bank of New Zealand adopted the official cash rate (OCR) as its major monetary policy instrument. In this context, it was announced that monetary policy decisions would cease to be explained in terms of the level desired for the MCI, but rather in terms of the OCR level. The MCI would continue to play an important role as summary indicator of monetary conditions (see the Reserve Bank of New Zealand (1999)).

(10) See, for instance, IMF (1996), page 16, OECD (1996), page 31, Goldman Sachs (1998), Goldman Sachs (1999) and ABN AMRO (2000).

(11) See, for instance, Duguay (1994), Deutsche Bundesbank (1999), Verdehlhan (1998), Mayes and Virén (1998) and Peeters (1998).

(12) Eika et al. (1996) discuss the econometric problems of the weights estimated on the basis of this approach.

Table 1 (to be continued)

WEIGHTS OF MCI ESTIMATED AND/OR USED IN SEVERAL STUDIES

	Type of model	Specification	Output (weights expressed as a %)				
			Ratio (Interest rate / exchange rate)	Exchange rate	Short-term interest rate	Long-term interest rate	Stock prices
Canada							
Freedman (1994)	Several	-	3.0	25	75	-	-
OECD (1996)	INTERLINK	Real	2.3	30	70	-	-
Sweden							
Hanson e Lindberg (1994)	Reduced form	Real	3-4	25-20	75-80	-	-
Dornbush et al. (1998)	Reduced form	Nominal	8.1	11	89	-	-
Mayes and Virén (1998)	Reduced form	Real	1.2	45	55	-	-
	NIGEM	Nominal	1.5	40	60	-	-
OECD (1996)	INTERLINK	Real	1.5	40	60	-	-
Norway							
Norges Bank (1995)	RIMINI	Real	3.0	25	75	-	-
Germany							
Deutsche Bundesbank (1999)	Reduced form	Real	3.0	25	75	-	-
Dornbush et al. (1998)	Reduced form	Nominal	1.4	42	58	-	-
Peeters (1998)	NIGEM	Nominal	6.1	14	38	48	-
	EUROMON	Nominal	9.0	10	5	85	-
Banque de France (1996)	NIGEM	Nominal	4.0	20	13	67	-
Mayes and Virén (1998)	Reduced form	Real	3.6	22	78	-	-
	NIGEM	Nominal	4.7	18	82	-	-
OECD (1996)	INTERLINK	Real	4.0	20	80	-	-
France							
Dornbush et al. (1998)	Reduced form	Nominal	2.1	32	68	-	-
Peeters (1998)	NIGEM	Nominal	2.1	33	5	63	-
	EUROMON	Nominal	3.5	22	17	61	-
Banque de France (1996)	NIGEM	Nominal	3.0	25	8	67	-
Mayes and Virén (1998)	Reduced form	Real	2.5	29	71	-	-
	NIGEM	Nominal	4.9	17	83	-	-
OECD (1996)	INTERLINK	Real	4.0	20	80	-	-
Italy							
Dornbush et al. (1998)	Reduced form	Nominal	2.9	26	74	-	-
Peeters (1998)	NIGEM	Nominal	1.9	35	5	60	-
	EUROMON	Nominal	5.7	15	62	23	-
Banque de France (1996)	NIGEM	Nominal	0.1	91	-122	131	-
Mayes and Virén (1998)	Reduced form	Real	7.8	11	89	-	-
	NIGEM	Nominal	7.0	13	88	-	-
OECD (1996)	INTERLINK	Real	4.0	20	80	-	-
Spain							
Dornbush et al. (1998)	Reduced form	Nominal	1.5	41	59	-	-
Banque de France (1996)	NIGEM	Nominal	1.3	43	0	57	-
Mayes and Virén (1998)	Reduced form	Real	0.8	56	44	-	-
	NIGEM	Nominal	2.3	30	70	-	-
OECD (1996)	INTERLINK	Real	1.5	40	60	-	-
United Kingdom							
Peeters (1998)	NIGEM	Nominal	4.6	18	31	51	-
	EUROMON	Nominal	3.0	25	59	15	-
Banque de France (1996)	NIGEM	Nominal	6.2	14	32	54	-
Mayes and Virén (1998)	Reduced form	Real	1.5	40	60	-	-
	NIGEM	Nominal	5.3	16	84	-	-
OECD (1996)	INTERLINK	Real	4.0	20	80	-	-
USA							
Goldman Sachs (1999)	FRB / US changed	-	18.0	5	35	55	5
OECD (1996)	INTERLINK	Real	9.0	10	90	-	-
Pagés and Eslava (2000)	NIGEM	Nominal	7.9	11	89	-	-
Japan							
Goldman Sachs (2000)	-	-	9.6	9	44	42	5
OECD (1996)	INTERLINK	Real	4.0	20	80	-	-

