

THEORETICAL AND EMPIRICAL ASPECTS OF THE ECONOMIC INTEGRATION AND TRADE LIBERALIZATION

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1. Introduction

In July of 1993, The European Union set out the political and economic criteria that the formerly centrally planned economies of Central, Eastern, and Southeastern Europe need to fulfill in order to become future members of the union.

These criteria, know as “Copenhagen Criteria”², require that the new entrants should present: “...i) stable institutions, guarantee the rule of the law, human rights and the protection of minorities; ii) be regarded as a functioning market economy able to cope with the competitive pressure and market forces within the Union in the medium term and iii) be capable in the medium term of applying the body of legislation that encompasses all EU law, including the basic treaties provided it continues its efforts on its transposition and intensifies its works on its implementations.”

“The process of adapting from a centrally planned economy to a fully functioning market economy is commonly referred to as transition. The notion of ‘transition’, as used in the literature that studies those countries’ recent experiences, refers specifically to the introduction of market economy institutions (markets for factors themselves, price-allocation mechanisms, etc.). Those countries were centrally planned economies until the collapse of the Soviet Union –the center of the old socialist system- in the early 1990, and the concept was created as a means to distinguish their experiences from the questions dealt by the Development Economics field (which deals with economies with a -mostly- market allocation process, but with levels of technology, human and physical capital below the consumption/production possibilities frontier: the level of human and physical capital in the above formerly planned economies is usually quite high, and the productivity/technology level, albeit below “Western” standards, was clearly above the one found in developing economies).

There are two main groups of countries with respect to the notion of transition described above. Countries like Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia are considered to be beyond the phase of ‘transition’ and therefore treated as functioning market economies. The second group of Southeastern European countries includes Albania, Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, and the Federal Republic of Yugoslavia (Republic of Serbia and Republic of

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² European Commission, “Composite Paper”, EC, Brussels, 1998.

Montenegro). These countries are still considered to be in ‘transition’ and establishment of a functioning market economy is among the first steps in their process of integration into the EU.

The reaching of the convergence criteria for the new entrants has to be seen as a set of mid-term goals, to be achieved in a sustainable, long run basis, adequately supported by micro reforms. In practice, the convergence to these nominal benchmarks will be reached through paths that will be largely national, and, therefore, specific to each of the candidate countries.

The time span required for the real convergence process of these countries, according to an IMF study³, using the average development level of the Southern EU member countries (Greece, Portugal and Spain) as a benchmark would be from a minimum of 11 to 15 years for the Czech Republic, to a maximum of 34 to 36 years for Romania. In other terms, it will be a generation-long process, even with sustainable macro policies

This process is expected to take even longer for the second group of countries that are still in ‘transition’ like Albania, Bosnia and Herzegovina, Croatia, Former Yugoslav Republic of Macedonia, and the Federal Republic of Yugoslavia (Republic of Serbia and Republic of Montenegro). All of these economies, either directly or indirectly, were severely impacted by the violent conflict associated with the break-up of the former state of Yugoslavia.

Following the conflict the EU Regional Approach sought to bring basic stability and prosperity to these countries. In May 1999 the European Commission set out the rationale for moving to a more ambitious vision for the region’s development. This was based on:

- a recognition that the main motivator for reform - including the establishment of a dependable rule of law, democratic and stable institutions and a free economy - in these countries is a relationship with the EU that is based on a credible prospect of membership once the relevant conditions have been met. The European Council offered this prospect explicitly in June 2000;
- the need for the countries to establish bilateral relationships between themselves which would allow greater economic and political stability in the region to develop;
- the need for a more flexible approach which, although anchored to a common set of political and economic conditions, allows each country to move ahead at its own pace. Assistance programs and contractual relations have to be flexible enough to accommodate a range of situations from post-conflict reconstruction and stabilization to technical help with matters such as the approximation of legislation to the core elements of the EU body of legislation that encompasses all EU law, including the basic treaties.

Main objectives of the EU assistance include:

- To bring countries closer to EU standards and principles, and to prepare them for gradual integration into EU structures.
- To lay the foundations for sustainable economic development and growth.
- To assist the governments of these countries in their efforts to achieve a comprehensive administrative and institutional reform.
- To assist the government at central and local level to facilitate the process of economic and social transformation towards a market economy.
- To support structural and economic reforms, focusing on energy, transport, environment and economic development.
- Social development focusing on education, and civil society strengthening.

³ Fischer, S., and Sahay, R., and Végh, C., “How Far is Eastern Europe from Brussels?”, IMF Working Papers, WP/98/53, IMF, 1998.

As can be seen in these objectives there is a strong emphasis on institutional building to ensure the transition to market economies in the short to medium term as well as a long-term sustainable economic development and growth. This emphasis on institutions is also supported by empirical studies, as the one by Rodrik and Subramanian⁴, which shows that the quality of institutions overrides everything else with respect to economic development and growth.

In conclusion, the process of integration into the European Union, with the EU membership as the final target, requires the transition countries to bring their legal, political and economic system into a level of conformity with the EU standards. In addition, an institutional reform is critical for achieving a functioning market economy.

The purpose of this paper is to provide a discussion from both the theoretical and empirical perspective of the process of economic integration. A discussion is provided on the treatment of the economic integration from the perspective of more traditional theories as well as more recent developments. The empirical evidence highlights the use of different empirical models in measuring the impacts of different aspects of integration on a country's growth rate and welfare level. These models are the econometric models, the computable equilibrium models and the gravity equation.

Particular attention is devoted to the trade liberalization aspect of integration. The paper also presents different case studies where different models are used and also the main findings of these studies.

The rest of the paper is organized as follows. Section 2 covers the theoretical aspects of the economic integration process. Section 3 discusses empirical tools commonly used to evaluate the impacts of integration. Special attention is devoted to the evaluation of the effects of border barriers on trade. The section provides a description of the theoretical background, data requirements, and uses of the three empirical tools, econometric models, computable general equilibrium models, and gravity equation. Section 4 concludes.

2. Theoretical Aspects of the Integration Process

Economic theory suggests that countries adhering to the EU membership should expect benefits from the membership in the form of higher growth rates and higher welfare in terms of higher per capita income. These countries also should expect higher levels of foreign direct investment as well as higher transmissions of technology. Theory further suggests that the key for long-term growth is in the country's ability to exploit increasing returns in research and development (R&D), also referred to as the engine of growth, resulting from higher levels of FDI and technology transmission.

