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The effects of (within and with EU) regional integration: Impact on real effective exchange rate volatility, institutional quality and growth for MENA countries

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The Effects of (within and with EU) Regional Integration

Impact on Real Effective Exchange Rate Volatility, Institutional Quality and Growth for MENA Countries

Leonardo Becchetti [1] and Iftekhar Hasan [2]

December 2005

Abstract

We analyse two potential effects arising from regional (and with EU) integration—increased quality of institutions (including the quality of financial institutions) and, economic policies and reduced multilateral exchange rate volatility—in a conditional convergence growth framework for MENA countries. To this purpose we outline an *ad hoc* methodology which implements the traditional bilateral exchange rate measures to test effects of multilateral exchange rate volatility on growth of per capita GDP. Our estimates show that both factors (quality of institutions and reduction of multilateral volatility) significantly and positively affect growth and conditional convergence. We observe that MENA countries are not far from EU and OECD countries in terms of exchange rate volatility, but much below in terms of institutional quality. We finally simulate the potential effects of an improvement in institutional quality in MENA countries on their process of growth and conditional convergence. We conclude arguing that regional integration may be highly beneficial for such countries, mainly because of its effects on institutional quality.

Keywords: institutions, exchange rate, economic policy

JEL classification: F31, F36

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Acronyms

AFA	advantage of flexibility argument
CVA	the cost of volatility argument
EU	European Union
GDP	gross domestic product
MENA	Algeria, Egypt, Israel, Jordan, Mauritania, Morocco, Pakistan, Somalia, Syria Tunisia, and Turkey
MU	monetary union
OCAs	optimal currency areas
QIRMPs	quality of institutional rules and macroeconomic policies
REERs	real effective exchange rates
TPR	trade portfolio risk

Figures and Tables given in Appendix 2.

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1 Introduction

Two of the main (anticipated and concurring) effects expected from regional integration among virtuous countries (or around a core of economically more advanced countries) are reduced exchange rate volatility, and higher and less heterogeneous quality of institutional rules and macroeconomic policies. In this paper we aim to evaluate the impact of past and future potential achievement in terms of regional integration of MENA countries among themselves and with the EU on these two expected effects and on levels and growth of real per capita GDP. We measure the magnitude of these two effects by looking at real effective exchange rates (REERs) and at different indicators of quality of institutional rules (including the quality of financial institutions) and macroeconomic policies (QIRMPs), without neglecting the potential costs generated by the reduction of exchange rate flexibility implied by exchange rate agreements within the process of regional integration. To do so we overcome the traditional limits of bilateral exchange rate measures and we build a measure of real effective exchange rate volatility which we call *trade portfolio risk* (also TPR). We define the trade portfolio risk as the risk of a portfolio whose assets are country's exchange rates with the main trading partners weighted by bilateral country trade shares. We then measure the effects of 'trade portfolio risk' and institutional quality for MENA countries on levels and rates of growth of real per capita GDP in order to evaluate the effects of past and future perspective benefits of an increased economic integration within the region and with the EU.

The paper is divided into seven sections (including this introduction and the conclusions). In the second section we briefly illustrate the two alternative arguments on the effects of exchange rate policies on economic growth focusing on the costs of volatility and the advantage of flexibility arguments. In the third section we illustrate theoretical and empirical findings on the effects of exchange rate volatility and institutional quality on growth. In the fourth section we propose our new trade portfolio volatility measure explaining how it may be particularly helpful in separating and testing simultaneously effects of costs of volatility and advantage of flexibility. In the fifth section we present descriptive findings showing how MENA countries seem quite in line with OECD and EU countries in terms of control of multilateral exchange rate volatility, while they definitely lag behind in terms of indicators of institutional quality. In the sixth section we present descriptive and econometric findings of our research, trying to evaluate the costs (and the perspective gains in case of acceleration of the process of regional integration) of the institutional gap of MENA countries in terms of growth and convergence.

2 Cost of volatility and advantage of flexibility: theoretical rationales and empirical findings

In the past, the evaluation of the effects of exchange rate regimes and volatility on growth has led to the development of two different arguments.

The first can be defined as the cost of volatility argument (CVA). It establishes that exchange rate volatility may be harmful for growth and thus provides indirect support to the creation of monetary unions which eliminate part of this volatility (Buiter, Corsetti and Pesenti 1998). According to this perspective, the elimination of exchange rate

volatility among union members (Buiter, Corsetti and Pesenti 1998; Devereux, Engel and Tille 1999) is generally considered a beneficial effect, given the perception that:

> unpredictable volatility can inflict damage … [and that] … although the associated costs have not been quantified rigorously, many economists believe that exchange rate uncertainty reduces international trade, discourages investment and compounds the problems people face in insuring their human capital in incomplete asset markets (Obstfeld and Rogoff 1995: 73-96).

Along the same line, De Grauwe and Schnabl (2004) emphasize that while the Mundell (1961) theory of optimal currency areas (OCAs) (which they term as Mundell I, following a classification proposed by McKinnon 2004) suggests the well-known caveats to be considered before opting for entering a monetary union, MU (minimum level of trade integration, limited occurrence of asymmetric shocks, sufficient mobility of workers), Mundell (1973a, 1973b) (or Mundell II) provide very different prescriptions. When exchange rate movements are an independent source of volatility and are also driven by speculative dynamics,[1] anticipated entry into MUs may help small open economies to avoid negative macroeconomic effects of exchange rate volatility. The empirical findings of De Grauwe and Schnabl (2004) support this hypothesis finding a positive association between exchange rate stability and growth in Central and Eastern Europe in the last decade.

The second view, which we will term the advantage of flexibility argument (AFA), finds that terms of trade shocks are amplified in countries with more rigid exchange rate regimes and that, after controlling for other factors, countries with flexible exchange rate regimes grow faster (Edwards and Levy-Yeyati 2003). This second approach traces back to Meade's (1951) argument that in countries with fixed exchange rates and inflexible money wages, adjustment in the equilibrium real exchange rates arising from external shocks occur through domestic nominal prices and domestic wages. In such cases, shock absorption would be easier under flexible exchange rate regimes. The same author recognizes that flexible exchange rates may not be of help in case of inflexible real wages, due to some indexation mechanisms. The advantage of flexibility also seems to be supported by empirical evidence. Edwards and Levy-Yeyati (2003) finds that terms of trade shocks are amplified in countries with more rigid exchange rate regimes and that, after controlling for other factors, countries with fixed exchange rate regimes grow faster. Their results are consistent with those of Levy-Yeyati and Sturzenegger (2003a) also using *de facto* exchange rate classifications. The same finding disappears in empirical works in which *de jure* classifications are adopted (Ghosh *et al.* 1996).[2]

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1 The third generation of currency crisis models is very akin to this way of thinking since it shows how crises need not be triggered by misalignment of fundamentals but may also be triggered by self-fulfilling agents' expectations (Obstfeld 1986 and 1994).

2 These findings are consistent with the argument of Ghosh *et al.* (1996) that 'the *de facto* behaviour of exchange rate may diverge from its de jure classification'. Calvo and Reinhart (2000) argue that this difference may explain why results on the effects of exchange rate regimes on growth are inconclusive. Levy-Yeyati and Sturzenegger (1999) find that 12 out of 35 countries identified as free float have, in fact, some form of exchange rate rigidity. The phenomenon is called by these authors 'fear of floating'.

