

Exchange Rate Régime Choice in Historical Perspective and Lessons for the Arab Countries[♦]

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Can we draw lessons from monetary and financial history for choosing among alternative exchange rate (exchange rate) régimes? Can countries freely choose their exchange rate régimes independently from the prevailing international monetary system? Do emerging economies face additional constraints in their choice of exchange rate régimes beyond those faced by developed, industrialised economies? What are the choices open to the Arab countries in their choice of exchange rate régimes? The comments in this review of Michael Bordo's valuable "Exchange Rate Régime Choice in Historical Perspective" will build on the paper to propose some lessons for the Arab economies and other emerging countries. The comments fall in three sections:

- 1) Some lessons from history and their policy implications.
- 2) On the choice of exchange rate regime as being a choice of a monetary constitution to ensure price stability.
- 3) The relevance of historical, empirical evidence for the choice of exchange rate régimes in emerging economies and the Arab countries. In particular, what lessons can be distilled from historical experience for the choice of exchange rate policies in the Arab countries?

Some lessons from history: stylised facts from 120 years

[♦] Comments on the paper by Michael Bordo, "Exchange Rate Regime Choice in Historical Perspective".

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Michael Bordo has, in this useful paper, brought to bear empirical evidence from over a century of exchange rate régimes under alternative monetary standards and diverse economic, political and security conditions, to gain insight concerning the parameters and results of the choice of exchange rate régimes.

The long-term evidence based on the experience of the industrial countries over 1880-1995 suggests the following stylised facts:

- (i) Nominal exchange rates were the most stable under the Gold Standard and the least stable in the inter-war period, 1919-1938.
- (ii) Price inflation rates were the lowest during the gold standard years and the dollar convertibility period up to 1971.
- (iii) There is no apparent connection between exchange rate régimes and real economic outcomes: medium and long-term aggregate economic growth rates are not affected by the exchange rate régime.

Further for the more recent period since 1971:

- (iv) The *de facto* evidence on exchange rates régimes is markedly different from the *de jure*.
- (v) Floating exchange rate experiences are associated with growth, without being associated with inflation. However, free *falling* exchange rates are associated with high inflation rates and low negative growth.

The evidence on the performance of exchange rate régimes shows that it is critical for economic analysis and empirical work to distinguish between *de jure* and *de facto* exchange rate régimes. Countries do not do what they say they do. And, like politicians, what countries say they do and what they do are very different! To judge the economic results of exchange rate régimes one should look at observed behaviour, and not the

declared or legal régime. The research by Carmen Reinhart and Ken Rogoff (2002)¹ is illuminating. They provide a 15-category schema for classifying exchange rate régimes. Their main results are striking:

- (a) 45% of all post–1970 pegs should be classified as managed floats, limited flexibility, freely floating or “freely falling” exchange rate régimes.
- (b) In the 1980’s and 1990’s, 53 % of managed floats were de facto pegs or crawling peg!
- (c) The official evidence on the performance of free floating régimes is misleading as the following table shows:

| | <u>Official Classification</u> | <u>R& R Classification</u> |
|-----------------|--------------------------------|--------------------------------|
| Inflation | 174% | Less than 10% |
| Economic Growth | 0.5 | About 2.3 % |

Hence, excluding the “outlier” cases of the “freely falling” exchange rate régimes changes the conclusion and pre-conceived notions that freely floating exchange rate regime is associated with or generates bad outcomes of high inflation and low growth.

The review of the long-term empirical evidence and exchange rate regime classifications yields two conclusions: (a) Official, *de jure*, classifications of exchange rate regimes such as publicly available and published by the international organisations (IMF, World Bank and other institutions) are misleading. They should be replaced or at the least supplemented by indicators of the *de facto* exchange rate regime. (b) Free floating is compatible with economic growth *and* low inflation. *Freely falling* exchange rates are the

¹ See also Ghosh, A., A-M. Gulde & H. Wolfe (2002).

result of unsound monetary, banking and fiscal policies that lead to low growth, high inflation and exchange rate crises.