On the other hand, many economists believe that there are important asymmetries, particularly in supply shocks, associated with the process of integration that would best be addressed through independent monetary policies. The rationale behind this is the assumption that a country's nominal wages and producer prices – or just money wages and the prices of nontraded goods – are sticky, perhaps even fixed for the short run.

A specific aspect of the integration process is also the removal of trade borders and barriers. One can ask the question: In this era of globalization, are borders just arbitrary lines on the map? Economic empirical work shows that further economic integration can very substantially increase world trade and welfare.

⁴ Rodrik, Dani. and Subramanian, Arvind. *The Primacy of Institutions (and what this does and does not mean)*. Finance & Development June 2003, p. 31.

National borders mark differences in institutions, policies and regulations that have economic significance. The significance of these policies becomes immediately clear when comparing countries to regions within countries that are not separated by national borders. Regions within countries are clearly more integrated: they have more synchronized business cycles, they engage in more extensive risk-sharing, they trade more with each other, their growth rates converge faster, their inflation rates are more similar.

The remainder of the section will discuss in more detail theoretical aspects of the economic integration from the perspective of economic development theories and trade integration theories. Additional aspects of the trade liberalization regarding trade borders and barriers will also be discussed within the theoretical framework underlying the gravity equation in Section 3.

There are two main theories of economic development, the neoclassical theory and the institutionalist or structuralist theory. These two theories have different views on the role of integration, or openness to trade, in sustained economic growth and development if one is concerned with the short run versus the long run situation.

The neoclassical theory focuses mainly on the efficient allocation of a given set of resources. The spirit of the neoclassical theory is the individual, who chooses among alternatives, maximizes its own welfare motivated by benefits and constraint by costs associated with any given action. One important element of the neoclassical theory is their presumption that the price mechanism leads allocation to potentially self-equilibrating directions. In addition, the existence of substitution possibilities implies high elasticities that facilitate a return to equilibrium.

The neoclassical approach to the international economy follows lines begun by Adam Smith, David Ricardo with the principle of comparative advantage, and more recent work of Heckscher and Ohlin. Nations would produce and export goods that use their relatively plentiful factors, and import goods made by factors that were locally relatively scarce. Gains from trade to the trading partners would leave both better off than they were before trade began.

The policy implications associated with the neoclassical theory are also familiar. Free markets with minimal entry barriers are of primary importance. Activities by monopolists and by those in control are suspect. This is especially important in developing countries where those in control have gained or maintained their positions by force. The state's role should be strictly limited to the provision of "essential" services and to the definition of property rights so as to reduce externalities. In international matters, free trade among nations is seen as preferable to the trade restrictions.

The structural theory focuses on the composition of the economy, principally on the sources of production. Industries and sectors of the economy are seen as rigidly compartmentalized. Inelasticities in factor and product markets replace high elasticities of the neoclassicists. Continuous disequilibrium rather than a self-equilibrating system is seen as the prevalent state in most economies.

With regard to international economy, divergent income elasticities of demand for poor countries' imports and exports (elastic demand for imports and inelastic demand for exports), lead to gaps in foreign exchange – gaps which are not erased by movements of prices and responsive allocation of resources. The gaps, if filled at all, are filled by outside forces – international transfers from rich countries or from international agencies. Again, no automatic tendencies to equilibrium are present.

The absence of an equilibrating mechanism in an economy always tending to disequilibrium – to unfilled gaps, domestically and internationally – has immediate policy implications. The desirability of government planning to deal with the circumstances imperfectly treated by the unaided market system follows from the structuralist analysis.

On a positive note, the main differences between neoclassical and structural theories exist only in the short-run. While neoclassical theory emphasizes long-run tendencies, structural theory stresses short-run situations. However, in the long-run structuralists are neoclassicists.

Without ignoring long run benefits to economic integration, it is important for countries going through this process to understand possible negative consequences in the short run. This will provide for better policy measures in trying to eliminate or minimize these consequences. Understanding these consequences becomes even more important because of the lack of sufficient empirical evidence on the impact of trade liberalization on developing countries, and a serious reconsideration of the standard trade integration (custom unions) theory to adapt it to the special circumstances of developing countries.

To see the shortcomings of the integration theories in the case when trade liberalization involves developing countries, let us first look at a brief summary of the conventional trade integration theory.

Tinbergen (1954) made a distinction between positive and negative integration. *Negative integration* denotes the removal of discrimination in national economic rules and policies under joint surveillance. *Positive integration* refers to the transfer to common institutions, or the joint exercise, of at least some powers. In practice, negative and positive integration may go together. Another classical theory propounded by Balassa (1961) uses a stage approach to evaluate economic integration. Balassa's five stages of economic integration are as follows:

- *Free Trade Area* - tariffs and quotas are eliminated within members of the integration, but members retain national tariffs (and quotas) against third countries. No positive integration here.
- *Customs Union*- No discrimination among members in products markets, with a common external tariff structure against non-members. No positive integration is present.
- *Common Market*- a customs union which abolished restrictions in factor movements. No positive integration here.
- *Economic union*- a common market that practices some degree of harmonization of national economic policies in order to remove discrimination that resulted from disparities in these policies. Positive integration is introduced here.
- *Total economic integration*- unification of monetary, fiscal, social and counter cyclical policies. A supranational authority is set up where decisions are binding for the member states. A vision of a centralist and unitary state is contemplated here.

Others like Robert Z. Lawrence (1995)⁵ have drawn a distinction between *deeper* integration, that is, integration that moves beyond the removal of border barriers, and *shallow* integration, which is trade liberalization.

As regards Robert Lawrence's approach, deeper integration does not mean better or more efficient integration. For instance, adoption of a common standard might discriminate against external imports and raise internal costs. Alternatively, deeper integration could enact measures that enhance efficiency-such as the international enforcement of competition policy or the international implementation of policies to deal with global greenhouse gases.