Our methodological point is that these two apparently conflicting views of the literature (advantage of flexibility and cost of volatility) may be tested to be not mutually exclusive when exchange rate volatility is properly measured with a multilateral trade weighted exchange rate. The rationale is that, while it is almost impossible to observe that AFA and CVA hold together when volatility is measured with the bilateral volatility with the dollar (given the strong negative relationship between the latter and fixed exchange rate regimes, especially if pegged to the dollar itself), multilateral trade weighted exchange rate volatility is unrelated with exchange rate regimes and allows the two arguments to be measured separately (Bagella, Becchetti and Hasan 2004).

3. The literature on exchange rate volatility, institutional quality and growth

3.1 Exchange rate volatility and growth: theoretical underpinnings and empirical measures

The main effects of exchange rate volatility on growth are expected to occur via the investment channel. The impact of exchange rate volatility on investment is, in principle, ambiguous as it depends on assumptions on market competitiveness, symmetry/asymmetry of investment adjustment costs and entrepreneurial attitudes toward risk (Caballero and Corbo 1989; Baum, Caglayan and Barkoulas 2001; Froot and Klemperer 1989; Serven 2000).

The effect is definitely positive under perfect competition, risk neutrality and symmetric costs of capital adjustment (Caballero and Corbo 1989), due to the well-known property of convexity of the profit function. This property implies that potential losses for insufficient investment in good states are higher than potential costs for excess capacity in bad states. Hence, firms will overinvest when the exchange rate volatility is higher.

The positive relationship does not hold anymore when we remove the assumptions of risk neutrality and symmetric costs of capital adjustment. In doing so, we realize we are getting closer to the real world if we just consider that the existence of sunk costs implies *per se* that costs of downward adjustments are higher than those of upward adjustments. More specifically, it has been shown that irreversibility must be accompanied by imperfect competition and decreasing returns to scale to invert the sign (from positive to negative) of the relationship between uncertainty, investment and growth (Serven 2000). By introducing the reasonable assumption of risk aversion in this framework, the direction of the link between investment and volatility becomes definitely and unequivocally negative.

On the empirical side, evidence on the exchange rate volatility/growth nexus is scant and controversial, also because of methodological problems arising in the definition of exchange rate volatility. Nonetheless, several empirical findings seem consistent with the above mentioned theoretical approach which considers the role of asymmetric sunk costs and finds a negative relationship among exchange rate volatility, investment and growth (Cottani, Cavallo and Khan 1990; Dollar 1992; Ghura and Grennes 1993; Darby *et al.* 1999).

3.2 Institutional quality and growth: theoretical underpinnings and empirical measures

The huge amount of empirical literature on growth and conditional convergence is, in most cases, an empirical test of the Solow or Solow-augmented growth model in the version proposed by Mankiw, Romer and Weil (1992). Their model has proven to be particularly successful, as the empirical specification to be tested can be easily accommodated to test hypotheses on the inclusion of additional factors affecting conditional convergence and different from human and physical capital investment. A survey summarizing results of this research field outlines something like 87 different factors potentially affecting conditional convergence (Durlauf and Quah 1998). Among them, quality of economic policies and of institutions plays a dominant role among them. Among those surveyed by Durlauf and Quah (1998) in their empirical studies, institutions (Rodrik 2000; Barro and Sala-i-Martin 1995) or, more specifically, financial institutions (Pagano 1993; King and Levine 1993) play a crucial role together with human capital (Mankiw, Romer and Weil 1992). Other factors such as the government sector (Hall and Jones 1999), social and political stability (Alesina and Perotti 1994) and corruption (Mauro 1995) all appears as different facets of the quality of institutions and economic policies.

In a direct evaluation of the relative significance of different factors which confirms our previous considerations, Sala-i-Martin (2002) finds that institutional quality is one of the most robust. The impact of institutions on growth with specific reference to transition countries is tested by De Melo, Denizer and Gelb (1996) and by Fischer, Sahay and Vegh (1996).

With regard to the innumerable theoretical rationales provided to explain the role of institutional quality on growth, we briefly remember some of the most important and representative ones: Rodrik (1999, 2002) argue that market based economies, to be successful, crucially need good institutions and, more specifically, institutions to protect property rights, to fight corruption, to support macroeconomic stabilization and to promote social cohesion. Klein and Luu (2003) find that that technical efficiency is positively related to policies supporting laissez-faire and political structures that promote policy stability. Esfahani and Ramirez (2003) find that good institutions support the creation of the infrastructure needed to promote growth.

4 Our methodology

The methodology for the construction of the multilateral exchange rate volatility is based on the idea that a country may be conceived as having a portfolio of assets represented by its relationships with trade partners. We measure potential benefits of economic integration by proposing a measure of exchange rate risk called *trade portfolio risk* (also TPR). We call trade portfolio risk the risk of a portfolio whose assets are a country's exchange rates with its main trade partners weighted by bilateral country trade (export plus import) shares.

More formally, if the *i-th* country has trade relationships with *j* (*j*=1,..,N) partners, the variance of its portfolio $\sigma_{p,i}^2$ may be written as:

$$\sigma_{p,i}^2 = \sum_j x^2{}_j \sigma^2{}_j + 2\sum_{h<k} x_h x_k \sigma_{hk}$$

Where σ_j^2 is the variance of the return of the *j-th* asset, i. e., the rate of return of the bilateral exchange rate with the *j-th* partner. x_j is the share of trade to the *j*-th partner out of the *i-th* country total export, σ_{hk} is the covariance between bilateral exchange rate returns of the *i-th* country with partners *h* and *k*. Our measure of effective exchange rate variance is therefore a 'portfolio variance'. It includes the volatility of each bilateral exchange rate and their covariances weighted for their relative trade shares. To analyse the behaviour of the export portfolio risk variable, we calculate moving windows of average two-year variances of mean monthly exchange rate returns weighted for the trade shares in our sample period.

With respect to a simple bilateral exchange rate with a leading currency (i.e., the dollar), the TPR variable has three advantages. First, it includes neighbours' (or trade partners') externalities in the evaluation of the effects of exchange rate volatility on growth. This inclusion is fundamental because a country may have good governance and good macroeconomic policies (and may, therefore, be likely to have a low bilateral exchange rate volatility with a leading currency, say, the dollar) but may import instability via variability of governance and economic policies of its trade partners. Individual country stability is therefore insufficient if it is not framed into regional stability and this is why the export portfolio risk variable is more likely to measure the costs of missing regional integration.[3]

A second important advantage of this measure is that favourable and unfavourable exchange rate movements with different trade partners may compensate each other, thereby dampening the negative effects of individual bilateral exchange rate volatility on growth (Qian and Varangis 1994). This effect is incorporated in our export portfolio risk measure which conveniently takes into account the potential impact of trade diversification on export risk.

A third final advantage is that this measure is much less correlated with exchange rate regimes than bilateral exchange rate volatility with the dollar and therefore it gives the opportunity of jointly testing the advantage of flexibility and the cost of volatility arguments as explained above. When building the TPR index we consider that, as far as trade shares of a given trading partner get lower, their contribution to the TPR becomes negligible. For this reason, and in order to avoid including trade partners with very small shares in the analysis, we consider the following three constraints: (i) no more than seven partners; (ii) a cumulative trade share not higher than 60 per cent, and (iii) an

3 A typical example for illustrating this point is that the inspection of the volatility of the bilateral dollar-Argentinean peso exchange rate would suggest low nominal (and slightly higher real) export portfolio risk before the Argentinean crisis, while our measure of export portfolio risk would have been higher including the volatility generated by the devaluation of the currency of one of its main trade partners (such as Brazil).

individual partner share not smaller than 2 per cent. When one of these constraints is hit, we do not include additional trade partners in our TPR measure.[4]

5 The specification of our conditional convergence growth model

We test the effect of trade portfolio volatility and quality of institutions and economic policies in a standard specification of a Mankiw, Romer and Weil (1992) model augmented for the role of institutions and exchange rate volatility.

