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Trade Openness and Vulnerability in Central and Eastern Europe

Pierluigi Montalbano,[1] Alessandro Federici,[2] Umberto Triulzi,[3] and Carlo Pietrobelli[4]

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Abstract

This paper offers a substantive contribution to the debate on the role of international trade on the development of emerging countries. The aim is to detect empirically the phenomenon of vulnerability induced by trade openness. The methodology adopts a forward-looking approach and tries to fill a missing link in the theory between trade shocks, volatility, and the wellbeing of countries, distinguishing between 'normal' and 'extreme' volatility.

The analysis is focused on Europe, in consideration of the dramatic and unprecedented trade liberalization process experienced by the Central and Eastern European countries at the beginning of the 1990s.

The main result of the analysis is that in spite of the apparent association between trade openness and good macroeconomic performance, Eastern European countries have

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[1] University of Rome 'La Sapienza', email: p.montalbano@dte.uniroma1.it; [2] University of Rome 'La Sapienza', email: alessandro.federici@uniroma1.it; [3] University of Rome 'La Sapienza', email: triulzi@ipalmo.com; [4] University of Rome III, email: c.pietrobelli@uniroma3.it

experienced a worsening of their macroeconomic wellbeing because of the trade shocks of the early 1990s. This preliminary evidence, remarkably strong also in the case of the poorest sections of the population, spurs some relevant policy implications, both at the national and supranational levels.

1   Introduction

Trade liberalization is the emerging issue of development studies. On the one hand, common wisdom suggests that openness to trade and factor flows offer remarkable opportunities for the economic and political progress of countries; hence, the main international organizations advocate structural reforms centred on trade openness for the developing countries. On the other hand, such openness translates into a growing feeling of insecurity and 'vulnerability'. This fosters intense political debate on the options and strategies available for helping developing countries fully capture the benefits of trade integration, and for reducing the likely negative effects.[1] This debate is currently in place within the WTO in the throes of carrying out the Doha Development Agenda and also within the EU under the framework of the new Cotonou Agreement, which established a set of Regional Economic Partnership Agreements with developing countries in Africa, Caribbean and Pacific—and of the enlargement towards CEECs (Central and Eastern European Countries).

This paper aims to empirically analyse whether the feeling of insecurity and vulnerability linked to trade liberalization can be justified in economic terms and whether policymakers should be genuinely worried. The aim is not to build a case against liberalization, but instead, help policymakers design and implement a new set of preventive policies and move towards a more forward-looking attitude.

The objective of the paper is twofold: to provide a substantive contribution to the debate on the role of trade liberalization on the macroeconomic performance of emerging countries, with a focus on the experience of Central and Eastern Europe. At the same time, the paper attempts to raise awareness of the vulnerability that may be induced as a likely side effect by trade liberalization.

A crucial question of this analysis is how to strike a balance between the advantages of an open economy and the disadvantages of greater exposure to external shocks? Considering the redistributive nature of trade, it is certainly not possible to denounce any shock that may cause even a single individual to suffer a reduction in income (Winters 2000). Moreover, in countries with low levels of trade, it is reasonable to assume that greater trade liberalization would reduce risk exposure rather than increase it, because larger world markets (with many players) tend to be more stable than smaller domestic ones (Winters 2000). However, should foreign shocks be largely unpredicted and greater than domestic ones, the opposite effect would ensue.

Practically speaking, there is a substantial grey area where countries enjoy a fair degree of stability but the probability to be hurt by external shocks could be high (Winters 2000). The object of this 'trade vulnerability' analysis is to gain a better understanding of this grey area.

In this respect, the case of the CEECs is particularly instructive. Since the early 1990s, the CEECs have experienced a dramatic and unprecedented process of political change, economic liberalization and institutional reform (Svejnar 2002). This, at the beginning of the transition process, created an economic slowdown of a magnitude never witnessed during peacetime years (Mundell 1995). The CEECs recovered only after a

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[1]   On these issues, see also Yusuf (2001) and also several essays in Ocampo *et al.* (2000).

number of years, following a U-shaped 'transition' curve (Figure A1). This economic slowdown has been explained, among others, by the occurrence of several negative trade shocks, such as the collapse of the Council for Mutual Economic Assistance (Comecon),[2] the discontinuation of the traditional trade linkages with the former USSR, as well as the immediate shift to world prices in foreign trade (Blanchard 1997). Did these shocks cause once-for-all or permanent effects? or, in other words, did they add to the vulnerability of the CEECs with regard to their socioeconomic conditions?

This paper attempts to answer these questions. The work is organized as follows: in the first part (sections 2, 3 and 4), we present a brief review of the literature drawn from apparently distant areas of research: trade openness (section 2.1) as well as vulnerability (section 2.2), and carry out some steps towards a macro-approach of vulnerability to trade openness (sections 3 and 4). In the second part, we present an empirical exercise on the vulnerability to trade openness in Europe. For this purpose, some stylized facts on the macroeconomic performance of European countries, both in terms of growth and volatility, are reviewed in section 5 and an empirical application for Europe for the period 1990-2000 is carried out in section 6. Finally, section 7 proposes a measurement of vulnerability to trade openness for European countries. Section 8 tests this measurement on the poorest population quintiles, and section 9 draws some conclusions and policy implications.

2   Review of the literature

2.1 On the effects of trade openness

Mainstream international economics based on the Heckscher-Ohlin theory asserts that international trade produces benefits for all participants. Countries and individuals specialize according to their comparative advantage, and relative prices of goods and factors tend to converge.

Over time, numerous studies, presenting substantial empirical evidence, explored additional issues such as the effects of trade openness on partner countries. These include: the impact of trade liberalization on poverty (Timmer 1997; Delgado *et al.* 1998; Mellor and Gavian 1999); and on inequality between and within countries (Frankel 2000; Ben-David 1993; Cornia and Court 2001; Milanovic 2003); the relationship between trade integration and economic growth (Edwards 1993; Frankel and Romer 1999; Dollar and Kraay 2001); and the role of policies and institutions (Krueger 1990; Ades and Di Tella 1997 and 1999; Lall and Pietrobelli 2002). (For an extensive review of the effects of trade liberalization on the wellbeing of partner countries, see McCulloch, Winters and Cirera 2001.)

Our intent here is to shed light on an additional issue regarding the effect of trade openness, with special focus on the relationship between trade liberalization, its associated risks, macro volatility and vulnerability. On this subject, the most complete

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[2] The Comecon was established in 1949 with the aim to promote economic, scientific and technological cooperation and develop economic integration among the following socialist member countries: USSR, Bulgaria, Czechoslovakia, Hungary, Poland, Romania, Albania (1949); East Germany (1950), Mongolia (1962); Cuba (1972) and Vietnam (1978).

and thorough analysis to date remains the work of Glick and Rose (1999). They indicate with empirical evidence how trade linkages should be first among the factors in explaining regional contagion during currency crises. Later Forbes (2001) examines how trade can transmit crises internationally via three distinct, and possibly counteracting, channels: the competitiveness effect (when changes in relative prices affect a country's ability to compete abroad); the income effect (when a crisis affects incomes and the demand for imports); and the cheap-import effect (when a crisis reduces import prices and acts as a positive supply shock). The author suggests that trade effects are not only statistically significant, but also quantitatively relevant (Forbes 2001). However, Corsetti *et al.* (2000), and Wincoop and Yi (2000) have remarked that these channels could counteract and balance each other out, and the resulting aggregate impact of trade linkages could be small. Another relevant strand of literature on the same issue, but with different techniques and objectives, is related to the 'small states' (Atkins and Mazzi 1999; Easterly and Kraay 1999).