Notes:

The weights of the exports of goods and services in GDP were calculated on the basis of data from the OECD (Economic Outlook, June 2000). In Freedman (1994) the MCI ratio (1994) is consistent with several estimation methods, in particular with Duguay (1994), in which a reduced form for the growth of aggregate demand is estimated, as a function of a three-month real interest rate and the real exchange rate of the Canadian dollar vis-à-vis the US dollar, among other variables.

INTERLINK, NIGEM, EUROMON, RIMINI and FRB / US correspond to macro-economic models of the OECD, of the National Institute of Economic and Social Research of London, of the Nederlandsche Bank, of the Norges Bank and of the Federal Reserve Board, respectively.

The simulations of macro-economic models were carried out for different time horizons: for instance, Goldman Sachs (1999) refers to one year, Mayes and Virén (1998) and Peeters (1998) refer to two years, Norges Bank (1995) refers to two-three years and the Banque de France (1996) to three years.

Table 1 (continued)

WEIGHTS OF MCI ESTIMATED AND/OR USED IN SEVERAL STUDIES

	Type of model	Specification	Prices (weights expressed as a %)				Exports as a percentage of GDP in volume terms in 1980-99 (1997-99)
			Ratio (Interest rate / exchange rate)	Exchange rate	Short-term interest rate	Long-term interest rate	
Canada							
Freedman (1994)	Several	-	2.0	33	67	-	26.8
OECD (1996)	INTERLINK	Real	-	-	-	-	(38.5)
Sweden							
Hanson and Lindberg (1994)	Reduced form	Real	-	-	-	-	
Dornbush et al. (1998)	Reduced form	Nominal	-	-	-	-	33.7
Mayes and Virén (1998)	Reduced form	Real	-	-	-	-	(47.5)
	NIGEM	Nominal	0.6	63	38	-	
OECD (1996)	INTERLINK	Real	-	-	-	-	
Norway							
Norges Bank (1995)	RIMINI	Real	-	-	-	-	38.5 (46.4)
Germany							
Deutsche Bundesbank (1999)	Reduced form	Real	-	-	-	-	
Dornbush et al. (1998)	Reduced form	Nominal	-	-	-	-	
Peeters (1998)	NIGEM	Nominal	-	-	-	-	
	EUROMON	Nominal	-	-	-	-	25.9
Banque de France (1996)	NIGEM	Nominal	1.6	39	10	51	(29.1)
Mayes and Virén (1998)	Reduced forma	Real	-	-	-	-	
	NIGEM	Nominal	2.7	27	73	-	
OECD (1996)	INTERLINK	Real	-	-	-	-	
France							
Dornbush et al. (1998)	Reduced form	Nominal	-	-	-	-	
Peeters (1998)	NIGEM	Nominal	-	-	-	-	
	EUROMON	Nominal	-	-	-	-	19.2
Banque de France (1996)	NIGEM	Nominal	0.6	61	5	35	(26.1)
Mayes and Virén (1998)	Reduced form	Real	-	-	-	-	
	NIGEM	Nominal	0.4	71	29	-	
OECD (1996)	INTERLINK	Real	-	-	-	-	
Italy							
Dornbush et al. (1998)	Reduced form	Nominal	-	-	-	-	
Peeters (1998)	NIGEM	Nominal	-	-	-	-	
	EUROMON	Nominal	-	-	-	-	21.2
Banque de France (1996)	NIGEM	Nominal	0.1	95	-47	53	(28.3)
Mayes and Virén (1998)	Reduced form	Real	-	-	-	-	
	NIGEM	Nominal	2.5	29	71	-	
OECD (1996)	INTERLINK	Real	-	-	-	-	
Spain							
Dornbush et al. (1998)	Reduced form	Nominal	-	-	-	-	
Banque de France (1996)	NIGEM	Nominal	1.0	50	0	50	18.1
Mayes and Virén (1998)	Reduced form	Real	-	-	-	-	(28.0)
	NIGEM	Nominal	2.5	29	71	-	
OECD (1996)	INTERLINK	Real	-	-	-	-	
United Kingdom							
Peeters (1998)	NIGEM	Nominal	-	-	-	-	
	EUROMON	Nominal	-	-	-	-	
Banque de France (1996)	NIGEM	Nominal	1.5	40	24	36	25.1
Mayes and Virén (1998)	Reduced form	Real	-	-	-	-	(31.4)
	NIGEM	Nominal	2.0	33	67	-	
OECD (1996)	INTERLINK	Real				-	
USA							
Goldman Sachs (1999)	FRB / US changed	-	-	-	-	-	8.5
OECD (1996)	INTERLINK	Real	-	-	-	-	(11.9)
Pagés and Eslava (2000)	NIGEM	Nominal	-	-	-	-	
Japan							
Goldman Sachs (2000)	-	-	-	-	-	-	11.3
OECD (1996)	INTERLINK	Real	-	-	-	-	(13.7)