It is trivial to see that, when we assume that part of the A-factor augmenting labour productivity is proxied by quality of institutions and multilateral exchange rate volatility, the model leads to the following specification in levels

$$\ln\left(\frac{Y_t}{L_t}\right) = c + \gamma_1[\ln(A_{QIMP}) + g_{PIMP}t] + \gamma_2[\ln(A_{REERV}) + g_{REERV}t] + \frac{\alpha}{1-\alpha-\beta}\ln(s_k) + \frac{\beta}{1-\alpha-\beta}\ln(s_h) + \\ -\frac{\alpha+\beta}{1-\alpha-\beta}\ln(n+g+\delta) \tag{1}$$

where $c=\ln(A_{KP(0)})+g_{KP}t$ is the quasi-public good component of knowledge products and is therefore assumed constant across countries and $[\ln(A_{QIMP}) + g_{PIMP}t]$, $_2$ $[\ln(A_{REERV}) + g_{REERV}t]$ are two specific components (quality of institutional rules and macroeconomic policies and real effective exchange rate volatility) of the country-specific factors augmenting the effects of labour input on levels and growth of real per capita GDP when we interpret $A_{V(QI,\ REERV,\ \ldots)}$ as $A_{V=}\gamma_1 A_{QIMP}*\gamma_2 A_{REERV*}\gamma_3 Ar$ where Ar captures all additional factors affecting the labour augmenting component. In this augmented MRW model, the possibility that all countries have the same steady state level of per capita income depends not only on the levelling of their rate of population growth and of their physical and human capital investment rates, but also on REER and quality of rules and macroeconomic policies.

Our augmented version of the model will be estimated also in growth rates under the following specification:

$$\ln(y_t) - \ln(y_0) = (1-e^{-\lambda t})\frac{\alpha}{1-\alpha-\beta}\ln(s_k) + (1-e^{-\lambda t})\frac{\beta}{1-\alpha-\beta}\ln(s_h) + \\ -(1-e^{-\lambda t})\frac{\alpha+\beta}{1-\alpha-\beta}\ln(n+g+\delta) - (1-e^{-\lambda t})\ln(y_0) \tag{2}$$

The difference with respect to the traditional MRW approach is in the interpretation of the common intercept and in the fact that convergence may be prevented by differences in the quality of policies and institutions and by REER volatility.

Variables for our empirical analysis are taken from various sources. The dependent variable *Y/L* is the real gross domestic product per working age person, *L* is the working

4 Sensitivity analysis on our cutoff criteria shows that small changes do not alter the substance of our results. Results are omitted for reasons of space and available upon request.

age population (population aged between 15-64). s_k is gross domestic investment over GDP and is calculated using values taken from World Bank Development Indicators, s_h is secondary school gross enrolment ratio. Indicators of institutional quality are taken from the economic freedom indicators of the Frazer Institute.

To interpret our model, and especially findings from the growth estimate in (2), remember that while the MRW estimation framework was adopted by the authors originally to test the (human capital augmented) Solow exogenous growth model, Bernanke and Gurkaynak (2001) show that such estimation framework is consistent with any growth model that admits a balanced growth path and therefore is compatible also with suitable endogenous growth models.

The exogenous/endogenous growth issue has special interest when we interpret the results of our growth equation, given that the interpretation under the two perspectives is quite different.

The validity of the MRW framework in the augmented Solow model perspective implies that growth is determined by transitional dynamics, leading to the steady state equilibrium level of per capita GDP (the latter being affected by country fundamentals which include human capital investment). Growth from this perspective is uniquely determined by exogenous changes in the labour augmenting A-factor.

The same empirical finding would imply, in the endogenous growth perspective, that human capital investment directly affects growth and not just equilibrium levels of per capita GDP.

However, since we introduce REER volatility and quality of institutions and economic policies as determinants of the A-factor, the traditional distinction between exogenous/endogenous growth models in terms of the role of economic policy as a growth stimulus fades away.

By arguing that REER volatility and quality of institutions and economic policies proxy important components of the A-factor which augments labour productivity and is uniquely responsible of further growth from the equilibrium point, we implicitly introduce the importance of institutions and policies also in the exogenous growth framework.

6 Empirical findings

6.1 Descriptive evidence on exchange rate volatility

The first descriptive evidence on the dynamics of trade portfolio volatility in different macroareas is provided in Table 1. We can see here that MENA countries are quite an exception, since they exhibit an average TPR much lower than that of other developing countries and are in line with that of OECD or EU countries at the end of the sample period. In addition, MENA countries seem to have successfully reduced their trade weighted exchange rate volatility from the very high levels of 1990, but also of 1994 when their TPR was about 40 times higher.

In the same direction Figure 1 shows that historical shocks on trade portfolio volatility for MENA countries have been much milder than those affecting HIPCs (heavily indebted poor countries) or Latin American countries. An important distinction needs to be made between Mediterranean and non-Mediterranean MENA countries, since we expect that the low TPR of the former has been helped by the process of integration with the EU. This impression is confirmed when we observe trade share dynamics. Mediterranean MENA countries have maintained around 50 per cent their trade share with EU countries throughout all the sample period and have a lower and slightly declining trade shares with the US (above 40 per cent). Trade shares versus EU and US are much smaller for non-Mediterranean MENA countries (around 10 per cent) (Figure 2).

6.2 Descriptive evidence on quality of institutions and macroeconomic policies

If MENA countries have a TPR almost in line with that of most developed countries, the gap is much more pronounced when considering another important factor of conditional convergence represented by the quality of institutions and macroeconomic policies.

We are well aware of the problems arising when building composite indicators such as those generally used in comparing institutions at international level. For this reason, as indicator on the quality of institutions and economic policies we employ a benchmark commonly used in the literature and represented by individual and aggregate components of the index published in the *Economic Freedom of the World: 2000 Annual Report* issued by the Frazer Institute.[5] The index is a weighted average of the different composed indicators designed to identify the quality of institutional arrangements and policies in major areas (see Appendix 1 for details).

We focus on three measures:

i) regulation of money credit and business

ii) legal structure and property rights; and

iii) a composite index which includes indicators (i) and (ii) plus the access to sound money and freedom to exchange with foreigners indicators.

We compare the dynamics of the indicator for MENA countries vis-a-vis the Eurozone, OECD non-EU, the transition countries that entered the EU in 2004 and transition-non candidates (Figures 3a-3c). All of the three pictures show similar patterns. Eurozone and OECD non EU countries have the highest scores. The transition countries that entered the EU start from low values but are rapidly converging to those of the first two groups. MENA countries, together with transition non-candidates, share the lowest scores. In the next section we try to evaluate the costs in terms of reduced growth of the lower quality of institutions and economic policies.

5 In a recent survey paper on these indicators, Whilborg (2004) demonstrates the strong correlation between the Frazer Institute indicators on the quality of institutions, institution investor country credit rating and transparency international's corruption perception index.

6.3 Econometric evidence

We perform our estimates on World Bank data on a dataset recording values for 120 countries for a sample period ranging from 1980 to 2000. Table 1 clearly shows that the trade portfolio risk variable in different macroareas is highly variable across time. In a cross-sectional estimate the effect of such variability on growth is not accounted for. We therefore believe that a panel estimate may better enhance the impact of the TPR variable in the estimates. Data are grouped into five 5-year spells in order to provide acceptable timelags to test conditional convergence effects in growth estimates.