2.2 Vulnerability: theoretical and methodological references

Vulnerability as a method of analysis does not override traditional approaches. Instead, it offers a new lens for examining the dynamics of development. It can be defined as the 'continuous forward-looking state of expected outcomes' (Alwang, Siegel and Jorgensen 2001) which themselves are determined by the characteristics of the unit of analysis, the correlation, frequency, timing and severity of shocks, as well as by the risk management instruments applied (Heitzmann, Canagarajah and Siegel 2001). Risks, in fact, are only one side of the coin. While risks are exogenous, vulnerability is endogenous as it is the result of strategies employed by individuals and communities facing the risks (Dercon 2001). It is important to underline that while wellbeing and poverty are ex-post outcomes, vulnerability is an ex-ante condition which could potentially lead to a negative outcome. Consequently, what really matters in assessing vulnerability is not the current values of the phenomena, but the ability to understand its future dynamics and intervene as needed. Vulnerability, in this light, could be considered as an evolutionary process generated by cumulative factors (Davies 1996).[3]

Vulnerability is indeed a complex subject. It is not determined by one, easily measurable factor. There are many sources of risk that interact with each other, as well as many different types of risk management strategies.[4] Moreover, risk management

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[3] This is a central point. Some disciplines consider vulnerability to be something which is very similar to ex-post poverty outcome assessments. Instead, a proper vulnerability assessment requires ex-ante analysis of the exogenous risk factors and risk management tools. While many international organizations (e.g. FAO, World Bank, UNDP, USAID) have made significant strides in improving our understanding of vulnerability, a proliferation of multiple methodologies, terminology and approaches to vulnerability exists, involving as diverse areas of interest as food security, conflict prevention, etc. (Triulzi and Montalbano 2002).

[4] Most approaches place particular emphasis on elaborating the classification of risks, risk response strategies and livelihood characteristics of households and communities. It is widely agreed that risks derive from a variety of natural, political, social and economic sources. Some methodologies (e.g., the World Bank) also distinguish between the characteristics of the risk, such as *frequency*, *magnitude*, *intensity* and *correlation* (World Bank 2003b). This depth of risk classification, however, is not widespread. Some experts prefer to use the term 'life event' instead of 'shocks' or 'stress' in order to allow for the inclusion of an active component, in contrast to a perception of the poor as passive social actors. Risk management tools are also analysed and grouped into specific categories in most

instruments need to be aimed at not only preventing risks, but more importantly also at encouraging individuals to take risks in a more conscious, beneficial and profitable manner with a long-term outlook (Holzmann 2001b).

As a result, there is no unanimous and consistent approach to vulnerability. However, there are a number of possible measurements of the phenomenon, which depend on the context in which vulnerability is actually analysed.[5] Economic literature, using among others a monetary measure, analyses vulnerability as a possible loss of wellbeing due to a combination of risks and management tools. There are currently a number of different approaches to vulnerability analysis from the economic point of view: (i) the exposure to observed risks (Amin, Rai and Topa 1999; Dercon and Krishnan 2000; Glewwe and Hall 1998); (ii) expected poverty (Chaudhuri, Jalan and Suryahadi 2002; Christiaensen and Boisvert 2000; Pritchett, Suryahadi and Sumarto 2000); and (iii) expected utility (Calvo and Dercon 2003; Ligon and Schechter 2003).[6] These studies adopt primarily a micro approach and focus on households. As argued by Hoddinott and Quisumbing (2003), all these contributions seek to measure vulnerability by adopting a two-step procedure: first, they estimate the distribution of future consumption expenditures and then construct a statistic from this estimated distribution in order to capture the reduction in household welfare resulting from the risk in household consumption expenditures.

3 Towards a macro approach to vulnerability

This paper adopts a macro lens and a slightly different approach than most of the available literature. The decision to focus on aggregate variables and not on households data is due to several considerations. First of all, this is due to the recognition that the economic process of globalization creates different circumstances in which endogenous, micro and natural shocks are becoming less important than 'man-made' external macro shocks. Especially in the last decade the incidence of macro shocks at the international level has been quantitatively very relevant. Between 1990 and 1997, more than 80 per cent of the developing countries experienced at least one year of negative per capita output growth as a result of an economic crisis, natural disaster or conflict (World Bank 2000a). These shocks, the result of a perverse combination of international turmoil and

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vulnerability approaches. These instruments are generally divided into *reduction*, *mitigation* and *coping mechanisms*. The sustainable livelihoods approach, for example, focuses on short-term coping strategies and long-term adaptive behavioural changes (UNDP 1999).

[5] There is, generally speaking, an intrinsic incompatibility between the completeness of the definition of vulnerability and its ability to be empirically valid (Alwang, Siegel and Jorgensen 2001). The problem for a quantitative analysis is to isolate a simple measure (or set of measures) that is comparable across time and location (Gamanou and Morduch 2002). The information requirements are high and no straightforward measurement of hypothetical situations is possible via survey data. Currently, most of the applications used infer the distributions of possible outcome shocks from the error process in cross-section regression models explaining consumption outcomes by household and community variables. This implies strong assumptions on how shocks evolve over time and space. The data needed to construct outcome-based measures are many, while they do not give much insight on how the poor cope with vulnerability (Dercon 2001). Other measures may help to fill these gaps, such as for example, the sustainable livelihoods approaches, which focus on assets.

[6] See Ligon and Schechter (2004) for an overview.

political economy mismanagement, have manifested themselves in various forms (public budget, balance of payments, currency and banking crises; hyperinflation, etc.) and affected, in various instances,[7] primarily the most integrated countries in the world economy (Easterly and Kraay 1999). In this new scenario, traditional social relationships and local market structures in developing countries are facing entirely new challenges, while the traditional coping mechanisms are under pressure and a vast proportion of the population has no means to benefit from the competition at international level (Dercon 2001). Furthermore, 'macro' covariate shocks (i.e., shocks that occur at the national or regional level) have been shown to impact more severely on the poor even when shocks do not affect people disproportionately (Lustig 2000). Along the same lines recent empirical works (Lundberg and Squire 2003) argue that trade openness erodes income growth in the bottom quintile of the population because of the poor's limited ability to save and their lack of access to general public or private safety net systems (World Bank 2000a).

The second reason that calls for a macro approach is related to policy. Recent events highlight the paucity of 'ex-ante' international macroeconomic policies that would be capable of properly recognizing and coping with the systemic nature of macroeconomic crises and their actual effects. In addition, current policies and *ad hoc* interventions usually fail to take into account the fact that there is a genuine chance that a large percentage of the population will fall below the poverty line in the near future (Glewwe and Hall 1998). As a result, policies need to be redesigned and redirected to address such issues (Holzmann and Jorgensen 2000; Holzmann 2001a).

Third, the adoption of a macro approach helps to raise a critique of the current, influential 'macro' literature on trade and poverty, which argues that trade is good for growth and growth is good for the poor (Dollar and Kraay 2000 and 2001). We argue that the ability of a country to benefit from full integration into a more open international economic environment strongly depends on its national characteristics and on the availability of effective coping mechanisms.

This macro approach is also subject to a number of caveats. First of all, as we focus on aggregate variables in cross-country comparisons, we deal only with covariant macro shocks at the country level (i.e., shocks affecting the variables on average, impacting on the population uniformly), without taking into account the differences among households or income distribution effects. Our results may thus differ across the social groups within each country while the relative income position of households is likely to have an important effect on their ability to have access to adequate tools and coping mechanisms. This shortcoming, however, is moderated by the evidence that also the aggregated effects hurt the poor disproportionately (Lundberg and Squire 2003; Lustig 2000). To overcome such a drawback, we also test the robustness of our results on the poorest quintile of the population.

Second, we take into account the limits of the cross-section analysis, even though we are aware that in our case it remains the best choice within the 'cost-benefit tradeoff' of

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7 Although some of the crises received considerable attention in the media (Mexico 1995; Southeast Asia 1997; Brazil and Russia 1998, and Argentina 2001), these, as highlighted also by the World Bank (2000a), represent merely the tip of the iceberg of a much vaster and more complex phenomenon.

the appropriate sample length. In fact, while with a longer sample we could have increased measurement accuracy, this phenomenon is likely to change over time, due to diverging characteristics and the performance of shocks and transmission channels (World Bank 2003a). Cross-section comparisons force us to adopt common thresholds within the sample. However, we can easily remove this assumption without invalidating the results.

Third, as one of the aims of the analysis is to propose a methodology that can be applied across countries and periods, we restrict ourselves to using macroeconomic data available from official international sources.[8] We acknowledge that this might involve the risk of missing a number of relevant country-specific issues, but it lets us enjoy the benefits and insights of a comparative approach.

However, we do acknowledge the paucity of analytical tools available for studying the effects of macro vulnerability on welfare across countries.[9] The avenue we choose for facing this limitation is to relate our trade vulnerability analysis with macro volatility studies.[10] Although the issue of volatility has been traditionally considered as a business cycle phenomenon with only secondary effects for emerging economies, the effects of volatility on growth and poverty alleviation are being recognized as a general factor of development and has attracted the interest of many scholars (World Bank 2003a). In fact, in recent years, episodes of extreme volatility have highlighted an entire new set of welfare implications for the developing countries. Moreover, recent empirical studies show that the relative volatility of consumption increased during the 1990s with respect to income, especially for the more integrated economies (Wolf 2004; Kose, Prasad and Silva Terrones 2003a).