Another important aspect of the present economic integration is that its paradigm has shifted. The underlying motives for economic integration in the 50s and 60s are very different from those in the present day. Unlike in the 50s and 60s, current initiatives involving developing

⁵Robert Z. Lawrence, Regionalism, Multilateralism, and Deeper Integration, 7-8, (1995).

countries are part of a strategy to liberalize and open their economies to implement export- and foreign investment-led policies rather than to promote import substitution.⁶

Current initiatives represents efforts to facilitate their members' participation in the world economy rather than their withdrawal from it. In other words, regionalisms in the present day are, by and large, not responses to thwart globalization. On the contrary, they are attempts to meet the needs arising from globalization. Furthermore, they are not arrangements to exclude outsiders but instead they are *inclusive* arrangements to allow outsiders to join them.

In fact, the new wave of regional integration is viewed less in terms of gains from trade creation/diversion and more in terms of scale economies, product differentiation, efficiency gains and policy co-ordination.⁷ There is also increasing emphasis on the role of foreign investment in regional integration and globalization and a genuine drive towards trade liberalization with the ultimate aim of creating free trade areas. Such free trade areas are viewed as a means of attracting FDI and achieving global competitiveness in trade.

A study has shown that the NAFTA Agreement has had a profound impact on the inflows of FDI to Mexico, particularly from countries outside the NAFTA region. Further, the establishment of NAFTA coincided with and had deepened the reforms that Mexico had had undertaken to liberalized its institutional framework. Lastly, with increasingly market-oriented economic policies, geographical proximity and the supply of cheap labor, Mexico possessed strong locational advantages with respect to its northern neighbors. As a result, FDI inflows into Mexico increased significantly⁸.

The following quote from the UNCTAD, World Investment Report⁹ sums up the challenges facing developing countries in this era of globalisation.

“A striking feature of the new environment is how transnational companies shift their portfolios of mobile assets across the globe to find the best match with the immobile assets of different locations.... The ability to provide the necessary immobile assets thus becomes a critical part of an FDI-and competitiveness-strategy for developing countries. While a large domestic market remains a powerful market for investors, transnational companies serving global markets increasingly look for world-class infrastructure, skilled and productive labor, innovative capabilities, and an agglomeration of efficient suppliers, competitors, support institutions and services”.

Let us now turn to the shortcomings of the integration theories with respect to developing countries. There are five aspects of free-trade areas between developed and developing countries which are not tackled by the integration theory and which could question its assumptions and predictions¹⁰:

- the (high) import and (low) export elasticities which might prove wrong the positive impact on the current account balance of trade liberalization;
- the possible working of economies of agglomeration favoring concentration of economic activities in more developed areas of a free-trade area;

⁶A.S Bhalla and P. Bhalla, *The New Regionalism vs Globalism? Regional Blocs Building Blocks or Stumbling Blocks* 17-18 (1997).

⁷Peter Robson, *The New Regionalism and Developing Countries*, 31. *Journal of Common Market Studies*, No. 3, (1993).

⁸Magnus Blomstrom and Ari Kokko, *Regional Integration and Foreign Direct Investment*, NBER Working Paper Series, Working paper 6019 (1997).

⁹UNCTAD, *World Investment Report, 1999. FDI and the Challenge of Development*.

¹⁰ Ivan Martin. “Elements for an Economic Theory of Free Trade Areas Between Developed and Developing Countries.” *Anuario Juridico Economico Escorialense*, Epoca II, No. XXXIV, 2001.

- the eventual preference for industry in low-competitiveness countries which without a certain level of protection might lose any chance of industrialization;
- the impact of those free-trade areas on inward foreign direct investment into developing countries, which might be actually negative; and
- the macroeconomic and political sustainability (far from granted) of those free trade areas.

Limited empirical work in this area suggests that there is a need to adapt conventional trade integration theory to the particular case of free-trade areas between developed and developing countries, and this cannot be done from a purely trade theory perspective, but must also take into account development theory and political economy considerations. In any case, a preliminary analysis seems to indicate that this new framework could favor "deep" integration schemes (where trade liberalization is supplemented by certain legislative harmonization, monetary stabilization schemes and even a sizeable resource transfer from developed to developing countries to support the transition process and compensate the losers) instead of the more frequent "hollow" integration processes (consisting of mere trade barriers removal).

There is an additional element of uncertainty with respect to the countries of South Eastern Europe. As noted above these countries are considered still in 'transition' toward a market economy, thus not yet functioning market economies. Therefore, theoretical and empirical findings should be applied with caution in the case of these countries, to the extent that integration theories assume a functioning market economy is in place.

3. Empirical Tools for Evaluating the Impacts of the Integration Process

There are three commonly used tools to evaluate the impacts of integration and in particular the effects of border barriers. These are econometric models, computable general equilibrium models, and gravity model or gravity equation. These models are in turn discussed below.

3.1. – Econometric Models

The objectives that guide the development of an econometric model are:

1 **Use:** An econometric model should be suitable for both forecasting and policy simulations. It should also be able to run simulations of policy and other scenarios under a variety of assumptions about how households, firms and financial markets form expectations, including the extent of available information.

2. **Conceptual design:** Expectations should be explicit. Structural equations for households, firms, and financial markets should be based on economic theories of optimizing behavior.

3. **Statistical implementation:** Estimation of equations in the model should be based on modern time series techniques. Equations should have satisfactory statistical properties, including goodness of historical fit.

4. **Simulation properties:** For shocks that are not unusual in historical perspective, the model's simulated responses should be close to those obtained from atheoretic models that do not impose strong priors, such as VARs. The model should also be able to match established rules of thumb regarding economic relationships under appropriate circumstances.

It can be noted that there are well-known conflicts between the objective for more theoretical rigor and the objectives related to forecasting and improved statistical properties. Therefore, the model design should attempt to improve the tradeoff between theoretical and empirical properties.

Improving this tradeoff means that an econometric model should stress three ideas: 1) basing macroeconomics on solid microeconomic foundations, 2) allowing for the possibility of disequilibrium in some markets, and 3) accounting for all balance-sheet and flow of funds constraints.

The econometric models rely on macroeconomic theory as a guide for the choice of left-hand-side and right-hand-side variables for the stochastic equations in the model.