We perform growth fixed effect panel estimates using the basic Mankiw, Romer and Weil (1992) approach in which the two main factors of growth are physical and human capital.[6]

In the choice of these two crucial inputs, we fully take into account the debate of the recent literature. Our basic specification framework considers WB investment to GDP ratio and secondary school enrolment rates. In a further step, sensitivity analysis on the effects of TPR on growth is run by taking into account the refinements recently proposed in the literature and replacing (i) enrolment ratios with average schooling years corrected for quality and (ii) World Bank with Heston and Summers (1996) investment to GDP ratios, given that in the latter measures, changes in physical capital stock are corrected for quality according to the results of cross-country surveys on comparability of physical capital.[7]

Results from different specifications of growth estimates under these two general frameworks for estimating human and physical capital are presented in Table 2.[8] Results of the baseline MRW specification show that conditional convergence is supported, even though human capital is not significant (Table 2: column 1). Note that this is also the problem of the seminal paper in this field (Islam 1995). We overcome the problem by augmenting the baseline specification with our TPR variable (Table 2: column 2). The introduction of the TPR variable is negative and significantly supports the cost of volatility argument.

With reasonable arguments De Grauwe and Schnabl (2004) considers that the cost of volatility must be higher for open economies, and especially for small open economies. For this reason we conventionally create a small open economy dummy for countries with less than ten million inhabitants and a ratio of import plus exports over GDP higher than 50 per cent. Therefore, we test whether the relationship between TPR and growth is

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6 To estimate our model we set the abnormal EPR levels of the two hyperinflationary countries (Bolivia and Nicaragua) at the 95th percentile value of the EPR variable.

7 Even though adopted in most empirical growth papers, the choice of gross enrolment ratios as proxies of human capital investment has been criticized since current enrollment ratios represent the investment of future and not current workers (Wossmann 2003). The solution considered optimal by the empirical literature is to use average schooling calculated by Barro and Lee (2000) corrected for the quality of teaching, of the educational infrastructure, or of the curriculum. The adjustment is obtained by using Hanushek and Kimko's (2000) educational quality index, conveniently normalized by Wossmann (2003) for each country relative to the measure for the United States.

8 For each specification we also performed the correspondent level estimates obtaining results consistent with MRW predictions. Since the focus of the paper is on growth we omit presentation of level results.

significantly different for this specific group of countries. Our results are extremely strong and find that the highly significant effect of the TPR growth relationship for small open economies is the main part of the overall effect (Table 2: column 3).[9]

In the next three specifications (Table 2: columns 4, 5 and 6) we want to evaluate the impact of institutional variables on the baseline MRW specification (column 1). We try three alternative specifications respectively considering:

i) regulation of money credit and business,

ii) legal structure and property rights, and

iii) the composite index which includes indicators (i) and (ii) plus the access to sound money and freedom to exchange with foreigners indicators (for details on the characteristics of this variable, see Appendix 1).

The introduction of these regressors is strongly significant and the magnitude of the coefficients is not negligible. Consequently, the overall significance of the estimate is much higher than in the MRW baseline model. Since all variables are in logs, we may evaluate coefficient magnitudes in terms of elasticity (under the restrictive assumption of linearity of underlying variable effects). The highest impact is that of the credit, labour and business indicator (0.32 or 32 per cent elasticity of GDP growth to changes in the institutional variable), followed by the composite indicator (0.24) and by the legal and property right indicator (0.06). Even though these quantitative considerations need to be taken with extreme care, we may more broadly agree on the existence a strong and significant impact of the quality of institutions on GDP growth. A collateral effect of the introduction of these variables is the disappearance of the impact of human capital (exactly as in the baseline MRW model). This finding is likely to be explained by the strong relationship between the returns of human capital and institutional framework which create high collinearity between the two variables.

In the following three specifications, we want to evaluate what happens with the joint inclusion of the exchange rate and institutional quality variables, including also the extra effect of TPR on small open economies, successfully tested in column 3. Results presented in columns 4, 5´ and 6´ illustrate the joint significance of the institutional quality and of the TPR variable, when interacted with the small open economy dummy. Coefficient magnitudes of the institutional quality variables do not vary substantially from previous specifications. We therefore conclude that institutional quality and reduction of exchange rate volatility are two crucial variables in conditional convergence, the latter especially for small open economies such as almost all MENA countries.

An inspection of the economic significance of the impact of trade portfolio risk on growth reveals that our estimates imply an elasticity between 0.005 and 0.01 of the level of per capita GDP with respect to the TPR variable. Consequently, a 100 per cent increase in TPR corresponds on average to a 0.8 per cent lower level of per capita GDP growth in a five-year period. The compared magnitude of exchange rate flexibility seems much larger at first glance since its elasticity is around 0.03. Consider though that

9 This result is robust to the introduction of variables measuring the bilateral exchange rate with the dollar, lagged changes in terms of trade and the dummy for flexible exchange rate regimes. Evidence on this point is omitted for reasons of space and available from the authors upon request.

our descriptive evidence clearly shows that dramatic changes of TPR are not uncommon (Table 1). For instance, the TPR of transition candidates is six times smaller in 2000 with respect to 1998, the TPR of Eurozone countries three times smaller in 2000 with respect to 1995 and ten times with respect to 1992. Given the magnitude of these TPR changes, their impact on growth is not at all negligible.

A potential limit of our results depends on the ex post nature of our TPR variable while the theory predicts a relationship between ex ante expected exchange rate volatility and growth. A possible solution to this problem is the definition of a proxy of ex ante TPR, based on the strong relationship between TPR and quality of institutions and macroeconomic policies often advocated in the literature (see the Van Foreest and de Vries (2002) argument in section 2) and documented in descriptive findings of our paper. We therefore argue that institutional quality and/or quality of monetary policy indexes may be reasonable proxies of ex ante expected TPR. To maintain our multilateral framework, we build an E [TPR] variable which is a trade-weighted difference in the quality of monetary policy with the main trading partners or, alternatively, trade weighted difference in the quality of institutions and of nominal interest rates. Results presented in Table 2 (column 7) show that the negative volatility-growth nexus is still there when trade portfolio volatility is instrumented by the above mentioned variables. This last finding solves some potential endogeneity issues which may arise from the use of the TPR variable, but does not allow us to disentangle the effect of the two variables as we did in previous estimates.

In the specification we introduce also a dummy for flexible exchange rates which is positive and significant. This confirms our hypothesis on the coexistence of cost of volatility and advantage of flexibility effects, and also the possibility of testing them together with our TPR measure.[10] An additional robustness analysis is performed by checking whether the significance and magnitude of the effect of quality of institutions on the dependent variable persist when we replace our proxies of physical and human capital investment with variables recently suggested by the literature (see footnote 7). Table 3 summarizes the findings from this exercise showing how our main result is robust to these changes.

By taking as reference coefficient magnitudes of institutional quality variables, we may make a simple quantitative exercise and check what would have been the predicted rate of growth in the last five years for MENA countries, had their level of institutional quality been that of the Eurozone countries or the transition countries that entered the EU in 2004. This simulation may help us to get an idea of the perspective gains for MENA countries from the improved institutional quality required by an advance in the process integration with Eurozone countries.