4   A suggested model of macroeconomic vulnerability to trade

Starting from traditional micro vulnerability literature, in order to extend the vulnerability analysis to a higher level of aggregation, we choose to rely on a panel of countries rather than on a panel of households and we base our measurement of welfare

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[8] In this analysis, we use the Global Development Finance (GDF) and World Development Indicators (WDI), the primary World Bank database for development data from officially recognized international sources. The database is updated quarterly.

[9] With a few exceptions (see Thomas 2003). However, often current studies have largely ignored a number of relevant macro issues, such as those related to the lack of policy credibility, or the inconsistency between short-term strategies and long-term commitments, and the relationship between conflicts and vulnerability (Triulzi and Montalbano 2001 and 2003).

[10] We may divide current volatility literature into two strands: one which analyses the effects of volatility, and the other that focuses on its determinants. Most of the literature on the effects of volatility suggests a positive relation between volatility and (average) growth. However, there is an alternative view, notably applied to emerging markets, which suggests a negative link, based on the explanation that greater uncertainty lowers investments in physical and human capital, thereby reducing long-term growth (Ramey and Ramey 1995; Martin and Rogers 1997; Talvi and Vegh 2000; Easterly, Islam and Stiglitz 2001; Pallage and Robe 2003; Hnatkovska and Loayza 2004). The second strand of the literature examines the determinants of particularly high or low volatility (i.e., extreme volatility) typically in cross-section analysis (Gavin and Hausmann 1996; Acemoglu *et al.* 2003; Rodrik 1999).

on the average growth of annual per capita consumption expenditure, considered as a good proxy for permanent income.

Then, we adopt a mixed approach to detect volatility. First, recalling Ligon and Schechter (2003), we define the vulnerability of country i as the difference between the expected per capita consumption growth under the hypothesis of no shocks and the expected value of the same variable under the hypothesis of shocks. In formula:

$$V(c_i) = \mathrm{E}[\bar{\bar{c}}_i *] - \mathrm{E}[\bar{\bar{c}}_i] \tag{1}$$

where $\mathrm{E}[\bar{\bar{c}}_i *]$ is the expected per capita consumption growth under the hypothesis of no shocks and $\mathrm{E}[\bar{\bar{c}}_i]$ is the expected per capita consumption growth under the shocks hypothesis. Hence, $\mathrm{E}[\bar{\bar{c}}_i *]$ is our benchmark (similarly to the poverty line in Ligon and Schechter 2003). In case of negative shocks, we obviously get $\mathrm{E}[\bar{\bar{c}}_i] < \mathrm{E}[\bar{\bar{c}}_i *]$. The larger the difference between the two measures, the higher the vulnerability of the country i.

Moreover, according to volatility literature (see section 2.2), we also argue that annual per capita consumption growth depends upon the volatility of its annual rates of change. In formula:

$$\bar{\bar{c}}_i = f\left(Vol\dot{c}_i\right), i = 1\ldots n, \tag{2}$$

where $Vol\dot{c}_i$ is the standard deviation of per capita consumption rate of change.

Finally, according to Amin, Rai and Topa (1999), Glewwe and Hall (1998) and the literature on the determinants of volatility, we link the volatility of consumption expenditures to a set of possible sources of shocks related to trade openness, as follows:

$$Vol\dot{c}_i = g(Volx_i), i = 1\ldots n. \tag{3}$$

where x_i is the number of trade variables and $Volx_i$ their standard deviation.

Practically speaking, as highlighted by equations (2) and (3), an increased volatility of variables related to trade openness will cause increased volatility of per capita consumption growth with negative effects on the consumption performances. According to this model, cross-country differences in the volatility of per capita consumption growth can arise alternatively from differences in the exposure of trade shocks or in the availability of coping mechanisms, producing different welfare conditions (Wolf 2004). This, in turn, according to equation (1) widens the difference between the expected value of actual per capita consumption growth and its potential value (i.e., our benchmark). The wider this difference, the more vulnerable the country analysed. Moreover, under the hypothesis that the poorest people consume most of their income in every period, we also implement the same framework to measure the vulnerability to trade shocks of the last quintile of the population.

5 Stylized facts about Europe

Focusing on the actual situation in Europe, as already underlined, the CEECs at the beginning of the transition era had not performed as well as many had expected However, following a U-shaped path, they succeeded to recover (Figure A1), indicating a process of relative convergence to the macroeconomic performance of Western European countries (Figure A2).[11]

Indeed, from the point of view of per capita consumption, CEECs show a mixed performance in the past decade. They registered, on average, with the relevant exceptions of the Baltic states, Belarus, Bulgaria and Hungary (Annex Table A1), an annual per capita consumption growth higher than most Western European countries (except Ireland). Moreover, if the standard deviation is used as a metric, CEECs show an higher degree of volatility during the same period for almost all the reported macroeconomic variables than the Western European countries (Annex Table A2). This finding is particularly relevant in the case of trade variables, per capita GDP growth rates and, above all, in the case of per capita consumption (Figure A3). In fact, the majority of CEECs show a relatively high volatility of consumption with respect to income (Figure A4). This result, which is consistent with other empirical analysis on emerging countries (see Kose, Prasad and Silva Terrones 2003b; Wolf 2004; World Bank 2000b),[12] demonstrates that compared to Western European countries, the economies in transition in Central and Eastern Europe show a lower ability to maintain a stable path of consumption in the presence of output volatility (see also Coricelli and Ianchovichina 2003).

Following Hnatkovska and Loayza (2004), we decompose the registered volatility of consumption between *normal volatility* and *extreme volatility*. Normal volatility is defined as the portion of standard deviation of consumption change that corresponds to deviations falling within a threshold (i.e., repeated and small cyclical movements around the mean). Extreme volatility is defined as the portion of standard deviation of consumption change that is above and below the same threshold (i.e., sharp positive or negative fluctuations from the mean). Extreme volatility, in turn, has been subdivided into *boom volatility* and *crisis volatility*. Here, we concentrate on crisis volatility, i.e., the portion of standard deviation of consumption change that corresponds to downward deviations below a fixed threshold. To carry out our decomposition, we adopt a common threshold set to equal the average volatility of the sampled countries. It provides absolute (as opposed to relative, country-specific) measures and, thus, facilitates cross-country comparisons. If we examine the cases of Austria and Latvia, being the less volatile and the more volatile countries, respectively, in the sample, we notice that while Austria experienced no extreme (boom or crisis) volatility, Latvia is characterized by relevant episodes of crisis volatility (1991-93 and 1995) and boom volatility (1994 and 1996-2001) (Figure A5).

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[11] Consistently with the Barro and Sala-i-Martin (1991 and 1995) hypothesis, among the European countries analysed we detect a clear negative relationship between the per capita income growth rate and natural log of its initial level (Figure A2). This process of convergence, namely 'β convergence', does not imply the existence of a reduction in the relative distribution of incomes over time, as in the case of the so-called 'σ convergence'.

[12] They show that while the volatility of output growth has on average declined in the 1990s relative to the three earlier decades, the volatility of consumption growth has increased especially for the financially more integrated developing countries.

6 Trade openness and volatility: an empirical analysis in Europe, 1990-2000

Starting from this empirical evidence, we ask the questions: do these stylized facts reflect clear-cut causal relationships between trade openness and consumption volatility? And, eventually, does the increased consumption volatility hurt the anticipated consumption performance?

To find the answers to these questions, an empirical analysis is carried out for 34 European countries over the period 1990-2000,[13] a decade of dramatic trade liberalization and of the implementation of major 'first type' reforms for the CEECs (Svejnar 2002).

To examine whether consumption volatility is associated with trade shocks, consistently with equation (3) of our model, we regress the volatility of annual per capita consumption growth on the volatility of trade openness and terms of trade,[14] also considering a dummy EEA in order to isolate the effect in the case of Western European countries.

The fit of the regression is good, and all coefficients are robust and significant (Table 1). The estimates bear the expected signs, denoting a positive and significant relation between volatility of the trade variables considered and volatility of consumption. They also underline the pervasive role of trade variables in the case of crisis volatility, especially terms-of-trade volatility. In addition, with regard to total volatility, the dummy EEA is negative and significant, indicating that Western European countries are structurally less volatile to trade shocks than the CEECs.