Choice of Exchange Rate Regime is a Choice of Monetary Constitution

Michael Bordo's paper (MB hereafter) reminds policy-makers that the classical Mundellian criteria (1961, 1963) for the choice of an exchange rate regime remain relevant to today's world of more highly integrated economies. The criteria revolve around the prevalence of types of shocks to the economy and the degree of capital mobility. The Mundellian criteria are precepts for risk management and policy-making in uncertain policy environments. Economies more prone to nominal shocks should opt for fixed exchange rate regimes. Fixed rates would allow quantity adjustments, such as changes in international reserves resulting in changes in money supply, as a form of adjustment to nominal external (or domestic) shocks. On the other hand, if real disturbances are more prevalent, policy-makers should opt in favour of more flexible exchange rate regimes. Flexible nominal exchange rates facilitate the smoothing of real aggregate (and sectorial) output to real external shocks, especially when domestic wages and prices are slow to change. Similarly, flexible real exchange rates can induce changes in consumption/saving choices, as well as in production, including shifts between tradeable and non-tradeable sectors, smoothing adjustment to disturbances. Following a negative real shock (such as a decline in the world price of oil), a nominal depreciation would raise the domestic price of exported goods and imported goods, the pass-through effect, and reduce real wages in line with reduced labor demand. In contrast, in countries with inflexible nominal exchange rates experiencing such negative real shocks, prices and wages need to fall to ensure that employment and output do not decline. If they do not, then countries will experience 'Dutch disease or Arabian disease'. Floating, by providing countries with a degree of monetary independence, can help insulate economies from real shocks and be less disruptive in the face of nominal rigidities in the labour and goods markets.

These exchange rate regime choices appear, at first blush, straightforward. The choice is conditioned on the ability of the authorities (both monetary and fiscal) to identify the

source and nature of shocks, distinguish between temporary and permanent disturbances, and that the dynamic economic and financial interactions between nominal and real disturbances are not strong, and do not lead to a 'blurring' of the signals. However, for policy makers living in volatile environments and lacking perfect information concerning the nature, persistence, domestic versus external origin of shocks and the interaction between domestic and external disturbances, the options are not obvious. The additional 'fly in the ointment' comes from increased openness and capital mobility, summarily termed the 'Impossible Trinity': the incompatibility between increased international financial integration/free capital movements, stable/fixed exchange rates and monetary independence. With capital mobility, monetary policies cannot be aimed both at maintaining stable exchange rates and at smoothing cyclical output fluctuations or responding to external shocks. In addition, if financial markets become more integrated and capital accounts are liberalized, then the constraint on policy makers becomes more stringent. Hence, as Stanley Fischer (2001)² points out, countries may be forced into a bipolar choice, with no intermediate regime: adopt free floating exchange rates, or move to a hard peg. You cannot have all three out of perfectly mobile capital, monetary independence and a stable currency. It is increasingly recognized today, though this was not well perceived at the time, that the Impossible Trinity lay behind the demise and eventual collapse of the Gold Standard and the Bretton Woods system. With increased international financial integration, the choice is really between monetary independence and exchange rate stability.

The MB paper correctly focuses on exchange rate regime choice as an attempt to resolve time-consistency and policy credibility problems, and adopt a monetary constitution that will bind the choices of policymakers. The intuition is that –similar to political constitutions- monetary constitutions should not be subject to tinkering and change. Monetary constitutions are the legal/regulatory infrastructures that anchor the public's expectations of the course of monetary and financial policies. It is in this sense that choosing a nominal anchor by pegging to a low inflation country, with the caveat that this be a credible and time-consistent policy, can anchor expectations of the current and future

² 'Exchange rate Regimes: Is the Bipolar View Correct?' Distinguished Lecture on Economics in Government, American Economic Association, Journal of Economic Perspectives, Spring 2001.

path of inflation. The caveat is important: the Argentine crisis shows, among other matters, that a nominal anchor is not sufficient to ensure stability, if there are no commitments or rules for fiscal policy and public debt management.³ Fiscal irresponsibility can destroy any monetary commitment. To quote M. Mussa's (2002) assessment of the Argentine crisis: "...fiscal imprudence killed the Convertibility Plan, rather than the other way around; and both together killed the Argentine economy." In this context, commodity standards –in particular the Gold Standard- played an important role in the institutional design of monetary constitutions because they left no choice, no discretion to the monetary authorities and this enhanced the automaticity and as a result the transparency of the system, allowing agents to firmly anchor their expectations on the commodity standard. By contrast, fiat currency standards however solemn the commitments, are more prone to promise and commitment breaking (*vide* Argentina).