Table 2

ESTIMATION OF MCI WEIGHTS FOR THE EURO AREA

	Type of model	Specification	Variable	Ratio (Interest rate / exchange rate)	Weights estimation (as a %)			
					Exchange rate	Short-term interest rate	Long-term interest rate	Stock prices
Dornbusch et al (1998)	Reduced form	Nominal	Output	2.2	32	68	-	-
Verdelhan (1998)	Reduced form	Real	Output	9.1	10	90	-	-
Mayes and Virén (1998)	NIGEM	Nominal	Output	6.3	14	86	-	-
	NIGEM	Nominal	Prices	1.9	34	66	-	-
	Reduced form	Real	Output	3.5	22	78	-	-
Peeters (1998)	NIGEM	Nominal	Output	4.2	19	29	52	-
	EUROMON	Nominal	Output	17.7	5	22	73	-
Pagés and Eslava (2000)	NIGEM	Nominal	Output	4.4	19	81	-	-
	NIGEM	Nominal	Prices	3.0	25	75	-	-
	NIGEM	Nominal	Output	4.0	19	34	44	2
	NIGEM	Nominal	Prices	2.7	26	34	38	2

Notes:

In the cases of Dornbush et al (1998), Peeters (1998), Mayes and Virén (1998) (NIGEM model) and Pagés and Eslava (2000), the weights were calculated for an horizon of two years.

In addition to the aspects considered in the table, the different works still differ in some important points, in particular as regards the countries included in the estimation and the exchange rate used. The countries included in the estimation were Germany, France, Italy, Spain, United Kingdom and Sweden, in Dornbush et al (1998); all euro area countries, in Verdelhan (1998); all euro area countries, except Luxembourg in Mayes and Virén (1998) and Pagés and Eslava (2000); and, in the case of Peeters (1998), in the NIGEM, Belgium, France, Germany, Italy, the Netherlands and Spain, and, in the EUROMON, additionally Denmark. As exchange rate, Dornbush at al (1998) use the Deutsche mark value vis-à-vis the US dollar, Verdelhan (1998), Peeters (1998) and Pagés and Eslava (2000) use effective exchange rates, and Mayes and Virén (1998) use bilateral exchange rates vis-à-vis the US dollar.

seen in Table 1, results are rather sensitive to the manner in which they are estimated, the MCI is often computed on the basis of values for weights that are consistent with several approaches.