The next step, according to equation (2) of our model, is to test whether higher levels of consumption volatility, as explained by the volatility of trade variables, actually worsen the macroeconomic performance of countries in terms of consumption growth. As seen in Table 2, the regression results reveal a negative and significant relationship between consumption volatility and the growth rates. This turns out to be particularly relevant in the case of the extreme and crisis volatility components. The model also highlights that a countercyclical behaviour in the management of policy tools is significantly and positively linked to good macroeconomic performance (see fiscal dummy for countercyclicality).[15] This point is particularly relevant, since it underlines the fundamental role of the availability of efficient coping mechanisms able to produce different welfare conditions.

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[13] The countries analysed are the Western European countries (members of the European Economic Area, EEA) of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom; CEE countries of Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, and Slovenia; as well as the other European countries of Albania, Belarus, Croatia, Macedonia, Russian Federation and Turkey.

[14] We use the following variables from the GDF&WDI central database: per capita household final consumption expenditure (constant 1995 US$); terms-of-trade adjustment (constant LCU) and trade (per cent of GDP): i.e., the sum of exports and imports of goods and services measured as a share of gross domestic product.

[15] Coutercyclicality is defined as the statistical correlation between the rates of change of final household per capita consumption and the rates of change of general final governmental consumption expenditure (per cent of GDP). Countercyclicality dummy assumes value 1 when correlation is negative, 0 otherwise.

These results underline the adverse effect of economic uncertainty on a country's performance; uncertainty that could be related to factors such as macroeconomic instability (Judson and Orphanides 1996), institutional weakness (World Bank 2000b; Rodrik 1991), political insecurity (Alesina *et al.* 1996), or, on a theoretical basis, to risk aversion and irreversibility of wrong choices (Hnatkovska and Loayza 2004). It is important to underline again the pervasive role of crisis volatility as well as the positive influence of national policy tools that are able to partially offset the negative effects.

Table 1
Effects of trade volatility on consumption volatility

Dependent variable	Consumption volatility		
	Total	Extreme	Crisis
Constant	0.0265482*	-0.0255411***	-0.0178068***
	0.0159269	0.0090247	0.0065356
Trade openness volatility	0.0016426*	0.0030859***	0.0020907***
	0.0009373	0.0010391	0.0007275
Terms-of-trade volatility	1.082337***	1.345288***	0.8848553***
	0.3489715	0.3630412	0.2917468
Dummy EEA	-0.0343089***		
	0.0107949		
Test Breusch-Pagan/Cook-Weisberg (Prob>chi2)	[0.0106]	[0.0338]	[0.0011]
R-squared	0.73	0.62	0.61
Observations	34	34	34

Note: Robust standard errors are reported below the corresponding coefficients.
    *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.
Source: Authors' estimation.

Table 2
Effects of total, extreme and crisis volatility on annual consumption performance

Dependent variable	Consumption annual rate of change		
Constant	0.0146746***	0.0129109**	0.0139055***
	0.0053625	0.0049837	0.0048053
Total volatility	-0.151357***		
	0.0551836		
Extreme volatility		-0.1452526***	
		0.0495562	
Crisis volatility			-0.2454084***
			0.0705418
Fiscal countercyclicality dummy	0.009648*	0.0096203*	0.0090316*
	0.0055026	0.0054275	0.0052014
Test Breusch-Pagan/Cook-Weisberg (Prob>chi2)	[0.0761]	[0.0935]	[0.5083]
R-squared	00:25	00:27	00:33
Observations	34	34	34

Note: Standard errors are reported below the corresponding coefficients.
    *** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.
Source: Authors' estimation.

With these facts in mind, we strongly support the need to go beyond the apparent positive association between trade openness and economic performance, particularly with regard to Eastern Europe. Trade liberalization, introducing an entirely new set of shocks and incentives, may have actually worsened growth and welfare performance in most CEECs, highlighting their actual vulnerability to trade openness.

7   Trade openness and vulnerability in Europe

In accordance with our suggested model (section 4), we thus estimate the expected per capita consumption rates of change with zero volatility—a measure of the *potential* consumption—and compare these with the actual levels of expected per capita consumption rate of change (in presence of volatility).

These results are reported in Table 3. It is easy to detect that the effect of volatility has been particularly relevant for the Baltic states (more than 2 per cent of their potential annual per capita consumption growth has been actually lost because of crisis volatility) and for the group of 'other European countries' (more than 1 per cent). The countries most notably affected by volatility are Latvia and Lithuania (almost 3 per cent of their potential annual per capita consumption growth has been lost because of 'crisis volatility'). In contrast, among the CEECs7 (the group that also includes the new EU member states) and, above all, among Western European countries (EEA member countries), the effect of volatility is less relevant, in particular with regard to the impact of extreme and crisis volatility.

Table 3
Annual loss of per capita consumption growth due to consumption volatility, %

	Total volatility	Extreme volatility	Crisis volatility		Total volatility	Extreme volatility	Crisis volatility
Estonia	-1.423	-1.271	-1.704	Austria	-0.125	0.000	0.000
Latvia	-2.608	-2.493	-2.931	Belgium	-0.162	0.000	0.000
Lithuania	-2.410	-2.307	-2.758	Denmark	-0.299	0.000	0.000
Baltic states	**-2.147**	**-2.024**	**-2.465**	Finland	-0.508	-0.254	-0.429
Albania	-1.877	-1.726	-1.416	France	-0.181	0.000	0.000
Belarus	-1.565	-1.486	-1.342	Germany	-0.192	0.000	0.000
Croatia	-1.348	-1.233	-1.139	Greece	-0.174	0.000	0.000
Macedonia, FYR	-1.148	-1.022	-1.005	Iceland	-0.655	-0.533	-0.589
Russian Federation	-0.741	-0.470	-0.127	Ireland	-0.329	0.000	0.000
Turkey	-0.839	-0.693	-0.737	Italy	-0.287	-0.211	-0.357
Other European	**-1.253**	**-1.105**	**-0.961**	Luxembourg	-0.380	-0.193	-0.326
Bulgaria	-1.364	-1.251	-1.534	Netherlands	-0.237	0.000	0.000
Czech Republic	-1.171	-1.033	-1.479	Norway	-0.177	0.000	0.000
Hungary	-0.641	-0.389	-0.506	Portugal	-0.258	0.000	0.000
Poland	-0.299	0.000	0.000	Spain	-0.240	0.000	0.000
Romania	-1.150	-1.054	-0.916	Sweden	-0.353	0.000	0.000
Slovak Republic	-1.467	-1.331	-1.855	Switzerland	-0.166	0.000	0.000
Slovenia	-0.932	-0.860	-0.852	United Kingdom	-0.282	0.000	0.000
CEECs7	**-1.004**	**-0.845**	**-1.020**	**EEA**	**-0.278**	**-0.066**	**-0.095**

Source: Authors' estimates.

Table 4
Probability of improvement of extreme volatility and its relative effects
on annual per capita consumption growth

| | Probability of an improvement in extreme volatility due to: | | | |
| | Trade openness | | Terms of trade | |
	Probability, %	Effects, %	Probability, %	Effects, %
Estonia	19.57	-0.2688	19.12	-0.1176
Latvia	20.09	-0.2748	21.94	-0.4021
Lithuania	21.09	-0.4118	10.23	-0.1389
Baltic states	**20.25**	**-0.3184**	**17.10**	**-0.2195**
Albania	20.49	-0.2234	21.35	-0.0998
Belarus	21.76	-0.3163	21.94	-0.2745
Croatia	17.66	-0.2683	20.99	-0.0756
Macedonia, FYR	19.58	-0.2365	17.85	-0.0961
Russian Federation	18.84	-0.2498	21.42	-0.1930
Turkey	9.13	-0.1412	13.78	-0.0549
Other European	**17.91**	**-0.2392**	**19.56**	**-0.1323**
Bulgaria	18.55	-0.1804	0.00	0.0002
Czech Republic	19.54	-0.2015	21.66	-0.1932
Hungary	21.38	-0.3027	0.00	-0.0522
Poland	0.00	-0.0892	0.00	-0.0109
Romania	13.11	-0.1347	3.91	-0.0608
Slovak Republic	21.15	-0.3051	20.35	-0.1315
Slovenia	18.04	-0.1689	0.00	0.0431
CEECs7	**15.97**	**-0.1975**	**6.56**	**-0.0703**
Austria	10.11	-0.1375	0.00	-0.0273
Belgium	16.40	-0.1650	14.96	-0.0561
Denmark	6.49	-0.0795	9.10	-0.0541
Finland	8.33	-0.1230	7.00	-0.0549
France	0.00	-0.0621	0.00	-0.0134
Germany	2.20	-0.0904	0.00	-0.0310
Greece	0.00	-0.0562	0.00	-0.0258
Iceland	0.00	-0.0744	0.00	-0.0484
Ireland	21.48	-0.2987	19.37	-0.0660
Italy	0.00	-0.0765	0.00	-0.0392
Luxembourg	21.31	-0.3252	12.27	-0.0724
Netherlands	2.49	-0.1175	0.00	-0.0165
Norway	0.00	-0.0283	20.92	-0.2200
Portugal	0.00	-0.0549	6.42	-0.0436
Spain	4.03	-0.1217	0.00	-0.0176
Sweden	13.94	-0.1488	16.53	-0.0789
Switzerland	2.20	-0.0953	14.66	-0.0901
United Kingdom	0.00	-0.0463	5.88	-0.0545
EEA	**6.06**	**-0.1167**	**7.06**	**-0.0561**