Results of this exercise (Table 4) show that MENA countries in the last four years would have gained an additional cumulative 7.2 per cent growth with the overall index of economic freedom of the OECD non-EU countries, 5.4 per cent with those of the Eurozone countries and 1.5 per cent with those of the transition countries that accessed the EU in the 2004. With the index of quality in credit, labour and business, the extra growth would have been up to 13.2 per cent (same quality of OECD non Eurozone

10 The dummy is significant also when introduced in specifications of columns 2, 3, 4′, 5′ and 6′. Results are omitted for reasons of space and available upon request.

countries), 8.4 per cent (same quality of Eurozone countries) and 6.2 per cent (same quality of transition countries which accessed the EU in the 2004).

We are obviously well aware of the limits of these quantitative exercises. Even though the exact amount of the effect is no more than a qualified guess, we are much more confident of the existence and of the robustness of a positive and significant impact of quality of institutions on growth.

7 Conclusions and policy implications for MENA countries

There is a growing consensus on the substantial impact that processes of regional integration may have on the peaceful coexistence of different populations and countries. More needs to be said about the links of regional integration with economic development. Two important directions to follow in this respect are the analysis of the impact on economic growth of improvement in institutional quality and reduction of multilateral exchange rate volatility, since both of the two factors may be clearly related with regional integration processes.

In this paper, we outline and estimate a simple conditional convergence model augmented for these two factors. Model estimates show that the positive impact of both of these is quite robust, even though the multilateral exchange rate volatility argument seems to hold particularly for small open economies. Important policy implications stem directly from this analysis if we just consider the composition of the institutional quality indicators. Our findings suggest that economic growth can definitely be enhanced by:

- The *quality of the legal system* (judiciary independent and not subject to interference by the government or parties in disputes; impartial court with a trusted legal framework for private businesses to challenge the legality of government actions or regulation; protection of intellectual property; overall integrity of the legal system);

- *Adequate monetary policies* that promote price stability through the independence of central banks with anti-inflationary targets and by proper regulation in credit (competitive banking system, high percentage of credit extended to private sector);

- *Labour* (no inflationary system of collective bargaining and unemployment benefit systems which preserve incentive to work), and

- *Business* (limits in price control, reduction of bureaucratic delays in starting and managing a business, limits of trade and exchange rate controls).

The implications of these results for MENA countries are quite relevant. In our findings we observe that while they seem quite in line with EU countries in terms of control of multilateral exchange rate volatility, they lag behind when we consider indicators of institutional quality. In a final tentative simulation we show that MENA countries' conditional convergence is expected to be much faster, should they be able to catch up institutional quality levels of Euro-zone countries or even the level of the transition countries recently admitted in the EU. In many cases, institutional conflicts of interest and domestic policy constraints may limit consensus and power for implementing these

reforms that may, on the contrary, be stimulated by the desire to increase integration with trading countries. The significant institutional convergence of this last group of countries to the Eurozone levels seems to indicate that regional integration remains a powerful force that can enact the institutional change needed to accelerate the process of convergence and growth.

Appendix 1: Composed indicators designed to identify the quality of institutional arrangements and policies

1) Size of government: expenditures, taxes, and enterprises:

   a General government consumption spending as a percentage of total consumption;

   b Transfers and subsidies as a percentage of GDP;

   c Government enterprises and investment as a percentage of GDP;

   d Top marginal tax rate (and income threshold to which it applies): (i) top marginal tax rate (excluding applicable payroll taxes); (ii) top marginal tax rate (including applicable payroll taxes).

2) Legal structure and security of property rights:

   a Judicial independence—the judiciary is independent and not subject to interference by the government or parties in disputes;

   b Impartial court. a trusted legal framework exists for private businesses to challenge the legality of government actions or regulation;

   c Protection of intellectual property;

   d Military interference in rule of law and the political process;

   e Integrity of the legal system.

3) Access to sound money:

   a Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last ten years;

   b Standard inflation variability in the last five years;

   c Recent inflation rate;

   d Freedom to own foreign currency bank accounts domestically and abroad.

4) Freedom to exchange with foreigners:

   a Taxes on international trade: (i) revenue from taxes on international trade as a percentage of exports plus imports; (ii) mean tariff rate; (iii) standard deviation of tariff rates;

   b Regulatory trade barriers: (i) hidden import barriers-no barriers other than published tariffs and quotas; (ii) costs of importing. the combined effect of

import tariffs, licence fees, bank fees, and the time required for administrative red-tape raises the costs of importing equipment;

c Actual size of trade sector compared to expected size;

d Difference between official exchange rate and black market rate;

e International capital market controls: (i) access of citizens to foreign capital markets and foreign access to domestic capital markets; (ii) restrictions on the freedom of citizens to engage in capital market exchange with foreigners index of capital controls among 13 IMF categories.

5) Regulation of credit, labour, and business:

a Credit market regulations: (i) ownership of banks-percentage of deposits held in privately owned banks; (ii) competition-domestic banks face competition from foreign banks; (iii) extension of credit-percentage of credit extended to private sector; (iv) avoidance of interest rate controls and regulations that lead to negative real interest rates, and (v) interest rate controls on bank deposits and/or loans are freely determined by the market;

b Labour market regulations: (i) impact of minimum wage-the minimum wage, set by law, has little impact on wages because it is too low or not obeyed; (ii) hiring and firing practices-hiring and firing practices of companies are determined by private contract; (iii) share of labour force whose wages are set by centralized collective bargaining; (iv) unemployment benefits-the unemployment benefits system preserves the incentive to work, and (v) use of conscripts to obtain military personnel;

c Business regulations: (i) price controls-extent to which businesses are free to set their own prices; (ii) administrative conditions and new businesses. Administrative procedures are an important obstacle to starting a new business; (iii) time with government bureaucracy-senior management spends a substantial amount of time dealing with government bureaucracy; (iv) starting a new business-starting a new business is generally easy, and (v) irregular payments-irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare.

Appendix 2: Figures and tables

Figure 1: Trade portfolio risk up and downs for MENA, South America and HIPC countries

Figure 2: Trade shares of MENA and MENA Mediterranean countries with the USA and EU

Figure 3a: Legal structure and property rights, MENA countries compared with representative groups of countries

Figure 3b: Quality of institutions and economic policies, MENA countries compared with representative groups of countries

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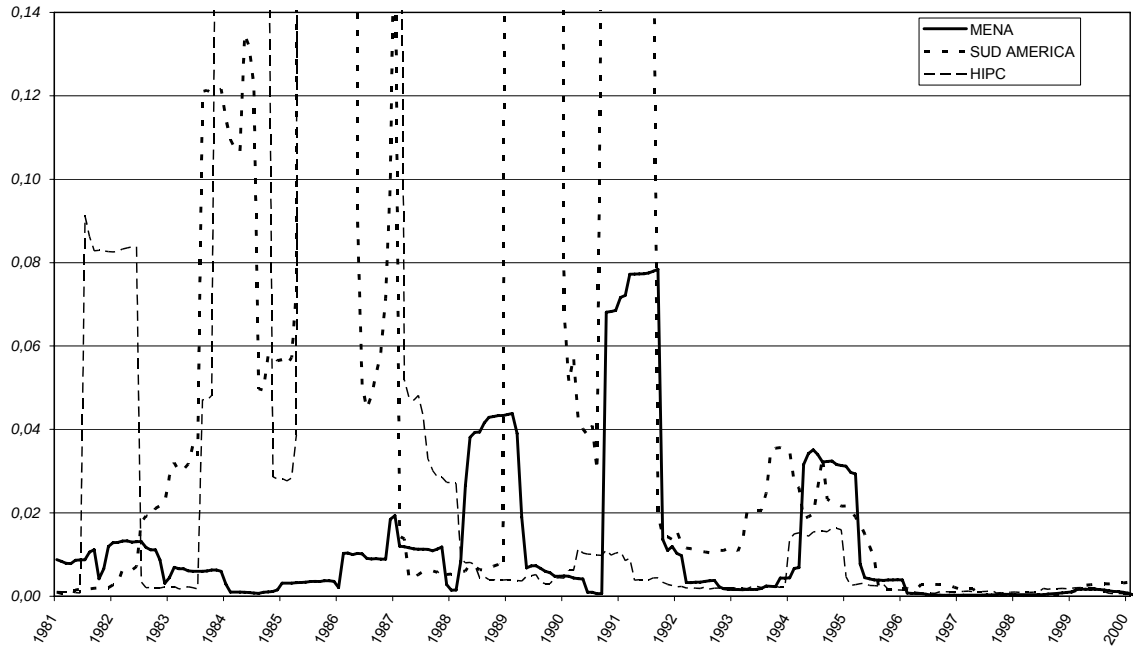
Table 1: The relative dynamics of trade portfolio volatility across macroareas