The economic behavior described by an econometric model can be summarized most easily by focusing on three main sectors:

1. **Households** choose equilibrium aggregate consumption based on the lifecycle model. The theory is that households form expectations of their relevant future variable values and maximize expected utility. The main choice variables are consumption, labor supply and money demand. The dynamic equation for aggregate consumption contains sluggish adjustment of actual consumption toward its equilibrium as well as modest effects of liquidity constraints.
2. **Firms** form expectations and choose investment, inventories (production), labor hours and employment, and prices based on expected profit maximization under imperfect competition, usually in a monopolistically competitive environment. Firms also are involved, along with households, in the short-run determination of wages. Adjustment dynamics are estimated to be most rapid for inventories and labor hours and slowest for wages and investment in producers' durable equipment. The speed of adjustment of the aggregate price is intermediate.
3. **Financial markets** set interest rates and the exchange rate by standard arbitrage conditions.

The values of prices and wages that firms set are not necessarily market clearing. Disequilibrium in the goods markets takes the form of unintended changes in inventories. Disequilibrium in the labor market takes the form of unemployment, where households are constrained by firms from working as much as the solutions of their unconstrained maximization problems say they want to. Disequilibrium comes about because of expectation errors. In order for a firm to form correct (rational) expectations, it would have to know the maximization problems of all the other firms and of the households. Firms are not assumed to have this much knowledge (i.e., they do not know the complete model), and so they can make expectation errors.

Tax rates and government spending variables are exogenous in the model. Regarding monetary policy, an interest rate rule is added, a rule where the nominal interest rate depends positively on the rate of inflation and on output or the unemployment rate. Interest rate rules are currently quite popular in macroeconomics. Last, the exchange rate is modeled as one of the many endogenous variables.

An econometric model also contains “traditional” equations—without explicit expectations—for imports, exports, nonresidential construction, employment, labor force participation, and the relative price of consumption.

With regard to simulation, an econometric model should indicate responses of the economy, more specifically output and inflation, to exogenous shocks. It is important to distinguish between two types of shocks, transitory shocks and permanent shocks.

Examples of transitory shocks include interest shocks (monetary policy) or government spending shocks (fiscal policy). Further, implications of perfect foresight are indicated by contrasting the effects of a future shock that is foreseen in one case and unexpected in the other.

A permanent shock would be a permanent change in monetary policy, where the experiment for example is a policy that aims to reduce the inflation rate permanently by one percentage point within ten years. In this case the effect of the shock (policy) will depend on the

credibility of the policy. One possibility is “perfect credibility,” the private sector fully believes that the announced disinflationary policy will occur as planned. A second possibility is that of “learning,” the private sector only slowly adjusts its views about the probability that the full disinflationary program will be carried out.

The simulation examples reported above demonstrate that the structural design of an econometric model is suitable for analyses aimed at a broad range of macroeconomic policy questions. Such a model has the flexibility to examine policy issues under different assumptions about policy credibility and the extent of economic information upon which expectations are based.

The methodology of an econometric model is more empirically driven than the use of calibration, which is also popular in macroeconomics. The aim of the econometric model is to explain the data well within the restriction of a fairly broad theoretical framework. In the calibration literature the stress is more on examining the implications of very specific theoretical restrictions; there is only a limited amount of empirical discipline in the specification choices. The aim in the calibration literature is not to find the model that best explains, say, the quarterly paths of real GDP and inflation, which is the aim of the econometric model.

Empirical applications of the econometric models:

1. Josef C. Brada and Ali M. Kutan. “Balkan and Mediterranean Candidates for European Union Membership: The Convergence of their Monetary Policy with that of the European Central Bank.”

The authors compare the convergence with German monetary policy of the Balkan countries (Albania, Bulgaria, Croatia, Macedonia and Romania) that are not candidates for EU membership in the current round or that are expected to gain entry in the current round (Slovenia), Mediterranean country candidates for EU membership (Cyprus and Malta) as well as Turkey (also qualified as a Balkan country). The sample also includes Austria, Finland and Sweden. The latter are the most recent members of the EU, and their inclusion will enable to judge the degree to which these countries' policies were dominated by German monetary policy shortly before and then after their joining the EU. Finally, Greece is included both as a Balkan country and as a member of the union for some time.

The authors find that significant linkages exist between German base money stock and that of recent members of the EU; the same holds true for some of the Mediterranean region candidates for EU membership and for Slovenia and Croatia. Among the other Balkan economies and Turkey, the ability to follow the policies of the Bundesbank is nonexistent. Such weak policy coordination suggests the need for strengthening the financial sectors of these countries, for macroeconomic stabilization and for a period in which they tie their policies more closely to the ECB before they can be considered serious candidates for EU membership.

The paper addresses the tradeoff between an independent monetary policy and the uncertainty about the appropriate rate of exchange to set against the Euro. Much as the Maastricht criteria played a key role in the creation of a common currency among some of the EU member countries, macroeconomic performance will play a key role in determining which of the transition economies will join the EU and when. Indeed, the introduction of the Euro among a core subset of EU countries makes macroeconomic convergence a more pressing issue than it was for earlier entrants into the EU. The gains to new countries from joining the EU will be realized only if “trade takes place over an exchange-rate regime that is mutually acceptable between East and West”. A regime of fixed exchange rates between the candidate countries and the Euro is the regime most likely to inspire such mutual confidence and to realize the full benefits of integration. In part this is so because fixed exchange rates between the currencies of these new member countries and the Euro will facilitate the rapid growth of

the new members' exports to the rest of the EU without raising fears of "beggar-thy-neighbor devaluations or unfair trading practices". Moreover, a credible adherence to a Euro peg will serve as an important spur to the structural and institutional changes required of the new members, thus guaranteeing to the EU that its new members will not backslide in their efforts at structural and institutional reform.

Among the macroeconomic indicators that most observers would view as important markers of credibility for such an exchange rate link are the inflation rate, the current account, macroeconomic policy, interest rates, productivity and employment, and indebtedness. However, the process of transition in the Balkan candidates renders highly problematic any quantitative judgment regarding the values that these markers should take in order to make a currency peg credible.

This leaves the money stock as the most appropriate measure of convergence between the transition economy candidates for EU membership and the Euro-zone countries. In the long run, if the candidate countries are able to follow the policies of the ECB in terms of a monetary aggregate target, then, as their financial systems mature and as the transitory effects of transition on inflation and interest rates recede, they should be able to achieve the same outcomes in terms of inflation and interest rates as are achieved by the ECB. In the meantime, so long as they can mimic ECB policies regarding the growth of the money base, then any inflation differential between themselves and the EU can be seen as reflecting Balassa-Samuelson effects¹¹ and the process of price convergence.