Source: Authors' estimates.

Indeed, there are examples of vulnerable countries also among the CEECs (see, for instance, Bulgaria, Czech Republic and Slovak Republic, which lost more than 1 per cent of their annual per capita consumption growth because of crisis volatility) and among EEA. In the latter case, we should mention Finland, Iceland, Italy and small Luxembourg (where, however, the loss due to crisis volatility has been less than 0.5 per cent of consumption growth).

Practically speaking, if CEECs7, Baltic states and the group of 'other European countries' had been able to reduce the degree of consumption volatility related to trade volatility, they would have achieved higher levels of consumption during the 1990s. This is precisely what we are aiming to demonstrate. This empirical exercise shows that CEECs' wellbeing during the 1990s has been remarkably and negatively affected by trade shocks, through the impact on consumption volatility, giving us a measure of the relative vulnerability of the CEECs to trade openness compared to Western European countries in the past decade.

However, since vulnerability is by definition a *forward-looking* approach, the measurement of vulnerability to trade openness calls for comment on the expected value of macroeconomic performance. For this task, we calculate the actual probability of each country to suffer a reduction in its annual per capital consumption growth because of trade shocks. Thus for each country analysed, we test the probability of an improvement of extreme volatility induced by a 25 per cent improvement of volatility of trade variables. We then calculate the associated negative effect in terms of a reduction in the annual per capita consumption growth.[16] The higher the probability of improvement of 'extreme volatility' in trade variables and the magnitude of its negative effect on per capita consumption growth, the higher the degree of vulnerability for a given country.

Table 4 reports the results for each country in the sample. It clearly confirms that Western European countries are structurally less vulnerable than other countries in the sample, both in the case of increased volatility of trade openness and terms of trade. On average, they show very limited probability to be adversely affected by a shock in terms of extreme volatility (about 7:100) and even in these unlucky episodes, the induced negative effects on annual consumption growth remain small (on average no more than -0.05 per cent in the case of terms-of-trade shocks and -0.11 per cent in the case of trade openness). Relevant exceptions are Norway, Ireland and Luxembourg which show levels of probability of extreme volatility and likely dimensions of negative effects on annual consumption similar to those of the Baltic states (i.e., the most vulnerable countries in the sample). In particular, the Scandinavian countries show all a clear tendency to achieve above-average values among EEA.

The most vulnerable groups in the sample are the Baltic states and the other European countries (the probability of experiencing an extreme volatility is almost 1:5). However, the situation is highly divergent among the countries within each group. For instance, among the CEECs7, while Czech Republic and Slovak Republic show some of the highest probability of extreme volatility in terms of trade and the worst results in terms of consumption performance, Bulgaria, Hungary, Poland and Slovenia register some of the best results. Similarly, among the other European countries, Albania, Russia and Belarus show some of the worst performance, while Turkey registers a performance similar to most of the Western European countries.

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[16] Under the hypothesis of a normal distribution of trade variables, we test the following hypothesis: H_0: $s^2 \leq \sigma^2$ against H_1: $s^2 > \sigma^2$. Under the null hypothesis $\frac{s^2(n-1)}{\sigma^2} \approx \chi^2_{n-1}$ where n is the number of years considered in the forecast, s^2 is the extreme volatility observed in the sample and σ^2 is the assumed higher extreme volatility.

However, the actual measurement of the CEECs7's estimated vulnerability needs a more careful approach. We need in fact to take into account that these countries are—or will shortly become—new member states of the EU.[17] Are these countries likely to experience a different volatility path because of EU economic and political integration? In other words, will the new member countries experience a sort of synchronization with the socioeconomic performance of EEA member countries and stabilization of their degree of volatility?

The obvious reference for testing this hypothesis is the past experience of Greece, Portugal and Spain, the Mediterranean EU countries that joined EEC in the 1980s. Actually, these countries did show an overall increased synchronization with the older EU member countries (Table 5),[18] with the relevant exception of Spain with reference to trade openness and Greece in the case of terms-of-trade volatility. The situation in terms of reduction of extreme volatility is also noteworthy: after accession, neither Portugal nor Greece have showed any sharp fluctuations in trade openness and terms-of-trade volatility, respectively.

Assuming that the new EU member countries of Central and Eastern Europe will experience trade volatility patterns similar to those of the Mediterranean EU member countries, we can thus calculate new probabilities of per capita consumption volatility for these countries and the likely impact on their macroeconomic performance (Table 6).

Of course, in the case of Portugal and Greece, the probability of trade-openness shocks and terms-of-trade volatility, respectively, is equal to zero because of the total overall reduction of extreme volatility following accession. In the case of a shock in trade openness volatility, the CEECs show a lower degree of vulnerability than in the previous

Table 5
Volatility patterns before and after EU accession

	Normal volatility			Extreme volatility			Total volatility		
	Before accession	After accession	Difference, %	Before accession	After accession	Difference, %	Before accession	After accession	Difference, %
Trade openness									
Greece	3.467	2.232	-35.61	4.254	1.579	-62.88	7.721	3.811	-50.63
Portugal	2.169	4.378	101.86	7.398	0.000	-100.00	9.566	4.378	-54.24
Spain	2.924	3.941	34.75	4.367	5.242	24.21	7.291	9.365	28.44
Terms of trade									
Greece	0.004	0.007	76.32	0.003	0.000	-100.00	0.007	0.007	2.99
Portugal	0.004	0.001	-78.29	0.013	0.011	-14.10	0.017	0.012	-30.58
Spain	0.004	0.001	-65.41	0.010	0.009	-12.55	0.014	0.010	-27.16

Source: Authors' estimates.

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[17] Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Solvak Republic and Slovenia joined European Union on 1 May 2004.

[18] This result is consistent with other similar empirical evidence. For instance, following the implementation of the NAFTA Agreement, Mexico also appears to have recorded a larger synchronization of its macro volatility with the US and Canada (Kose 2004).

exercise under the prevalence of the Greece effects and an improvement of trade vulnerability under the Spanish case. Instead, in the case of shocks in terms-of-trade volatility, the results are quite surprising: since CEECs will register a decrease in extreme volatility less than proportional to total volatility, they actually show a higher degree of vulnerability, notwithstanding a reduction of total volatility.

Table 6
Probability of improvement of extreme volatility and effects
on annual per capita consumption growth after EU accession

| | Volatility shocks from trade openness | | | | | |
| | Greece | | Portugal | | Spain | |
Country	Probability %	Effect %	Probability %	Effect %	Probability %	Effect %
Czech Republic	13.21	-0.099	0.00	-0.092	21.55	-0.259
Estonia	13.24	-0.133	0.00	-0.123	21.57	-0.345
Hungary	14.95	-0.149	0.00	-0.139	23.38	-0.389
Latvia	13.73	-0.136	0.00	-0.126	22.10	-0.353
Lithuania	14.67	-0.203	0.00	-0.188	23.10	-0.529
Poland	0.00	-0.044	0.00	-0.041	0.00	-0.115
Slovak Republic	14.73	-0.151	0.00	-0.140	23.15	-0.392
Slovenia	11.85	-0.083	0.00	-0.077	20.04	-0.217
	Terms-of-trade volatility shock					
	Greece		Portugal		Spain	
	Probability %	Effect %	Probability %	Effect %	Probability %	Effect %
Czech Republic	0.00	-0.199	26.44	-0.134	25.77	-0.141
Estonia	0.00	-0.121	23.97	-0.082	23.29	-0.086
Hungary	0.00	-0.054	0.00	-0.036	0.00	-0.038
Latvia	0.00	-0.414	26.71	-0.279	26.05	-0.293
Lithuania	0.00	-0.143	14.60	-0.096	13.95	-0.101
Poland	0.00	-0.011	0.00	-0.008	0.00	-0.008
Slovak Republic	0.00	-0.135	25.18	-0.091	24.50	-0.096
Slovenia	0.00	-0.044	0.00	-0.030	0.00	-0.031

Source: Authors' estimates.