Lessons for the Emerging Markets

Recent proposals to set-up alternative institutional frameworks for monetary policy (monetary union, a currency board to replace the central bank, dollarization or 'euroization', or the adoption of an exchange rate or inflation target) are best analysed as attempts to pre-commit against future temptations to deviate from optimal policy. All are various strategies to tie governments' hands. Anchors and currency unions are attempts to secure the low inflation rate of the anchor country, to generate a credible price stability policy and greater financial stability. The benefits are straightforward: lower transactions costs for goods and services, and the benefits of trade and investment expansion. On the cost side, anchoring countries import the monetary policy of the anchor country, losing the potential advantage of having and conducting an independent monetary policy and the ability to act as lender of last resort and ensure the stability of the financial and banking system. Further, maintaining monetary sovereignty also implies retaining the option of monetizing the domestic currency public debt and reducing its real value. This may be valuable if fiscal and tax reforms are costly to implement or not available, as would be the case for countries emerging from conflicts.

³ See Michael Mussa's testimony before the US Senate Committee on Banking, Housing and Urban Affairs, Subcommittee on International Trade and Finance, on "Argentina's Economic Crisis", 28 February, 2002.

As noted above, anchors and currency unions are not a panacea; in particular they do not ensure that the banking sector will be sound and that countries can avoid financial crises. Additional costs also arise from the loss of seigniorage and ability to issue sovereign domestic currency debt. However, as noted by Alesina & Barro (2002) countries could develop seigniorage compensation arrangements.

More generally, as pointed by Alesina & Barro (2002), the countries most likely to benefit from a strong exchange rate anchor are those (a) that are unable to independently achieve monetary, price and financial stability; (b) whose economic shocks are highly correlated with those of the potential anchor, since countries with the largest co-movement of output and prices with an anchor country will have the lowest costs of abandoning monetary independence; (c) small countries that are highly dependent on foreign trade; (d) countries that are close in terms of ‘distance’ –including geography, language, borders- to potential anchors.

The empirical evidence, also consistent with the ‘gravity model’ which assigns primary importance to geography and location as a determinant of trade, suggests that adherence to a common currency arrangement can expand trade by a factor of two to three. Trade expanded by some 25 to 30% under the gold standard, whereas in the case of the Canadian Provinces, the effect, according to Rose & Glick (2002), was to increase trade by up to 2200%. However, it is also the case that the examples are also associated with large reductions in transport costs and the presence of network economies of scale arising from the transport revolution of the 19th and early 20th century which led to the tremendous expansion of marine, railroad and canal networks.

The MB paper while written from the perspective of the industrialised countries – somewhat justified given the scarcity of comparative long time series data on emerging economies- and issues relevant to the international financial architecture, derives some important lessons for emerging market economies.

Briefly, let me focus on three issues/lessons relevant for our region.

1. Currency boards or hard pegs did not rule out banking and financial crises.

In turn, as the unfolding of the Asian crisis taught us, banking and financial crises can translate into economic crises, resulting in a loss of

- confidence, asset market crashes and extended periods of low growth, recession and unemployment. For the Arab countries, the lesson is clear: pegging exchange rates is no panacea; it is not a substitute for developing and implementing sound macroeconomic and financial policies, developing sound banking control and supervision policies, and seeking through structural reform to lower dependence and vulnerability to oil and gas production and exports.
2. The Arab economies, similar to most emerging economies have limited or no access to international capital markets and where access is available is it at a relatively high risk premium compared to underlying economic risks. The problem of ‘original sin’ is as prevalent in the Arab economies as in other regions.
 3. A central issue for exchange rate regime choice is financial development and maturity and in particular the ability of countries to issue debt in their own currency. This is the bi-polar view, which emphasises credibility and financial development.

Exchange Rate Regimes in the Arab World: Lessons from History & the Way Forward

For many of the Arab countries and emerging economies, the exchange rate regime and monetary constitution were not domestic economic policy choices: they are legacies of the colonial political regimes and reflected the economic and financial interests of the colonial powers and their representatives.⁴ The prime examples are the Sterling zone that emerged after WWII in the former British colonies and the Franc CFA imposed on the former Colonies of French Africa. For the Arab countries under former British colonial rule the strong linkages were initially to Sterling and following Sterling’s demise to the

⁴ See the recent paper by Barro & Tenreyro (2002), who show that “the probability that a client adopts the currency of a main anchor increases when the client is geographically close, speaks the same language, and shares a colonial relationship with the anchor.”