In the case where the estimation of weights is based on the effect on aggregate demand, the interest rate effect prevails over the exchange rate effect, i.e., the β/γ weight ratio is higher than one, standing frequently around 2-4, in the case of more open economies (such as the European economies) and close to 8-10 in the case of large and relatively closed economies (United States and Japan). Given that the exchange rate, in addition to its effect via aggregate demand, has a direct effect on prices (through import prices), when the calculation of short-term interest-rate and exchange-rate weights is based on the impact on the inflation rate, its ratio is lower than that obtained when the calculation is based on aggregate demand, sometimes leading to a ratio below 1. Long-term interest rates, when included as an additional component of the index, tend to have a higher weight than short-term interest rates, in particular, as should be expected in Continental European countries, such as Germany and France.

In addition to the estimates carried out for the different European countries, there are also studies that attempt at computing the MCI for the euro area as a whole. Their results should however be interpreted with caution. Since the MCI is affected by regime changes, no conclusion should be drawn from past experience to the future behaviour of the euro area. As can be seen in Table 2, most results point to a ratio of the interest rate weight to the exchange rate weight of around 4, when calculated on the basis of the effect on out-

put. This value is closer to the ratios typically estimated for open economies than to ratios obtained for closed economies, thereby apparently reflecting a stronger relative impact of the exchange-rate channel, than that inferred merely from the importance of external trade in the euro area[13][14]. In those cases in which the MCI includes the long-term interest rate, in addition to the exchange rate and the short-term interest rate, the estimates reveal that this variable will have a stronger impact on output than that of the short-term interest rate, which, nonetheless, seems to continue to have a stronger effect than that of the exchange rate. As should be expected given to the financial structure of the region, the importance of the introduction of long-term interest rates in an MCI for the euro area is confirmed.

4. LIMITATIONS OF THE MCI

The MCI presents some problems both at the level of its construction and in terms of the possible interpretations of its changes.

The weights of the components are not directly observable but are based on econometric estimates, which are highly sensitive to the model used and, for the same specification, have underlying broad confidence intervals[15]. The MCI is therefore conditional on a particular model of the economy, which has implicit a considerable degree of uncertainty.

Furthermore, there is the implicit assumption that the relative impact of the MCI components on output or prices does not change over time. Should this not be true (such impact may be changed in response, for instance, to structural changes in economic behaviour), its usefulness within short time horizons is limited. It is also not to be expected that the estimated weights are invariant vis-à-vis policy changes, which jeopardises, in particular, the use of the MCI as an operational target for monetary policy.

Moreover, the use of the MCI as an indicator of the effects of monetary policy changes on activity or prices does not seem to be the most appropriate. In fact, as pointed out above, there is no direct relationship between MCI movements and monetary policy changes. The former may reflect other factors, such as expectations as to future policy developments, changes in external interest rates, the credibility of policy decisions, public finance developments and prospects and the behaviour of exogenous variables in general. In other words, the MCI is endogenous and is not under the direct control of monetary authorities. This is even more apparent when the MCI includes other financial variables in addition to short-term interest rates and exchange rates.

The interpretation of the MCI as a leading indicator of output growth or of the inflation rate should also be carried out with caution. In fact, the MCI merely captures some of the factors determining the future trend of these variables. It is therefore not to be expected that it shows a stable relationship with output, or with the inflation rate[16]. Against this background, the MCI should be evaluated together with several factors such as, for instance, the prevailing activity conditions, fiscal policy and the degree of market flexibility.

Finally, problems also arise, even if the MCI is interpreted as an indicator of the effect of changes in monetary / financial conditions, evaluated by the components included in the index, on the relevant variable. A given movement of the MCI may have different consequences in terms of the final policy objective, depending on the factors underlying changes in the components. Therefore, it is necessary to distinguish between changes in the index determined by equilibrium movements of the components, to which the central bank shall

(13) According to balance of payments data, exports in the euro area accounted for 17 per cent of GDP, on average, in the 1997-99 period, compared with ratios, similarly calculated, of approximately 11 per cent in the United States and Japan, 27 per cent in the United Kingdom, 40 per cent in Canada and Norway and 43 per cent in Sweden. These figures differ from those presented in Table 1, since those were calculated according to the most frequent procedure that corresponds to the use of national accounts data. This form of calculation, however, should not be applied in the case of the euro area, as export and import data of euro area national accounts include intra-community trade, thus overestimating external trade in the area.

(14) Note, however, that the large disparity in the values obtained in the different studies suggests, as mentioned, the need for particular caution in the interpretation of the index behaviour.