At the same time, these countries face a difficult dilemma. To the extent that they are able to conduct an independent monetary policy, one geared to their specific requirements, they should be able to achieve faster rates of economic growth and, perhaps, economic restructuring than might be possible if they follow the policies of the ECB. However, the study results suggest that this advantage will come at the cost of uncertainty about the appropriate rate of exchange to set against the Euro as these countries prepare to join the EU. Even if these countries can achieve exchange rates that are near equilibrium and relatively stable against the Euro, these rates will reflect past monetary policy, and they will continue to do so even if these countries switch to being dominated by ECB policies for a few years before accession. However, once they join the EU and begin to adopt ECB policy in preparation for joining the Euro zone, their monetary policy will be different from what it was previously, and this different monetary policy will imply a different equilibrium exchange rate. Thus the challenge and the risk for the monetary authorities in these countries will be to select an exchange rate on the eve of their entry into the EU that will reflect their future monetary policies rather than their past ones. Countries such as Slovenia that have followed German monetary policy in the 1990s may have given up a measure of monetary policy independence and suffered corresponding losses in terms of growth and the pace of restructuring. However, to the extent that their current exchange rates can be seen as being close to equilibrium, they can feel confident that their current exchange rate against the Euro is a relatively reliable indicator of what a sustainable parity against the Euro will be once they join the EU. While results do not enable the weighing of the relative costs and benefits of these two approaches to monetary policy, it can be noted that policy makers in the countries that have joined the EU most recently as well as those in the market-economy candidate countries have opted for greater certainty about the exchange rate over monetary policy independence.

¹¹ Balassa-Samuelson effects mean that there is scope for a real appreciation of the equilibrium exchange rate.

2. Daniel Piazzolo. "The Credibility and Growth Effects of EU Institutions on Eastern Europe."

This paper examines the additional advantages of membership of the Central and Eastern European countries in the European Union (EU) over the already advanced economic integration between the Union and its eastern neighbors. Besides transfers, further reductions in trade barriers and guaranteed market access, EU accession will enhance the credibility of economic reforms in the Central and Eastern European countries through the establishment of institutions common to the EU members. EU membership requires the transition countries to bring their legal, political and economic system into conformity with EU standards and to implement effectively the so-called *acquis communautaire*, which includes many institutional components that are crucial for the functioning of a market economy.

The paper discusses the experience of institutional integration between nations at different stages of development and investigates the economic impact of institutional reform. Furthermore, the paper delineates an approach to estimate the growth effects of the *acquis communautaire* on the Central and Eastern European countries.

An estimate of the potential growth effect resulting from improved economic institutions through EU membership has been derived suggesting the possibility of a "static" growth bonus in GDP of 12 percent (not accounting for induced capital accumulation) and an additional "dynamic" growth bonus of up to 24 percent. This should be regarded as a rule-of-thumb approximation. The paper also highlights the importance of policies conducive to enhancing the functioning of the market economy.

3. Jeffrey D. Sachs and Andrew M. Warner. "Economic Convergence and Economic Policies."

The paper addresses many of the crucial debates in development economics that are encapsulated in the question of economic convergence. Is there a tendency for the poorer countries to grow more rapidly than the richer countries, and thereby to converge in living standards? Some recent research on endogenous growth has emphasized increasing returns as a possible reason not to expect convergence. Other research has suggested that convergence may be achieved only after poor countries attain a threshold level of income or human capital. This paper presents evidence that a sufficient condition for higher-than-average growth of poorer countries, and therefore convergence, is that poorer countries follow reasonably efficient economic policies, mainly open trade and protection of private property rights.

4. Lúcio Mauro Vinhas de Souza. "Beyond *Transition*: Essays on the monetary integration of the Accession Countries in Eastern Europe."

The relationship of the set of monetary and fiscal targets in the criteria with the exchange rate regime is one of dependence and concordance with the macro setting of reforms. As a general rule, most "transition" economies adopted, at some point early in their transformation process, macroeconomic stabilization programs with some form of exchange rate anchor. The Accession countries have, at the moment, several different ways of linking their national currencies to the Euro area. One of the main questions is whether all the application countries shall, with time, converge to a common optimal strategy for their progressive integration into to the Euroarea or whether heterogeneity will continue until the very end. As for the national economies the initial central parity rate to the Euro is crucial for their competitiveness, this author believes that any convergence strategy for the applicant countries should be necessarily specific to the individual countries' conditions.

5. Evzen Kocenda. "Limited Macroeconomic Convergence in Transition Countries."

This paper analyses performance of the transition economies in the Central and Eastern European (CEE) countries in terms of their convergence in selected macroeconomic fundamentals. The analysis uses monthly data on industrial output, money aggregated (M1), consumer prices and produce prices from 1991 to 1998. The analysis is carried out within distinctive groups of countries based on different trade and geographical arrangements and uses a panel unit-root test as an economic tool. In general, the paper concludes that the transition CEE countries were not successful in achieving a certain degree of natural economic integration among them so far. Certain levels of convergence occurred only for a limited number of countries at the advanced stage of transition process.

6. Juan-José Ganuza, and Esther Hauk. "Economic Integration and Corruption: The Corrupt Soul of the European Union."

The paper studies the link between corruption and economic integration. It shows that if an economic union establishes a common regulation for public procurement, the country more prone to corruption benefits more from integration. However, if the propensities to corruption are too distinct, the less corrupt country will not be willing to join the union. This difference in corruption propensities can be offset by a difference in efficiency. The paper also shows that corruption is lower if integration occurs. A panel data analysis for the European Union confirms that more corrupt countries are more favorable towards integration but less acceptable as potential new members.

7. Axel Dreher. "Does Globalization Affect Growth?"

This paper finds that globalization is good for growth. On average, countries that globalized more, experienced higher growth rates. This is especially true for actual economic integration and – in developed countries – the absence of restrictions on trade and capital. There is although evidence, that cross border information flows promote growth. The accusation that poverty prevails because of globalization is therefore not valid. To the contrary, those countries with the lowest growth rates are those who did not globalize. Countries like Rwanda or Zimbabwe, e.g., insulated themselves from the world economy. They have poor institutions, which repress growth and promote poverty. Nevertheless, all else equal it will not be enough for poor countries simply to globalize their economies to spur growth rates and reduce poverty.