US\$. For Arab countries under former French colonial rule or influence the initial exchange rate arrangement was a French Franc peg. Following the series of FFr devaluations and depreciation the arrangements have been diverse, (see exchange rate arrangement map in Fig 1).

The recent advent of the Euro changes the international financial system and its architecture. The unification of European currencies and abolition of the constituent currencies of the Euro is an important structural innovation that changes the infrastructure of the international currency market, by changing the available financial and monetary instruments and by fundamentally altering the structure of international payments. Further, the introduction of the Euro changes the international financial system and its architecture. By implication, it changes the menu of policy options available to the monetary authorities in the emerging economies and the Arab countries. Should the emerging economies and Arab countries change their exchange rate régimes? Should they change the currency composition of their international reserves?

While the Euro is still an “infant” currency in the long history of currencies and monetary standards, issued by the ECB, which is a “young” institution that is in the process of investing in its credibility and reputational capital, it is, nevertheless, a competing currency to the US dollar. In particular, the Arab countries need to reconsider their choice of exchange rate régimes and choice of currency peg and foreign exchange market intervention medium in the light of:

- 1) Their predominant trade and economic linkage with Europe (see Table 1a).
- 2) Their policies of increased international economic integration, notably with the EU and entry in the WTO.
- 3) Structural changes leading to increased production diversification, less reliance on the oil and gas sector as a source of government revenue and as the main commodity export.
- 4) In addition, the Arab countries are slowly but gradually developing and opening up their capital markets. In turn, the liberalization and development of the financial markets generates increased

international financial integration and necessitates a revision of exchange rate policy régimes.

As the exchange rate geography map of the region shows, many of the Arab countries have pursued effective exchange rate pegs to the US\$ since the end of the Sterling zone. This exchange rate arrangement, by itself, has *not* led to an expansion of intra-regional trade, which represents less than 8% of the countries' international trade. Other factors, such as higher tariff and non-tariff barriers and non-diversified, similar production patterns and relatively small-sized economies have had a more important, and negative, impact on the expansion of regional trade and integration. Given these structural factors, what are the pros and cons of different currency anchors? Should the Arab countries anchor their currencies to the US\$, the Euro or to the Yen? The GCC countries have recently taken some important policy initiatives. GCC governments have agreed a timetable to establish a customs union by 2003, integrate their exchange rate regimes by the same date; reach an agreement on convergence criteria to be achieved by 2005; and adopt a common currency by 2010. Given the proposed common currency, what anchor, if any, should the GCC choose?

Alesina, Barro and Tenreyro (2003) provide a methodology for a country that would seek to adopt a foreign currency. They examine three important criteria for judging the benefits of an anchor: (i) the expansion of international trade that could result from a currency area; (ii) the effect on the degree of co-movement of prices and output; and (iii) the reduction of inflation resulting from linking to a low-inflation anchor currency. Clearly, the more closely the country is integrated with the anchor country through trade, co-variability of inflation and similarity of real shocks revealed by the extent of output co-movement, and the greater the reduction in inflation, the greater the benefits of a currency union or of adopting a low inflation currency.

Tables (1a, 1b, 1c and 1.d) summarize the empirical results for the Arab countries. The main points are:

- If trade were the only criterion, the Euro would be chosen as the better anchor currency, for the Arab countries of North Africa as well as the countries of the Middle East and the Gulf. The choice between the Euro

and the Yen is unclear for Oman and the UAE, given the importance of trade with Japan.

- The Euro would also be chosen if the criterion were the extent of output co-movements by all the Arab countries, with the exception of Oman (the Yen) and Saudi Arabia (unclear choice between the Euro and the \$).
- However, on a price inflation basis, the US\$ would be preferred choice of the countries of the Middle East and the Gulf, whereas the North African countries would prefer the Euro. However, this result may be biased by the existing and long-standing (de facto and de jure) exchange rate peg to the US\$, resulting in a high degree of co-movements of domestic inflation rates with the US.

These empirical results suggest that for the Arab countries an optimal anchor policy would call for linking to the Euro and not the US\$, given the importance of trade and output linkages. In addition, the EU is now proposing closer ties with the countries of the region through (a) the EuroMed Association Agreements, and (b) proposing a free trade agreement with the GCC countries. In particular, the GCC countries that are planning for a currency union will need to consider the nature of the exchange rate arrangement that will be put in place floating, fixed or an intermediate choice. If the choice is to fix or choose an anchor, then the empirical evidence would favor linking to the Euro rather than to the US\$ or to the Yen.