Table 2: The impact of trade portfolio volatility in conditional convergence growth equations

Table 3: Sensitivity analysis on the effects of institutional quality variables in MRW estimates with different human and physical capital proxies (specifications 4, 5 and 6 of Table 2)

Table 4: If institutional coefficients were to be taken seriously .... (Additional four year growth of per capita GDP growth of MENA countries if institutional indicators were those of OECD non-EU, Eurozone or transition candidates)

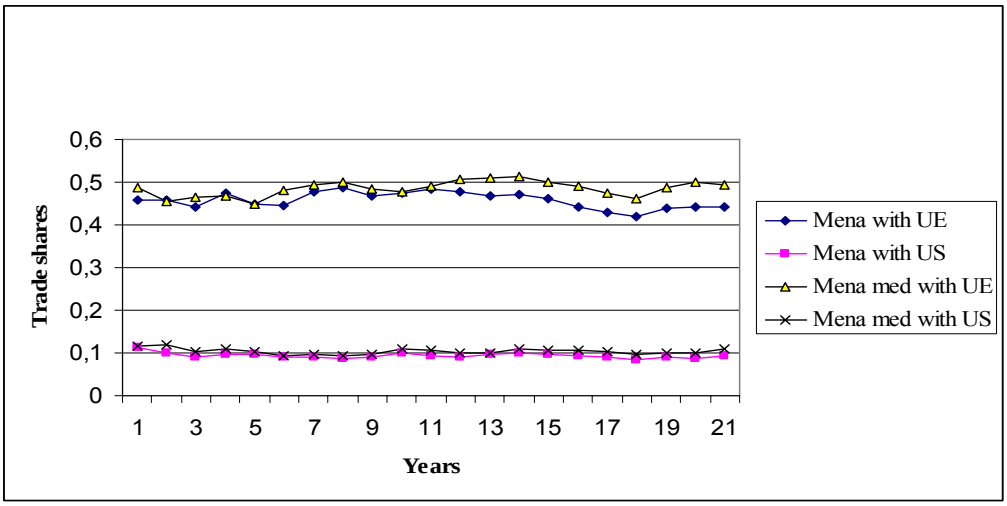
Figure 1
Trade portfolio risk up and downs for MENA, South America and HIPC countries



Note: For the definition of trade portfolio risk, see section 4.

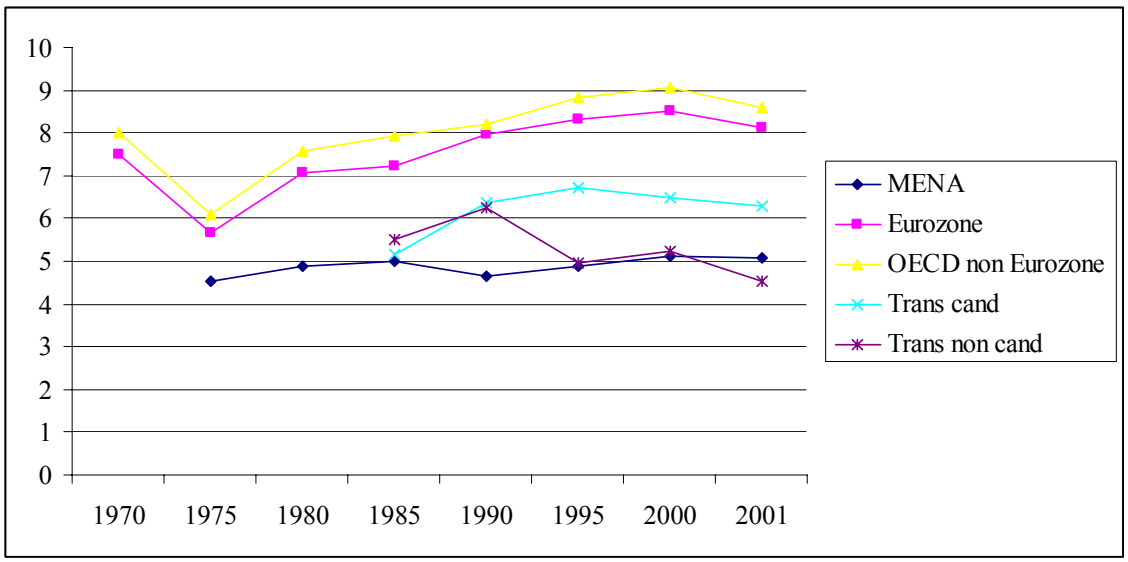
Source: Authors' elaboration from Datastream and IMF DOTS database.

Figure 2
Trade shares of MENA and MENA Mediterranean countries
with the USA and EU



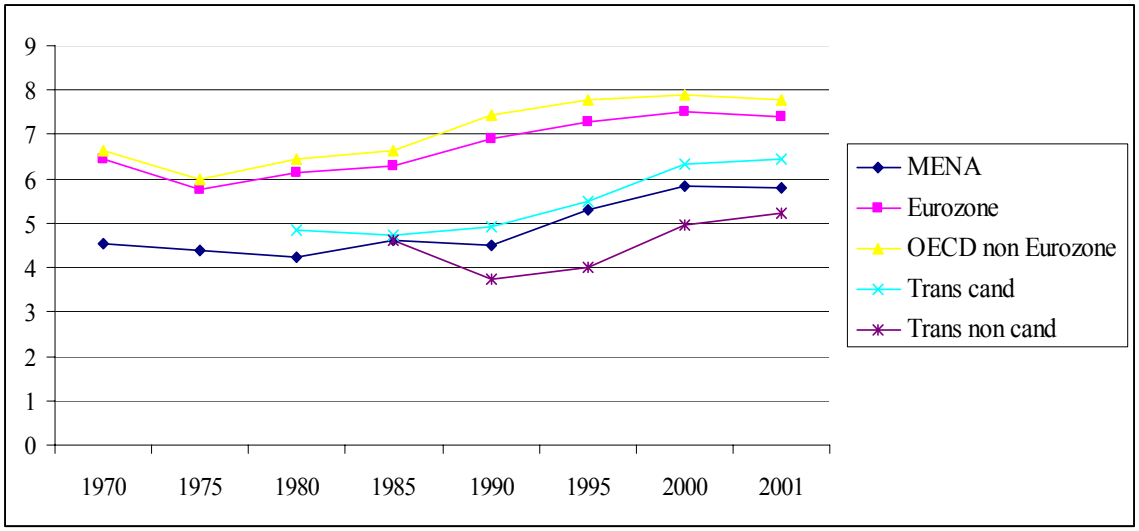
Source: Authors' elaboration from IMF DOTS database.