8. Enrico Spolaore and Romain Wacziarg. "Borders and Growth."

This paper presents a framework to understand and measure the effects of political borders on economic growth and per capita income levels.

Existing empirical evidence demonstrates that larger countries benefit less from trade openness than smaller ones in terms of economic growth, suggesting that trade openness affects growth through the channel of market size. As a result, it is also the case that smaller countries face incentives to adopt more open trade regimes. In addition, results for France and Germany suggest that both would have benefited, in terms of growth, from merging politically.

9. Luis A. Rivera-Batiz, and Paul M. Romer. "Economic Integration and Endogenous Growth."

This paper also examines the effect of integration on economic growth. In a world with two similar, developed economies, economic integration can cause a permanent increase in the worldwide rate of growth. Starting from a position of isolation, closer integration can be achieved by increasing trade in goods or by increasing flows of ideas. The paper considers two models with different specifications of the research and development sector that is the source of growth. Either form of integration can increase the long-run rate of growth if it encourages the worldwide exploitation of increasing returns to scale in the research and development sector

10. Daniel Berkowitz and David N. DeJong. “Integration: An Empirical Assessment of Russia.”

In the process of implementing market reforms, many post-socialist countries have struggled to preserve economic and political integration. Using a statistical model of commodity trade, the paper quantifies the evolution of economic integration observed among regions within Russia during 1995-1999, and explores potential determinants of the patterns of integration observed.

The measure of integration exhibits rich regional variation that, when aggregated to the national level, fluctuates substantially over time. Controlling for a host of additional regional- and national-level variables, the paper finds a strong negative correspondence between openness to international trade and internal economic integration within Russia. It also finds negative but weaker links between integration and regional-income disparities and inflation volatility.

11. Marina Bakanova and Lúcio Vinhas de Souza. “Trade and Growth under Limited Liberalization: The Case of Belarus.”

This paper describes the current structure and framework of international relations of the Republic of Belarus, which is centered in a very close relationship with Russia, almost to the exclusion of the rest of the globe. The paper also estimates the growth effects of this current relationship with the Russia Federation, and simulates the effects of alternative frameworks with a simple model. The results of the estimations seem to indicate that the current almost exclusive relationship with Russia is not optimal from the point of view of Belarusian welfare.

As an alternative to “Eastward-biased” policy could be a more balanced one leading to an “Association Agreement” with the European Union (who, due to its size, can be seen as an effective proxy for free trade with the “Rest of the World”), which, after the Enlargement is finished, would be the largest neighbor of Belarus and its natural market. This could bring very substantial benefits for the country, especially if coupled with the acute need in the resumption of the domestic reform and liberalization process.

12. Carmela Martín, José Antonio Herce, Simón Sosvilla Rivero, and Francisco J. Velázquez. “European Unión enlargement: Effects on the Spanish economy.”

This paper examines the macroeconomic effects, which are associated with regional integration in the economic literature, on the economy of Spain resulting from further enlargement of the EU:

- Shock (i) (trade and structural adjustment)
- Shock (ii) (enlargement and liberalization of the single market)
- Shock (iii) (changes in flows of direct investment)

- Shock (iv) (changes in structural funds)

13. Salvador Barrios, and Juan Jose de Lucio Fernandez. “Economic Integration and Regional Business Cycles: Evidence from the Iberian Regions.”

This paper provides evidence of the positive impact of economic integration on EU regions' business cycles convergence by focusing on two neighbouring countries: Spain and Portugal. The paper shows that while a rise in cross-country business cycle correlation has also been experienced by other European countries, it has been relatively more pronounced for Iberian regions. Econometric evidence suggests that the existence of an administrative border, the economic size of regions and their industrial structures can explain a substantial proportion of regional cycles.

14. Ettore Dorrucci, Stefano Firpo, Marcel Fratzscher, and Francesco P. Mongelli. “European Integration: What Lessons for Other Regions? The Case of Latin America.”

This paper tests for the hypothesis that institutional integration interacts with economic integration at the regional level. In particular, it asks what lessons can be drawn from the European experience with regional integration for Latin America. Several indicators of institutional and economic integration for both the EU and Latin America are presented. The paper finds that Latin America is currently less economically integrated not only than the European Union today, but also in some cases even than the EU at the beginning of its regional integration process. A cluster analysis illustrates that the link between institutional and economic integration has worked both ways throughout the whole EU experience. The more institutional integration went beyond the creation of a customs union and moved towards a common market and an economic and monetary union, the deeper economic integration turned out. Increasing economic integration in turn corroborated and sustained the process of institutional integration.

3.2. – Computable General Equilibrium Models

The main reason to use a CGE model is to provide a quantitative evaluation of the effects of government policies. A CGE model is basically a large set of demand and supply functions that cover every market, both for commodities and factors of production in the economy.

The demand side of commodity markets is comprised of private households, government agents, and firms. Some of these agents are domestic and some are foreign and therefore capture export demand. Private households are able to buy only as much as their income allows them. They receive this income as they sell labor services to firms, but they also receive a return on any capital investment that they have made.

As private households sell their labor and capital services to firms, it enables firms to produce. In addition to buying these primary production factors firms also buy intermediate inputs from each other. Commodity purchases by all agents comprise both imported and domestically produced goods.

In addition to participating in the regulatory process, the government has a number of tax and subsidy instruments available for redistributive uses.

The distinguishing features of general equilibrium modeling derive from the Walrasian general economic equilibrium theory that considers the economy as a set of agents, interacting in several markets for an equal number of commodities under a given set of initial endowments and income distribution. Each agent defines individually his supply or demand behavior by

optimizing his own utility, profit or cost objectives. Their decisions yield a set of excess supply functions that fulfill the Walras law, i.e., the global identity of incomes and expenditures.

CGE models turned the above theory into an operational model to be used for comparative static analysis. CGE models simultaneously determine changes in quantities of goods supplied and demanded, and their prices, in an aggregated multi-sectoral and multi-agent setup.