The choice of the Euro as an anchor would be reinforced if:

- The EuroMed countries and the GCC move towards closer trade and economic integration with the EU as a result of the EuroMed Agreements and coordinated implementation of the Greater Arab Free Trade Area (GAFTA) with a free trade agreement with the EU and entry into the WTO.
- Innovation in payment arrangements through an extension of the Euro zone to the EuroMed countries and the Arab countries of the Middle East.

The choice of an anchor currency involves political and strategic considerations as well, involving the potential consequences of pricing and payment of oil and gas in Euro and a change in the composition of the international reserves of the countries of the region. As regional integration gains force, the Arab countries should give more weight to economic and financial considerations in their choice of exchange rate regime and less weight to their post-colonial legacy. Clearly, the common language, geographical proximity and a common legal and regulatory heritage all play in favor of a common currency area for the GCC countries. But other economic policy aspects are important: enhancing labor mobility, unifying and simplifying conditions of establishment and foreign investment, and moving towards tax and fiscal harmonization.

Final comments and the road ahead

The MB paper is rich in providing a broad historical perspective on the performance of exchange rate regimes under different monetary constitutions and standards, structurally different economic conditions, as well as different political regimes and state of affairs. We should retain several lessons: (a) The de facto evidence on exchange rates régimes is markedly different from the de jure and international financial institutions, such as the IMF, should reflect the difference in arrangements in their publications and reporting. (b) Floating exchange rates have *not* been associated with inflation and low growth. (c) The key to successful floating and avoiding the ‘fear of floating’⁵ is financial development. As MB points out, “countries that could successfully operate pure floats were more financially developed than those which could not”. The key distinguishing characteristic of key countries versus periphery countries lies in the conditions for financial maturity: the availability of broad, deep and resilient financial markets, sound fiscal policies that avoid systematic budget deficits and unsustainable public debt dynamics, and monetary authorities that are sufficiently independent to generate stable monetary conditions. To overcome the ‘fear of floating’ countries will need to focus on financial development and on modernizing their payment systems, and in particular, the operation of sound, safe and efficient payment and securities settlement systems. Developing

⁵ See the discussion in Calvo, G. and C. Reinhart (2000) of the factors underlying the reluctance to float their currencies.

There are, I believe, some important lessons and conclusions for the Arab countries: (d) Greater freedom in the choice of exchange rate regimes and arrangements is necessary. The region is turbulent and is exposed to a large number of real shocks: volatile oil prices, high economic dependence on oil & gas income, exports and government revenue, conflicts and insecurity, and water scarcity and climatic conditions that impact on agricultural production. The prevalence of real shocks warrants increased nominal and real exchange rate flexibility. The countries of the region should seek and implement more exchange rate flexibility rather than pegging arrangements that are not based on valid economic and financial criteria. (e) To the extent that the Arab countries seek a currency anchor, economic analysis and empirical evidence confirm that the Euro would be a better anchor currency for most Arab countries. (f) The Arab countries should reinforce the independence of their central banks through new laws and institutional reforms leading to monetary constitutions favouring price stability. (g) We should also aim to strengthen the links between the central banks of the region by, in particular, a planned process of integrating payment systems and extending the Euro zone to the Arab countries. (h) Priority should be given to the development of the financial markets. This should start with the development of government bond markets, which will facilitate the process of fiscal and tax reform, by enabling governments to smooth the difference between their volatile receipts and payments. Performing government bond markets will facilitate the implementation of monetary policy and the emergence of long-term institutional lenders.

The above are lessons that have, I believe, wide applicability for the Arab and other emerging markets. They help policy makers, avoid mistakes, widen the feasible choice set of exchange rate regimes and reach financial maturity.