8   The effects on the poorest

As mentioned earlier, we also test the robustness of our results on the economic performance of the poorest quintile of the population. Note that in this particular case, disposable per capita income[19] is considered to be a good proxy of permanent income under the key hypothesis that the poorest consume most of their income in every period. Consistent with the same empirical exercise carried out for the average level of annual per capita consumption volatility, we also found a positive and significant relationship between the volatility of trade variables and the volatility of annual per capita income in the case of the poorest quintile of the population (Table 7). In addition, dummy EEA remains negative and significant and the impact higher in presence of terms-of-trade volatility.

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[19] According to Basu (2001), per capita income within each quintile is given by $q=(x1+...+xt)/t$, where $t=n/5$

Table 7
Effects of trade volatility on income volatility of the poorest quintile of the population

Dependent variable	Poorest quintile income volatility		
	Total	Extreme	Crisis
Constant	0.0233034*	-0.0170362**	-0.0102353*
	0.0132428	0.0067229	0.0050561
Trade openness volatility	0.0013097***	0.0023066***	0.0015363***
	0.000435	0.0007371	0.0005053
Terms-of-trade volatility	0.7740452***	1.01342***	0.6792978***
	0.2410086	0.2506656	0.2230376
Dummy EEA	-0.0256336**		
	0.0101201		
Test Breusch-Pagan/Cook-Weisberg (Prob>chi2)	[0.0484]	[0.0264]	[0.0104]
R-squared	0.67	0.53	0.49
Observations	33	33	33

Note: Robust standard errors are reported below the corresponding coefficients.
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' estimation.

Table 8
Effects of total, extreme and crisis volatility on annual rate of change in income
among the poorest quintile of the population

Dependent variable	Annual rate of change in the income of the poorest quintile		
Constant	0.0180462***	0.0162651***	0.0148926***
	0.0048272	0.0041035	0.0042547
Total volatility	-0.1966422**		
	0.0831103		
Extreme volatility		-0.1923244***	
		0.0719827	
Crisis volatility			-0.2178431**
			0.1072503
Fiscal procyclicality	-0.0201437*	-0.0189141*	-0.0197635*
	0.0100175	0.0098156	0.0102317
Test Breusch-Pagan/Cook-Weisberg (Prob>chi2)	[0.4415]	[0.3722]	[0.3375]
R-squared	00:24	00:27	00:21
Observations	33	33	33

Note: Standard errors are reported below the corresponding coefficients.
*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

Source: Authors' estimation.

Thus, we test for the possible negative effects of income volatility on annual rate of income change for the poorest quintile of the population. Once again, consistent with the results of the above estimates, the results reveal a negative and significant relationship between income volatility and the growth rate together with a significant and positive effect of a countercyclical behaviour of fiscal policy (Table 8).

Hence, we measure the actual degree of vulnerability, caused by trade openness, of the poorest quintile of the population for each country in our sample. These results are again consistent with the average outputs. The most vulnerable poor live primarily in the Baltic states, followed by other European countries and CEECs7 (with the relevant exceptions of Bulgaria and Slovenia), while the poorest populations in the most of the Western European countries are not vulnerable to trade shocks, except in Finland, Greece, Ireland and Portugal.

Table 9
Effects of volatility on income growth of the poorest quintile of the population

	Total volatility	Extreme volatility	Crisis volatility		Total volatility	Extreme volatility	Crisis volatility
Estonia	-1.677	-1.638	-1.261	Austria	-0.233	0.000	0.000
Latvia	-2.477	-2.402	-2.053	Belgium	-0.272	0.000	0.000
Lithuania	-1.913	-1.871	-1.374	Denmark	-0.273	0.000	0.000
Baltic states	**-2.022**	**-1.970**	**-1.563**	Finland	-0.770	-0.538	-0.509
Albania	-2.488	-2.145	-2.069	France	-0.244	0.000	0.000
Belarus	-1.571	-1.477	-0.946	Germany	-0.284	0.000	0.000
Croatia	-1.835	-1.742	-1.385	Greece	-0.345	0.180	0.204
Macedonia, FYR	-0.782	-0.580	-0.405	Iceland			
Russian Federation	-1.499	-1.431	-0.718	Ireland	-0.581	-0.137	-0.155
Turkey	-1.086	-1.019	-0.763	Italy	-0.217	0.000	0.000
Other European	**-1.544**	**-1.444**	**-1.048**	Luxembourg	-0.574	0.000	0.000
Bulgaria	-1.058	-0.937	-0.680	Netherlands	-0.219	0.000	0.000
Czech Republic	-0.585	-0.670	-0.628	Norway	-0.241	0.000	0.000
Hungary	-0.945	-0.689	-0.703	Portugal	-0.378	-0.197	-0.223
Poland	-0.741	0.527	0.597	Spain	-0.271	0.000	0.000
Romania	-1.172	-1.080	-0.717	Sweden	-0.497	0.000	0.000
Slovak Republic	-1.230	-1.097	-0.994	Switzerland	-0.277	0.000	0.000
Slovenia	-0.094	-0.000	-0.000	United Kingdom	-0.310	0.000	0.000
CEECs7	**-0.871**	**-0.714**	**0.617**	**EEA**	**-0.352**	**-0.062**	**-0.064**

Source: Authors' estimates.

9   Conclusions

This paper offers a substantive contribution to the debate on the role of international trade on the development of emerging countries. More specifically, it tries to fill a missing link in the theory between trade shocks, volatility, and the wellbeing of countries. To achieve this aim, the paper presents a methodology to study these relationships and explores, both conceptually and empirically, the case of Eastern Europe.

The main result of the analysis is that in spite of the apparent association between trade openness and good macroeconomic performance, Eastern European countries have experienced a deterioration of their macroeconomic wellbeing as a result of the trade shocks of the early 1990s. Moreover, it is the 'extreme' component of the volatility of

trade variables that has the strongest negative effects on the macroeconomic performance of partner countries. This has to be related to the limited ability of the more fragile countries in terms of their economy and institutional capacity to cope with a higher degree of 'uncertainty' as well as the poor utilization of adequate policy tools which would be able to mitigate the repercussions of trade shocks on the domestic economy. These results are robust also in the case of the poorest quintile of the population, sparking concern for the actual subsistence of these people in case of trade shocks.

These results spurs some general and relevant policy implications both at the national and supranation levels. First of all, countries need to act in order to limit the impact of trade shocks on the volatility of their macroeconomic framework, as this is likely to worsen their macroeconomic welfare. This implies the need to adopt specific and forward-looking national policies to support the trade liberalization process, i.e., policies both to mitigate the impact of trade shocks on the national economy and to enhance the 'coping mechanisms' of the population in the face of external shocks. In view of this goal, a micro approach which, for instance, would limit policy intervention to risk insurance tailored to specific target groups would appear to be insufficient.

Second, countries with weak institutions and imperfect internal markets risk being adversely affected by the consequences of globalization. Hence, the *governance* of the globalization process needs to be improved, establishing a new 'culture of prevention' and designing policies that are able to limit the size and frequency of shocks at the international level. In other words, multilateral agreements and international institutions should play a role in reducing the degree of risk exposure within the current international setting.

This paper points to a new direction for future research. It is, for instance, fundamental to test and improve the methodology by broadening on the one hand the areas of research (e.g., to include other shocks linked to trade openness) and the instruments adopted and deepening, on the other hand, the level of analysis so as to conduct specific risk and vulnerability analysis at the 'meso' level.