In the last 20 years or so, an enormous number of practically useful CGE models have been developed to study a wide range of policy areas in which simpler, partial equilibrium tools would not be satisfactory. Equilibrium models have been used to study a variety of policy issues, including tax policies, *development plans*, agricultural programs, international trade, energy and environmental policies and so on. A range of mathematical formulations and model solution techniques have been used in these modeling experiences.

The advantages of computable general equilibrium models for policy analysis compared to traditional macro-economic models are now widely admitted. The general equilibrium models allow for consistent comparative analysis of policy scenarios by standardizing their outcome around the concept of an equilibrium point, fulfilling the same consistency criteria. In addition, the computable general equilibrium models incorporate micro-economic mechanisms and institutional features within a consistent macro-economic framework, and avoid the representation of behavior in reduced form. This allows analysis of structural change under a variety of assumptions.

Empirical uses of the CGE models include:

1. Daniel Piazzolo. "Poland's Membership in the European Union: An Analysis with a Dynamic Computable General Equilibrium (CGE) Model."

This paper presents a dynamic Computable General Equilibrium (CGE) model for Poland's integration into the European Union (EU) that allows for quantification of income and welfare effects stemming from tariff reduction, border-cost reduction, reduction of technical barriers to trade and increased EU-transfers. For all channels, long-run income increases substantially compared with the reference scenario. The welfare effects are also positive, but much smaller because the welfare measure takes into account the time path of consumption throughout the adjustment period. Typical welfare effects are estimated at less than 1 percent of total consumption over time discounted to the beginning of the adjustment period. This low figure reflects the compression of consumption early in the adjustment period that finances the investment needed to build up the capital stock to support higher output and consumption farther into the future. The paper presents also sensitivity analyses for the CGE model concerning different specifications of the adjustment cost parameters, the intertemporal elasticity of substitution, the Armington substitution elasticity and the rate of time preference. The overall result of the examination of Poland's membership in the EU with the dynamic CGE model draws attention to the fact, that income growth effects as such are not necessarily welfare gains, since growth requires investment and therefore foregone consumption.

2. Daniel Piazzolo. "Investment Behavior in Transition Countries and Computable General Equilibrium Models."

When applying Computable General Equilibrium (CGE) models to transition economies, it is not plausible to use the standard assumption that the base year data represents stable structural characteristics or even the steady state of the economy. The suggestions forwarded until now to overcome this problem are discussed in this article. An amendment is proposed

by modifying the investment modeling within the dynamic CGE setting. The standard formulation of installation costs for capital is extended through the inclusion of adjustment costs that depend on the change of the investment level. Such formulation of the adjustment costs within the dynamic CGE model leads to an investment behavior that mirrors the empirical data of the first years of the transition.

3. Arjan Lejour, Ruud A. De Mooij, and Richard Nahuis. "EU Enlargement: Economic Implications for Countries and Industries."

This paper explores the economic consequences of the enlargement of the European Union with countries from Central and Eastern Europe. The paper focuses on integration aspects that go beyond the reduction of formal trade barriers, namely accession to the internal market and free movement of labor. The economic implications for sixteen industries in several European countries are assessed by using a CGE model for the world economy. The results suggest that the candidate member states will gain substantially from accession to the internal market, although some sectors in these countries will shrink. Most EU countries will experience small welfare increases. The paper also finds that the internal market effects are large compared to the economic effects of removing formal trade barriers and migration.

4. Marina Bakanova and Lucio Vinhas De Souza. "Trade and Growth under Limited Liberalization: The Case of Belarus."

This paper studies the connection between trade and growth in the context of a partial and inconsistent liberalization process in a specific Eastern European country in transition towards market economy, namely, the Republic of Belarus. The analysis of the country trade patterns during the USSR period and the years since independence revealed that unlike its close neighbors (the Baltic States and Poland) Belarus did not succeed in changing the commodity or the geographical structure of its trade. It is almost a good representation of reality to say that Belarus trades with Russia. The assessment of the rationale for the closer integration with Russia and the impact of this process on Belarus growth led to the conclusion that the integration in the form of a non-exclusive Free Trade Area and within the framework of a wider set of international connections rather than the move towards a Customs Union (and a Union State) with Russia would be a more optimal policy for Belarus. This conclusion is supported by the results of country-specific growth regressions and of a counterfactual "free trade experiment" via a small CGE model.

5. Ben J. Heijdra, Christian Keuschnigg, and Wilhelm Kohler. "Eastern Enlargement of the EU: Jobs, Investment and Welfare in Present Member Countries."

Eastern enlargement of the EU promises gains, but also imposes fiscal costs on incumbent countries. A sensitive issue concerns immigration, jobs and wages. The paper addresses these issues in a general equilibrium framework, both analytically and through numerical simulations. Analytical results identify capital accumulation as a prime transmission channel. Using a dynamic CGE model with search unemployment of high- and low-skilled labor, the paper simulates the effects of enlargement on Germany finding small effects from trade, but more pronounced labor market effects from migration. Based on German model elasticities, approximate expected benefits and costs are provided for the other 15 member countries as well.

6. Johannes Brocker and Martin Schneider. "How Does Economic Development in Eastern Europe Affect Austria's Regions? A Multiregional General Equilibrium Framework."

The paper quantifies regional welfare effects arising from the increasing trade flows between Austria and its Eastern neighbors after the opening up of Eastern Europe. The paper calibrates a static multiregional Computable General Equilibrium (CGE) model with benchmark data from 1994 for Austria, subdivided into nine Federal Provinces. The regions are linked by trade flows with the four Eastern neighboring countries and with the rest of the world. The paper simulates the effects of the increase of trade interpenetration as observed between 1989 and 1999 in a comparative static analysis. Regional welfare effects under fixed and flexible wages are presented. National CGE results are also compared with estimates obtained in a simple partial equilibrium approach.

7. Ben J. Heijdra and Christian Keuschnigg. "Integration And Search Unemployment: An Analysis Of Eastern EU Enlargement."

The paper develops a unified general equilibrium model including savings with overlapping generations, investment and search unemployment. Long-run analytical results for the small open economy identify capital accumulation as a prime transmission channel. The effects of integration on unemployment, however, depend importantly on the nature of wage taxation and unemployment compensation. As a separate methodological contribution, the paper extends a dynamic CGE model for Germany to allow for search unemployment of high- and low-skilled labor. Simulating the effects of Eastern EU enlargement, it finds quantitatively small effects of integration but more pronounced labor market effects from immigration.