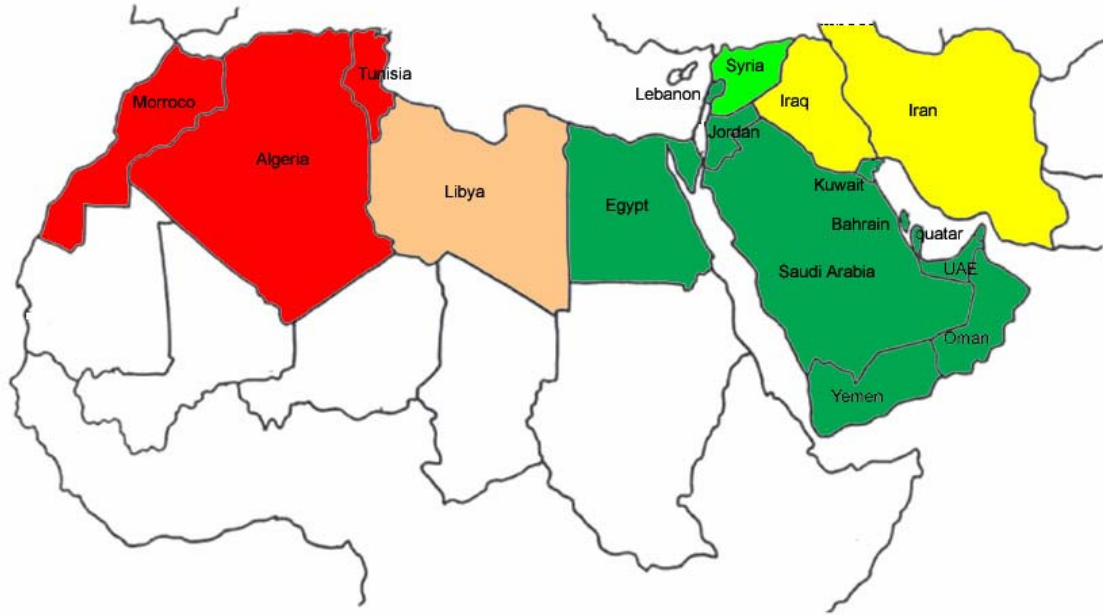
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**FIG 1 : EXCHANGE RATES ARRANGEMENTS
MIDDLE EAST AND NORTH AFRICA 2001**