Annex

Figure A1
The U-shaped curve of per capita GDP of European transition countries, 1990-2001
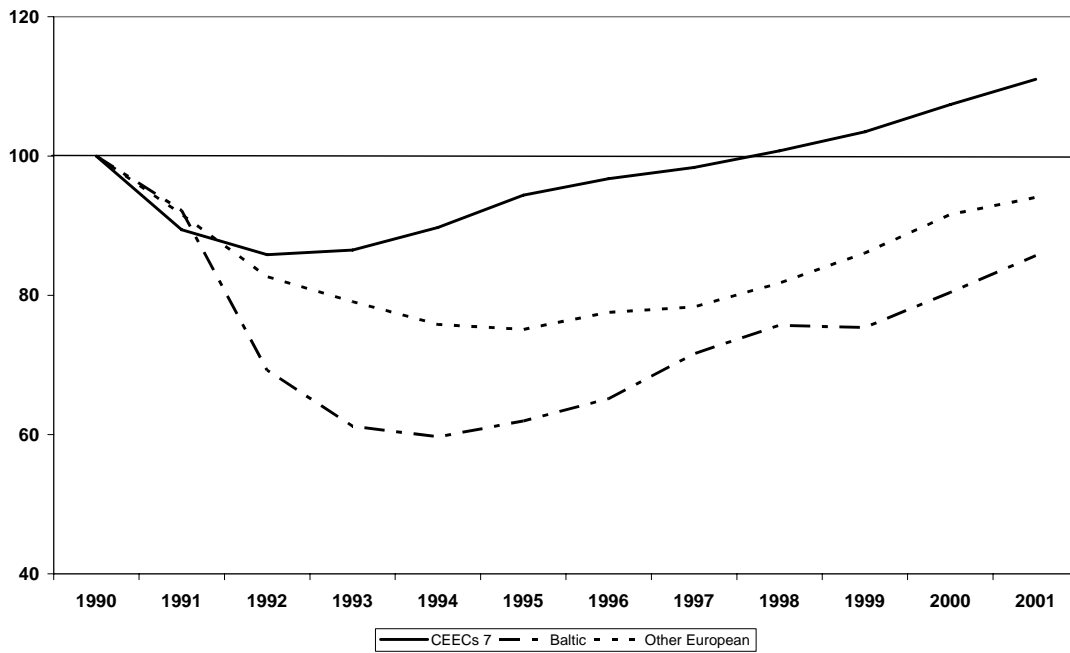
Note: The CEECs7 = Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic and
          Slovenia.

          Other European = Albania, Belarus, Macedonia FYR and Russian Federation.

          Baltic states = Estonia, Latvia and Lithuania.

Source: World Bank, World Development Indicators.

Figure A2
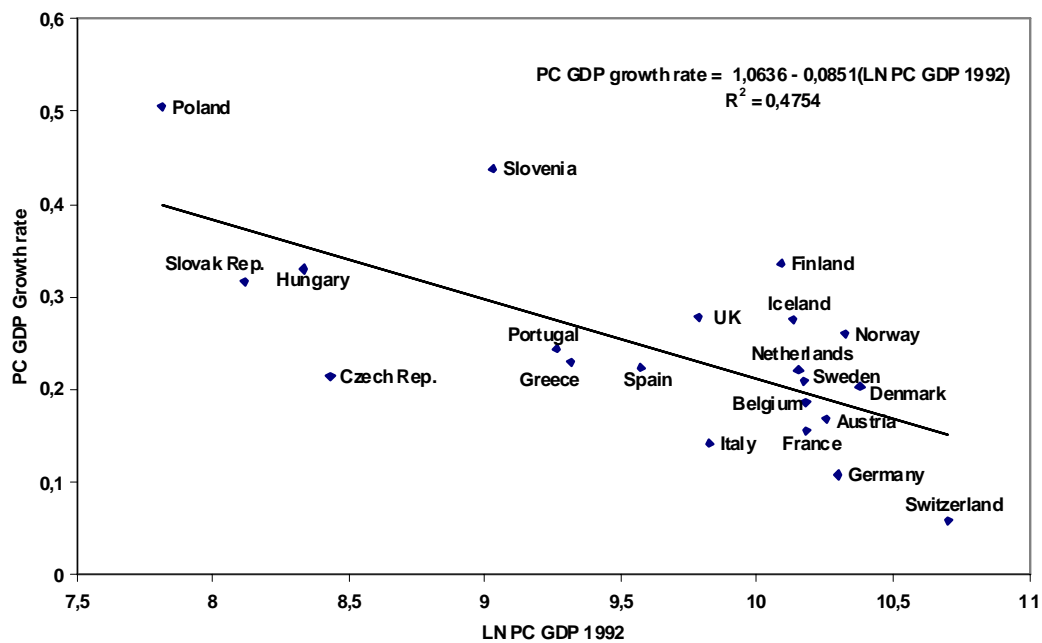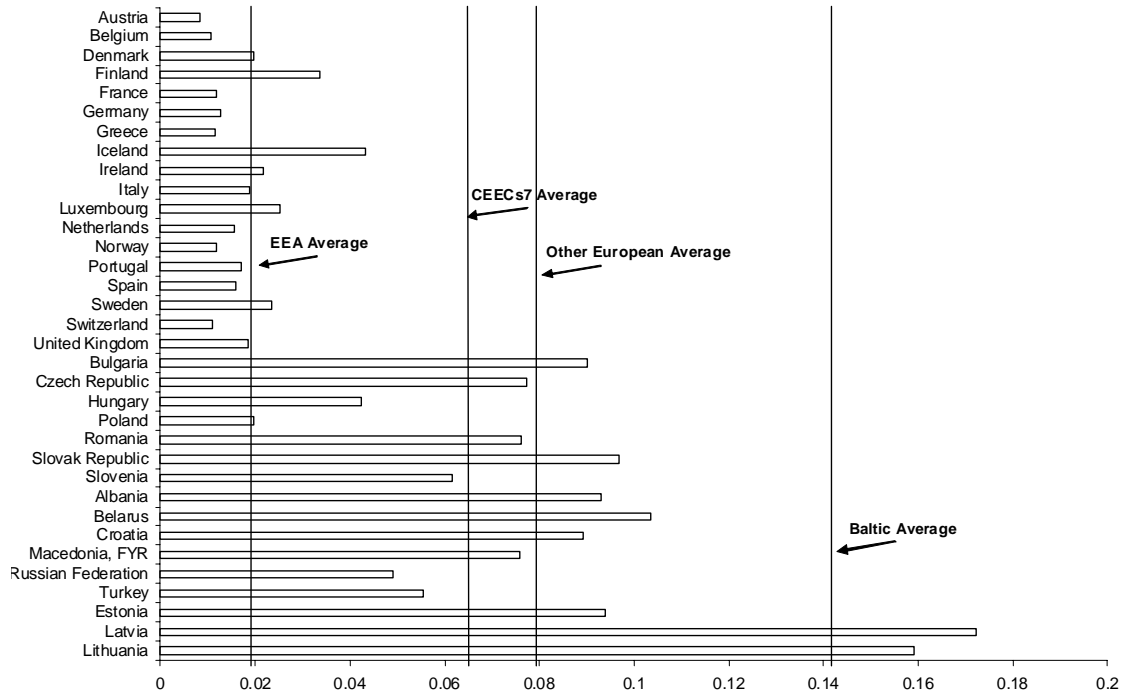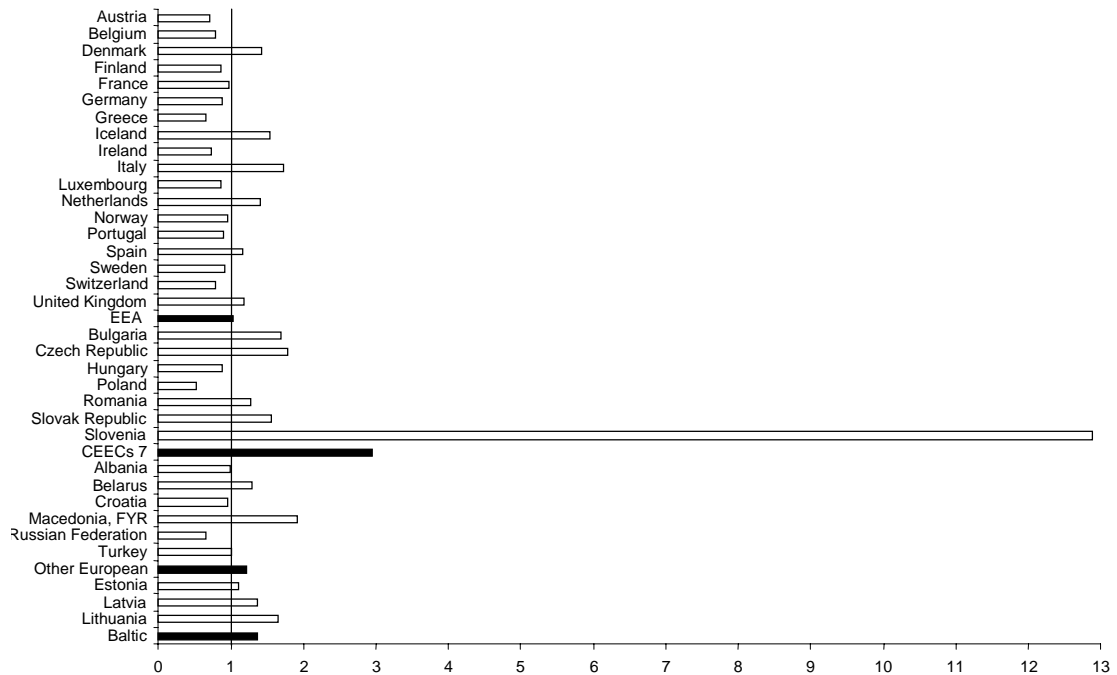Per capita GDP β convergence in Europe, 1992-2001