(15) For instance, behind the 2.17 ratio, obtained in Dornbush et al. (1998) for the euro area, is an interval of 0-4 for a confidence level of 95 per cent.

(16) See Deutsche Bundesbank (1999).

not react (i.e., in these cases, it is not optimum that the MCI stays constant), and those generated by other factors, a situation in which a central bank reaction may be warranted[17]. For instance, an MCI increase motivated by an appreciation of the exchange rate or by an increase in the long-term interest rate, associated with stronger growth prospects should not probably lead to a change in monetary policy, given that this shock would be accompanied by inflationary pressures justifying tighter monetary and financial conditions. Even in cases in which MCI changes are not in line with the behaviour of fundamental variables, an automatic monetary policy response towards correcting this movement could be undesirable. For instance, whenever long-term interest rates increase due to lack of credibility of monetary policy, the monetary authority response towards reducing the tightness of monetary conditions could lead to a further increase of the risk premium and therefore to an even higher increase in long-term interest rates, reinforcing the initial MCI movement.

In practice, the monetary authority has to face the problem of correctly identifying the factors underlying a MCI change within an adequate timing, which suggests that an automatic activism of monetary policy based on MCI should be avoided[18].

5. CONCLUDING REMARKS

The advantage of the MCI lies in that it is a summary indicator of monetary and financial conditions, it is simple to follow and easy to understand, and its computation may be readily updated. These factors are behind the importance assigned to it by central banks, international organisations and private economic analysts. The index, however, has been used with different purposes and built in alternative forms, which may give rise to misunderstandings regarding the manner in which it should be interpreted.

The interpretation of the index movements shall be consistent with the manner in which it has been built up. This determines, in particular, the variable on which the impact of changes on monetary and/or financial conditions is being evaluated, and the time horizon underlying its evaluation.

All the above limitations, as well as the uncertainty as to the computation of weights, jeopardise, in particular, the use of the MCI as an operational target for monetary policy. In fact, this would require that the index would be well defined and that there would be no doubts as to the magnitude and significance of its changes. Additionally, given that the movements of the variables typically incorporated in the MCI reflect other factors besides monetary policy, it is not correct to interpret the MCI as an indicator of the direction of changes in the stance of monetary policy.

The MCI should therefore be used as a synthetic indicator of the effect of changes in monetary/financial conditions (not necessarily related with monetary policy) on the relevant variable, over a given time horizon. Since a particular movement of the MCI may have rather different consequences in terms of the relevant variable, depending on the underlying factors, this interpretation also has limitations, and must always be associated with an acquaintance with the type of shocks that have affected the economy.

(17) With a view to evaluating the information content of the MCI, Grande (1997) compares the behaviour of the index in the presence of six exogenous shocks with the direction of the desired monetary policy response and with the impact of shocks on inflation. The results obtained depend on the characteristics of the model and on the hypothesis assumed for the parameters. For certain shocks, the MCI reveals misleading signals both as an indicator of the monetary policy stance (in case the purpose of the monetary authority is to minimise the deviations of the inflation rates vis-à-vis its target value) and as an indicator of inflationary pressures. Thus, this study considers that MCI movements can only be interpreted as a reference to the type of shocks affecting the economy.

(18) Gerlach and Smets (1996) suggest that when exchange rate disturbances determined by changes in demand and supply conditions cannot be clearly identified, the weight to be assigned to the exchange rate in the MCI should be less than the weight deriving from the exchange rate elasticity of aggregate demand. They also consider that in the cases in which past experience shows that a large part of exchange rate movements are equilibrium movements (such as in Australia, in opposition to Canada and New Zealand), monetary policy should not respond to the exchange rate. This type of argument may justify the fact that some countries following a monetary policy with an inflation target (for instance Australia and the United Kingdom) reject the use of the MCI. Smets (1997b) estimates response functions for the central banks of Canada and Australia and concludes that, in response to depreciations, while the Bank of Canada raised the interest rates, the Bank of Australia did not react. Smets (1997b) considers that this behaviour may be partly explained by the greater importance of terms of trade shocks in Australia and nominal shocks in Canada.

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