Exchange rates arrangements



Peg to US dollar



Crawling band around US dollar



Crawling band to Euro



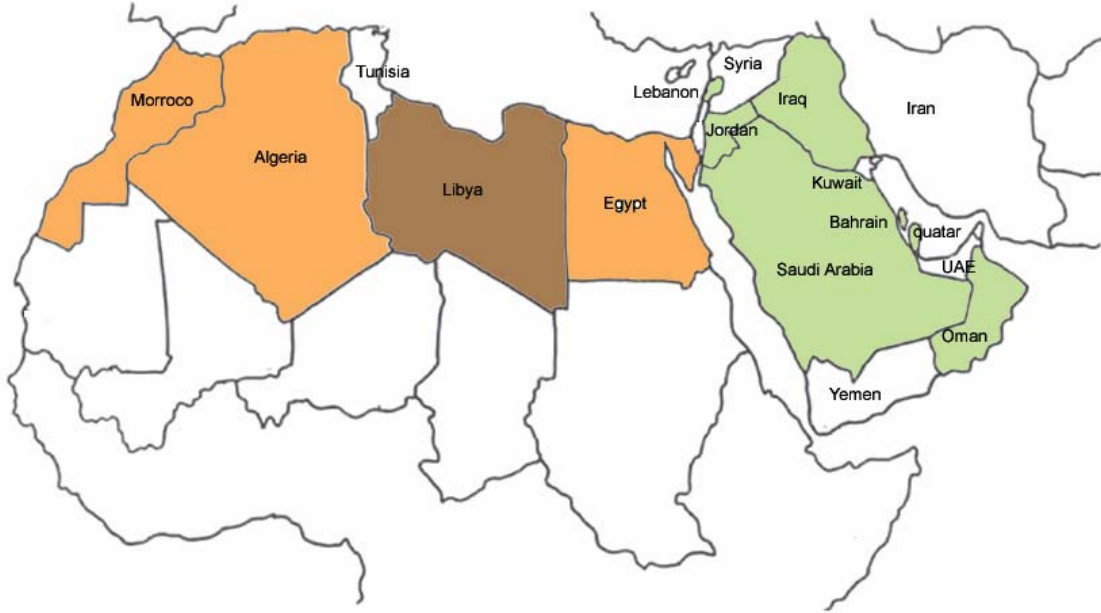
Managed floating



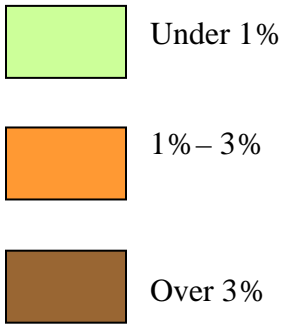
Dual market

* There is no data on Iraq market determined rates after 1998

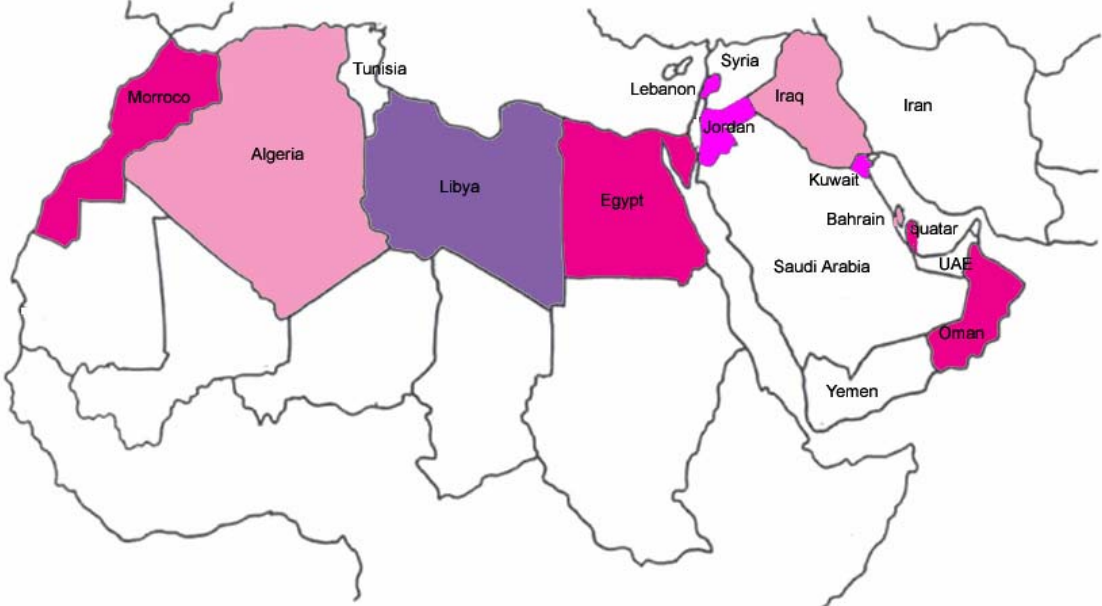
EXCHANGE RATE VOLATILITY
MIDDLE EAST AND NORTH AFRICA 2001



Exchange rates volatility



INTERNATIONAL RESERVES VOLATILITY
MIDDLE EAST AND NORTH AFRICA 2001



Reserves volatility

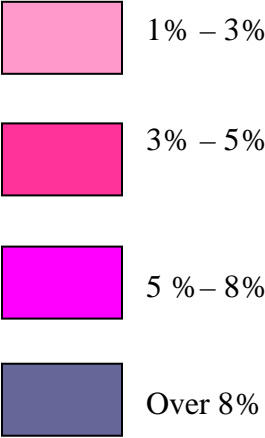


Table 1.A High Trade-Share Countries
Best Anchor Based on the Three Criteria

| <u>Country</u> | <u>Trade</u> | <u>VP</u> | <u>VY</u> |
|-----------------------|---------------------|------------------|------------------|
| Algeria | Euro | Euro | Euro |
| Iran | Euro | Euro | Euro |
| Jordan | Euro | US | Euro |
| Mauritania | Euro | Euro | Euro |
| Morocco | Euro | Euro | Euro |
| Oman | Euro/Japan | US | Japan |
| Saudi Arabia | Euro | US | US/Euro |
| Syria | Euro | US | Euro |
| UAE | Japan/Euro | US | Euro |

Source: Alesina, A., R. Barro, S. Tenreyro (2002). "Optimal Currency Areas," NBER working paper 9072, July.