Figure 3a
Legal structure and property rights,
MENA countries compared with representative groups of countries



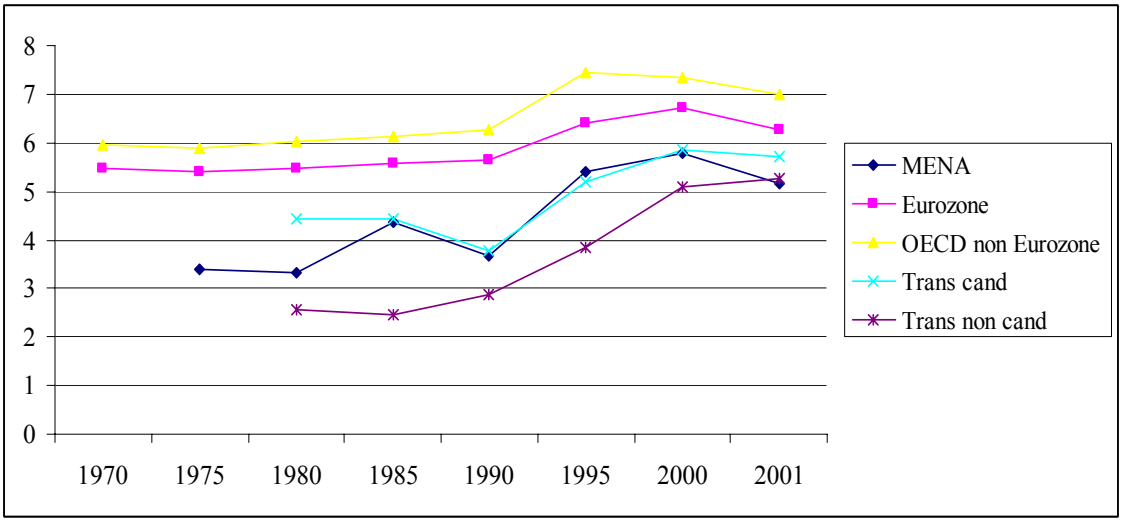
Source: Authors' elaboration from Datastream and IMF's DOTS database.

Figure 3b
Quality of institutions and economic policies,
MENA countries compared with representative groups of countries



Source: Authors' elaboration from Datastream and IMF DOTS database.

Figure 3c
Credit labour and business,
MENA countries compared with representative groups of countries



Source: Authors' elaboration from Datastream and IMF's DOTS database.

Table 1
The relative dynamics of trade portfolio volatility across macroareas

	Eurozone	OECD non-EU	Transition candidates	Transition non-candidates	MENA	Latin American countries
1980	0.0001940	0.0005533	0.0025394	0.0001057	0.0021633	0.0005528
1981	0.0003466	0.0001342	0.0038470	0.0008962	0.0142089	0.0007017
1982	0.0002000	0.0029110	0.0809345	0.0004692	0.0005651	0.0111006
1983	0.0001124	0.0016421	0.0002005	0.0001291	0.0003816	0.0631913
1984	0.0001616	0.0002593	0.0002616	0.0066659	0.0004469	0.0340898
1985	0.0002898	0.0008257	0.0004359	0.0039779	0.0006245	0.0355935
1986	0.0000605	0.0003518	0.0005168	0.0002226	0.0029055	0.0031403
1987	0.0001126	0.0005415	0.0010800	0.0059923	0.0004104	0.0020527
1988	0.0001461	0.0001425	0.0011811	0.0000959	0.0085016	0.0020502
1989	0.0001619	0.0001073	0.0327992	0.0002888	0.0018232	0.0171249
1990	0.0000938	0.0001154	0.0127287	0.0365089	0.0323007	0.0891855
1991	0.0002720	0.0001120	0.0026689	0.0824572	0.0005244	0.0010962
1992	0.0003050	0.0001409	0.0006854	0.0203340	0.0003669	0.0008258
1993	0.0002000	0.0001746	0.0007326	0.0004743	0.0004751	0.0070089
1994	0.0000563	0.0007834	0.0002169	0.0007963	0.0021457	0.0057376
1995	0.0001180	0.0005524	0.0042368	0.0002876	0.0009053	0.0009547
1996	0.0000335	0.0000493	0.0000905	0.0032572	0.0000878	0.0007101
1997	0.0000489	0.0006753	0.0000663	0.0197763	0.0001135	0.0000907
1998	0.0000861	0.0003534	0.0003362	0.0045173	0.0002012	0.0002611
1999	0.0000478	0.0000886	0.0001051	0.0030805	0.0000757	0.0011156
2000	0.0000362	0.0000832	0.0000648	0.0015527	0.0000576	0.0007141

Notes: Eurozone countries: Belgium, Germany, Spain, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland and Greece;

OECD high-income countries: Australia, Canada, Japan, Iceland, Norway, New Zealand, Switzerland, and USA.

Transition non-candidates: Albania, Armenia, Azerbaijan, Bosnia, Bulgaria, Croatia, Macedonia, Moldova, Romania, Russian, Tajikistan, Ukraine, Uzbekistan, and Yugoslavia.

Transition candidates (first phase enlargement) Czech R, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak, and Slovenia;

MENA countries: Algeria, Egypt, Israel, Jordan, Mauritania, Morocco, Pakistan, Somalia, Syria Tunisia, and Turkey (data for other MENA countries such as Libya and Lebanon not available).

Source: Authors' elaboration from Datastream and IMF's DOTS database.

Table 2
The impact of trade portfolio volatility in conditional convergence growth equations

	Fixed effects									
	(1)	(2)	(3)	(4)	(5)	(6)	(4)´	(5)´	(6)´	IV-2SLS (7)
Ln(Y/L)$_{t0}$	-0.210**	-0.273**	-0.271	-0.229	-0.223	-0.216**	-0.255	-0.272**	-0.238**	-0.165**
	[-9.81]	[-7.46]	[-7.46]	[-9.85]	[-8.63]	[-9.58]	[-7.60]	[-7.32]	[-7.29]	[-3.97]
ln(s$_k$*)* (1)	0.079**	0.080**	0.068	0.077	0.081	0.088**	0.037	0.055**	0.044**	0.066*
	[3.88]	[3.00]	[2.54]	[3.41]	[3.32]	[3.91]	[1.83]	[1.96]	[1.70]	[1.99]
ln(s$_h$*)* (2)	-0.019	0.061*	0.061	0.05	0.016	0.031	0.05	0.050	0.022	0.0184
	[-1.33]	[2.13]	[2.14]	[1.54]	[1.34]	[1.24]	[1.34]	[1.93]	[1.08]	[0.5]
ln(n+g+d) (3)	-0.242**	-0.287 **	-0.261	-0.261	-0.222	-0.252**	-0.325	-0.286**	-0.214**	-0.169*
	[-5.56]	[-3.82]	[-3.48]	[-5.31]	[-4.31]	[-5.20]	[-4.68]	[-3.95]	[-3.15]	[-1.92]
Ln(TPR)		-0.007 *	-0.004				0.005	-0.005	0.007	-0.018**
		[-2.02]	[-1.22]				[1.46]	[-1.64]	[1.85]	[-1.94]
*Ln(TPR*smopec)*			-0.008				-0.007	-0.007	-0.008	
			[-2.56]				[-2.94]	[-2.65]	[-3.32]	
Ln(Indexfree)				0.245			0.260			
				[7.64]			[6.18]			
Ln(legstrupro)					0.063			0.045		
					[3.29]			[1.67]		
Ln(credlabus)						0.323**			0.342**	
						[8.30]			[7.44]	
Dflex										0.045**
										[2.45]
Constant	1.734**	1.706**		1.734	1.40	0.815**	0.996	1.61	1.07**	0.973**
	[4.9]	[4.78]		[4.9]	[5.27]	[3.40]	[3.01]	[4.49]	[3.31]	[2.47]
F test (overall regression significance)	11.98	12.84 (0.00)	11.98	39.09 (0.00)	25.48 (0.00)	15.59 (0.00)	39.09 (0.00)	10.80 (0.00)	18.16 (0.00)	TPR instrumented by TWTOTINST & TWDIFINT
R-sq Within	0.1825	0.166	0.1825	0.30	0.23	0.27	0.30	0.20	0.30	0.045
F test u_i=0 (*joint significance of fixed effects*)	2.24	2.14 (0.04)	2.24	3.24 (0.00)	2.84 (0.01)	2.53 (0.00)	3.24 (0.00)	2.35 (0.00)	2.85 (0.00)	1.81
F test Ho: (1)+(2)=-(3)	0.1131	(0.0826)	0.1131	(0.00)	(0.00)	(0.01)	(0.00)	(0.04)	(0.03)	
Observations	434	434	434	570	541	403	570	390	397	320
Groups	106	106	106	111	110	95	111	93	95	88