Figure A3
Consumption volatility (standard deviation)
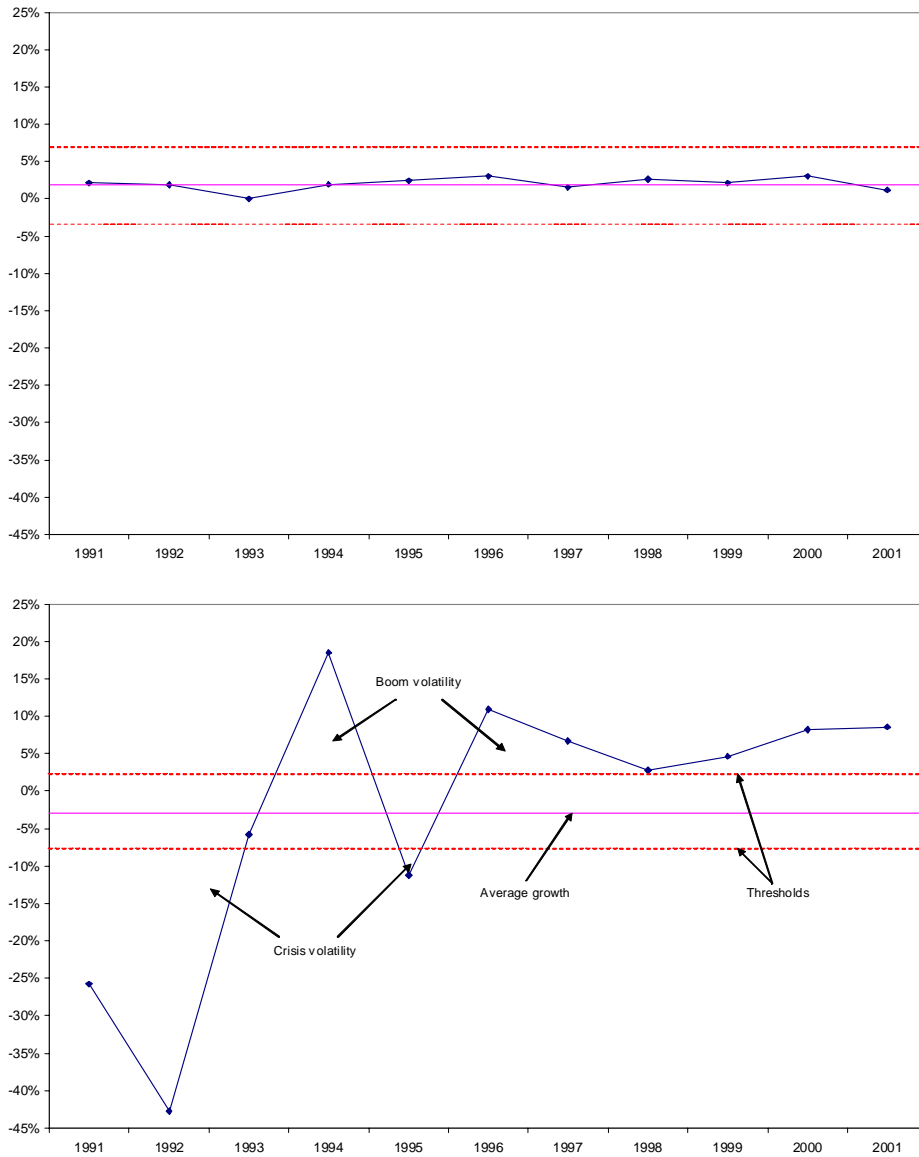The European picture, 1990-2001

Source: Authors' estimates.

Figure A4
Consumption volatility (standard deviation) relative to income volatility
The European picture, 1990-2001

Source: Authors' estimates.

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Figure A5
Volatility decomposition of per capita consumption rates of change, 1991-2001
A comparison between Austria (top) and Latvia (bottom)

Source: Authors' estimates.

Annex Table A1
Average annual per capita consumption growth in Europe, 1990-2001

Average annual per capita consumption growth			
Estonia	0.83	Austria	1.92
Latvia	-1.76	Belgium	1.78
Lithuania	-2.24	Denmark	1.53
Baltic states	**1.92**	Finland	1.10
Albania	4.47	France	1.05
Belarus	0.60	Germany	1.60
Croatia	3.13	Greece	1.96
Macedonia, FYR	1.39	Iceland	2.28
Russian Federation	1.74	Ireland	4.72
Turkey	1.74	Italy	1.55
Other European	**2.44**	Luxembourg	1.54
Bulgaria	-1.93	Netherlands	2.15
Czech Republic	1.36	Norway	2.44
Hungary	0.06	Portugal	2.94
Poland	4.86	Spain	1.74
Romania	1.74	Sweden	1.74
Slovak Republic	1.74	Switzerland	1.74
Slovenia	1.74	United Kingdom	1.74
CEECs7	**-1.93**	**EEA**	**1.53**

Source: World Bank, WDI.

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Annex Table A2
Volatility of CEECs main macroeconomic variables, 1990-2001 (standard deviation)

	Per capita consumption growth rate (annual %)	GDP per capita growth rate (annual %)	Per capita consumption rate/per capita GDP growth rate	Life expectancy	Enrolment	Trade (% of GDP)	Terms of trade	Import price index	Current account balance
Albania	9.484	6.439	1.473	1.11	0.106	16.661	21.466	18.895	3.583
Bulgaria	5.283	5.263	1.004	0.31	0.039	11.358	5.316	9.187	3.932
Croatia	5.064	6.817	0.743	0.73	0.047	8.224	3.441	7.371	5.718
Czech Republic	3.218	2.695	1.194	0.91	0.043	13.110	5.503	7.047	2.520
Estonia	9.947	8.419	1.181	1.26	0.053	20.952	3.581	10.159	3.939
Hungary	3.303	2.475	1.335	0.83	0.065	23.435	2.813	6.559	3.409
Latvia	15.635	12.867	1.215	1.41	0.074	17.976	16.306	9.989	6.190
Lithuania	3.169	10.285	0.308	1.40	0.053	30.257	6.196	3.459	3.759
Poland	1.988	1.764	1.127	0.77	0.045	6.795	3.378	4.749	2.792
Romania	5.875	4.792	1.226	0.30	0.058	7.691	5.990	10.135	1.670
Slovak Republic	4.283	4.183	1.024	0.39	0.058	14.509	4.113	8.341	5.086
Slovenia	4.611	2.851	1.618	0.84	0.038	3.674	3.819	9.342	3.113
CEECs7	4.080	3.432	1.189	0.62	0.050	11.510	4.419	7.909	3.217
Baltic states	9.584	10.524	0.911	1.36	0.060	23.062	8.694	7.869	4.629
EEA	1.70	1.717	0.991	0.54	0.057	8.989	2.411	7.670	2.048
Other European	7.64	6.302	1.212	0.75	0.068	13.226	9.038	17.954	3.160

Source: World Bank, WDI.

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