Table 1 B : Average trade to GDP ratio, 1960-1997* (percentage)

| | <u>With U.S</u> | <u>with Euro-12</u> | <u>with Japan</u> |
|--|-----------------|---------------------|-------------------|
| Oman | 3.6 | 17.7 | 16 |
| Iran, Islamic Rep. | 3.1 | 12.3 | 5.4 |
| Mauritania | | 34.8 | 5.4 |
| Algeria | | 24.4 | |
| Syrian Arab Rep. | | 15.2 | |
| Kuwait | | | 9.5 |
| U.A.E | | | 15.7 |
| Bahrain | | | 8.4 |
| Saudi Arabia | | | 8 |
| <i>Industrial countries unweighted mean</i> | 2.5 | 7.3 | 0.8 |
| <i>Developing countries, unweighted mean</i> | | | |
| <i>Africa</i> | 3.3 | 14.2 | 1.4 |
| <i>Asia</i> | 3.7 | 4.3 | 5.5 |
| <i>Europe</i> | 0.8 | 7 | 0.3 |
| <i>Middle east</i> | 4.2 | 11.6 | 6.1 |

* Trade is the average of imports and exports. (Imports is the average of the values reported by the importer and the exporter. Idem for exports.)

Averages are for 1960-97 (when GDP data are not available, the average corresponds to the period of availability). The equations for co-movement include only one observation for each pair, corresponding to the period 1960-97. The explanatory variables then refer to averages over time.

For a Euro-12 country, the trade ratios apply to the other 11 countries

Source: Glick & Rose (trade values); WDI 2001 (GDP)

Source: Alesina, A., R. Barro, S. Tenreyro (2002). "Optimal Currency Areas," NBER working paper 9072, July.

Table 1 C : Co movement of prices, 1960-1997 *

| - | <u>with the US</u> | <u>with the Euro-12</u> | <u>with Japan</u> |
|--|--------------------|-------------------------|-------------------|
| Iran, Islamic Rep. | 0.479 | 0.467 | 0.497 |
| Oman | 0.125 | 0.145 | 0.162 |
| Egypt, Arab republic | 0.0681 | | |
| Saudi Arabia | 0.0646 | | |
| Bahrain | 0.0563 | | |
| Morocco | | 0.0426 | 0.0918 |
| <i>Industrial countries unweighted mean</i> | <i>0.83</i> | <i>0.0507</i> | <i>0.0919</i> |
| <i>Developing countries, unweighted mean</i> | | | |
| <i>Africa</i> | <i>0.1445</i> | <i>0.1403</i> | <i>0.1647</i> |
| <i>Asia</i> | <i>0.0913</i> | <i>0.1103</i> | <i>0.1237</i> |
| <i>Europe</i> | <i>0.1107</i> | <i>0.1152</i> | <i>0.1307</i> |
| <i>Middle east</i> | <i>0.1348</i> | <i>0.1607</i> | <i>0.173</i> |

* The table shows the value VP, the standard error of the residual for the AR-2 regression for the log of
Of the real exchange rate. In some cases, the sample differs from 1960-97.

For a member of the Euro-12, the co-movement is in relation to the other 11 countries. In some cases,
the sample differs from 1960-97.

Source: Alesina, A., R. Barro, S. Tenreyro (2002). "Optimal Currency Areas," NBER working
paper 9072, July.

Table 1 D : Co movement of Outputs, 1960-1997*

| - | <u>with U.S</u> | <u>with Euro-12</u> | <u>with Japan</u> |
|--|-----------------|---------------------|-------------------|
| Oman | 0.12 | 0.118 | 0.112 |
| Iran, Islamic Rep. | 0.073 | 0.066 | 0.069 |
| <i>Industrial countries unweighted mean</i> | <i>0.0251</i> | <i>0.0198</i> | <i>0.0282</i> |
| <i>Developing countries, unweighted mean</i> | | | |
| <i>Africa</i> | <i>0.0591</i> | <i>0.0577</i> | <i>0.0596</i> |
| <i>Asia</i> | <i>0.0524</i> | <i>0.05</i> | <i>0.0541</i> |
| <i>Europe</i> | <i>0.0449</i> | <i>0.0421</i> | <i>0.0443</i> |
| <i>Middle east</i> | <i>0.0749</i> | <i>0.0713</i> | <i>0.0748</i> |

* The table shows the value VP, the standard error of the residual for the AR-2 regression for the log of
of the real exchange rate. In some cases, the sample differs from 1960-97.

Source: Alesina, A., R. Barro, S. Tenreyro (2002). "Optimal Currency Areas," NBER working
paper 9072, July.