Table 3
Sensitivity analysis on the effects of institutional quality variables in MRW estimates
with different human and physical capital proxies
(specifications 4, 5 and 6 of Table 2)

	Average quality of schooling years		Average years of schooling		Secondary school enrolment ratio
	PWT physical capital investment	WB physical capital investment	WB physical capital investment	PWT physical capital investment	PWT physical capital investment
Indexfree	0.208 [7.23]	0.204 [6.72]	0.201 [6.64]	0.205 [7.10]	0.253 [8.33]
Credit, labour and business	0.258 [6.27]	0.265 [6.49]	0.245 [5.99]	0.239 [6.08]	0.308 [7.88]
Legal structure and property rights	0.052 [2.85]	0.061 [3.18]	0.061 [3.19]	0.053 [2.91]	0.018 [3.68]

Notes: Estimates are run on eight 5-year spells.

Variable legend

$(Y/L)_{t0}$ real per capita GDP of the first year in each 5-year spell;

s_k : WB investment to GDP ratio;

s_h : net secondary school enrolment ratio;

TPR: trade portfolio volatility (for the definition see section 4).

Smopec: dummy taking unit value for small open economies (which conventionally defined as countries with less than 10 million inhabitants and a ratio of import plus exports over GDP higher than 50%) and zero otherwise.

Dflex: dummy for de facto flexible exchange rate regimes.

Indexfree: index of economic freedom;

Lesgstrupro: index of legal structure and property rights;

credlabus: index of quality of credit, labour and business regulation (for definitions of the institutional indicators see Appendix 1). In column 7 and the TPR variable is instrumented by the following two variables:

(i) $\text{TWDIFINT}_{ij} = \sum_j x^2{}_j \left(Ri - Rj\right)$ where Ri is the nominal interest rate of country i. (ii) Tvtotinst: indicator of relative institutional strength for country i with

$\text{TWTOTINST}_{ij} = \sum_j x^2{}_j \left(INDECXREEDi - INDEXFREEDj\right)$

where indexfreed is defined in Appendix 1 and x_j is the share of trade (total volume of export plus total volume of import) to the *j*-th partner out of the *i*-th country total trade (volume of export plus volume of import).

T-stats in square brackets.

Numbers in parentheses are p-values from the relative F test on the null hypothesis indicated. ** 95% significance with bootstrap standard errors; * 90% significance with bootstrap standard errors. We use the percentile and bias corrected approach with 2000 replications.

Source: Authors' elaboration based on data from Gwartney, Lawson and Samida (2000).

Table 4
If institutional coefficients were to be taken seriously ....

(Additional four year growth of per capita GDP growth of MENA countries
if institutional indicators were those of OECD non-EU, Eurozone or transition candidates)

	OECD non-EU	Eurozone	Transition candidates
Indexfree	7.2%	5.4%	1.5%
Credit, labour and business	13.2%	8.4%	6.2%
Legal structure and property rights	3.0%	2.7%	0.7%

Notes: Simulation realized by taking coefficients magnitude from columns 4, 5 and 6 of Table 2 and by replacing institutional values of MENA countries with those of the group of countries indicated in each of Table 4 columns.

Legend: Indexfreed: index of the quality of institutions and of economic policies. It is measured as a simple average of the following composed indicators:

1) Size of government: expenditures, taxes, and enterprises
   - a General government consumption spending as a percentage of total consumption
   - b Transfers and subsidies as a percentage of GDP
   - c Government enterprises and investment as a percentage of GDP
   - d Top marginal tax rate (and income threshold to which it applies) (i) top marginal tax rate (excluding applicable payroll taxes); (ii) top marginal tax rate (including applicable payroll taxes)

2) Legstrupropri
   - a Judicial independence—the judiciary is independent and not subject to interference by the government or parties in disputes
   - b Impartial court—a trusted legal framework exists for private businesses to challenge the legality of government actions or regulation
   - c Protection of intellectual property
   - d Military interference in rule of law and the political process
   - e Integrity of the legal system

3) Moneyacces
   - a Average annual growth of the money supply in the last five years minus average annual growth of real GDP in the last 10 years
   - b Standard inflation variability in the last 5 years
   - c Recent inflation rate
   - d Freedom to own foreign currency bank accounts domestically and abroad

4) Freedomexc
   - a Taxes on international trade (i) revenue from taxes on international trade as a percentage of exports plus imports; (ii) mean tariff rate; (iii) standard deviation of tariff rates
   - b Regulatory trade barriers (i) hidden import barriers-no barriers other than published tariffs and quotas; (ii) costs of importing—the combined effect of import tariffs, licence fees, bank fees, and the time required for administrative red-tape raises the costs of importing equipment
   - c Actual size of trade sector compared to expected size
   - d Difference between official exchange rate and black market rate
   - e International capital market controls (i) access of citizens to foreign capital markets and foreign access to domestic capital markets; (ii) restrictions on the freedom of citizens to engage in capital market exchange with foreigners index of capital controls among 13 IMF categories

…/.

5) Credlabbus

a Credit market regulations (i) ownership of banks-percentage of deposits held in privately owned banks; (ii) competition-domestic banks face competition from foreign banks; (iii) extension of credit-percentage of credit extended to private sector; (iv) avoidance of interest rate controls and regulations that lead to negative real interest rates, and (v) interest rate controls on bank deposits and/or loans are freely determined by the market

b Labour market regulations (i) impact of minimum wage-the minimum wage, set by law, has little impact on wages because it is too low or not obeyed; (ii) hiring and firing practices-hiring and firing practices of companies are determined by private contract; (iii) share of labour force whose wages are set by centralized collective bargaining; (iv) unemployment benefits-the unemployment benefits system preserves the incentive to work, and (v) use of conscripts to obtain military personnel

c Business regulations (i) price controls-extent to which businesses are free to set their own prices; (ii) administrative conditions and new businesses. Administrative procedures are an important obstacle to starting a new business; (iii) time with government bureaucracy-senior management spends a substantial amount of time dealing with government bureaucracy; (iv) starting a new business-starting a new business is generally easy, and (v) irregular payments-irregular, additional payments connected with import and export permits, business licenses, exchange controls, tax assessments, police protection, or loan applications are very rare.

Source: Authors' elaboration based on data from Gwartney, Lawson and Samida (2000).

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