8. Rikard Forslid, Jan I. Haaland, Karen H. M. Knarvik, and Ottar Maestad. "Integration and Transition: Scenarios for the Location of Production and Trade in Europe."

Applying a newly developed CGE-model, the paper presents scenarios for the future economic geography of Europe. The model divides the world into ten regions, five of which are European, and 14 industries, of which 12 are imperfectly competitive. With a complete input-output structure, the model captures comparative advantage mechanisms as well as intra-industry trade and 'new economic geography' agglomeration forces. The simulations focus on the consequences of successful transformation in Eastern Europe. The results indicate that transformation and European integration are of great importance for Eastern Europe, while the overall effects for other European regions are small. Individual sectors in the EU, such as Textiles and Transport Equipment, are, however, in some cases strongly affected.

9. Alan V. Deardorff, Drusilla K. Brown, and Robert M. Stern. "Some Economic Effects of the Free Trade Agreement Between Tunisia and the European Union."

Using a specially constructed version of the Michigan Brown-Deardorff-Stern (BDS) Computational General Equilibrium (CGE) Model of World production and Trade the paper estimates the potential economic effects on the Tunisian economy that may result from the free trade agreement (FTA) between Tunisia and the European Union (EU) that was concluded in July 1995. The paper finds that the static welfare benefits for Tunisia of the FTA range from slightly negative to somewhat positive, depending on what is assumed about intersectoral capital mobility in Tunisia.

10. Roberto A. De Santis. "The Impact of a Customs Union with the European Union on Internal Migration in Turkey."

The impact of the recent Customs Union (CU) agreement between Turkey and the European Union on internal migration is studied using an intra-industry trade Computable General Equilibrium (CGE) model with intersectoral capital mobility. The numerical results show that the CU is welfare enhancing and causes a reduction of the urban-rural wage gap as suggested by theoretical studies. At the same time, it leads to rural-to-urban migration and raises the capital rent, results that are counter intuitive with respect to the dual economy literature. Furthermore, the rise in formal labor demand and the migration response to the CU have not resulted in an increase in urban unemployment, but rather to a fall in the unemployment pool. The study also shows that the proposal of maximizing welfare by uniformly subsidizing the entire labor market is impracticable, especially if the high wage union sector can negotiate employment conditions.

11. Sebastien Dessus and Akiko Suwa-Eisenmann. "Trade Integration with Europe and Labor Reallocation in the Southern Mediterranean Countries: The Case of Egypt."

This paper looks at the implications of the Euro-Mediterranean partnership agreement on labor and wages in Egypt, using a dynamic CGE model, which takes into account the labor market segmentation. The results suggest that trade liberalization bears the risk of promoting the use of capital-intensive technology, thus reducing the employment content of growth. Employment policies that increase the mobility between the segments of the labor market and the wage flexibility could enhance the job creation effect induced by the trade liberalization. Employment and trade policies are also complementary in political terms, by alleviating the losses borne by the insiders following the entry of new workers into the labor market.

12. Mary E. Burfisher, Sherman Robinson, and Karen Thierfelder. "Developing Countries and the Gains from Regionalism: Links Between Trade and Farm Policy Reforms in Mexico."

The paper uses a multi-country computable general equilibrium (CGE) model with agricultural policy details to simulate the effects of North American Free Trade Agreement (NAFTA). The paper finds that Mexico gains from NAFTA only when it also removes domestic distortions in agriculture. In that case, agriculture can generate allocative efficiency gains large enough to offset the terms of trade losses that arise because Mexico has higher initial tariffs than its NAFTA partners. When a reduction in tariffs agreement forces a developing country to reform its domestic distortions that are linked to trade restrictions, it becomes a building block toward multilateralism.

3.3. – Gravity Equation

Two commonly used tools to evaluate the effects of border barriers are gravity equations and computable general equilibrium models. Gravity equations generally find that borders have a substantial negative effect on trade, while integration has a positive effect. But the estimated equations are a very crude tool for policy analysis because they are based on ad hoc specifications that can be seriously questioned on theoretical grounds. The ad hoc nature of standard gravity equations also precludes welfare analysis.

Computable general equilibrium (CGE) models are potentially more useful for policy analysis but they have two drawbacks: (1) they are simulated rather than estimated, and (2) they are almost always based on a very large black box consisting of dozens to hundreds of equations. The first characteristic makes it difficult to know how reliable is the simulation model while the second characteristic makes it difficult to evaluate what drives the findings.

Many CGE models have been applied to evaluate the impact of NAFTA, but almost always the implied effect on Mexican trade is only a small fraction of what we have seen in reality. Moreover, these models have the additional problem that while they capture the policy barriers of interest, such as tariffs under NAFTA, they omit other relevant trade barriers. These other barriers are several to many times the size of formal trade barriers and their presence alters the proper analysis of the impact of removing formal barriers.

Recent work on gravity equation incorporates features of general equilibrium in the gravity equation. This gravity equation can be used then as a general equilibrium tool to explore the comparative statistics of welfare with respect to borders or currency unions. The rest of this section provides a discussion on the theoretical background and empirical uses of the gravity equation.

The gravity equation, predicts that the volume of bilateral trade is positively related to the countries' gross domestic products (GDPs) and negatively related to trade barriers between trade partners¹². Empirical research has found that various versions of the gravity equation well describe the variation in the volume of trade across country-pairs as well as over time¹³.

Empirical success without much theoretical backing

The first building block of the gravity equation is product differentiation. The second building block is identical, homothetic consumer preferences, approximated by a constant elasticity of substitution (CES) utility function. The problem with the gravity equation is what is called a model identification issue. The gravity equation prediction can be derived from very different structural models, including Ricardian models, Heckscher-Ohlin (H-O) models, and increasing returns to scale (IRS) models. These three trade models differ in the way product specialization is obtained in the equilibrium: in the Ricardian models it is because of technology differences, in the H-O models it is because of the factor proportions differences, and in the IRS model it is because of the increasing returns at the firm level.

On the one hand, when consumers have both identical and homothetic preferences and access to the same goods prices, a sufficient condition for obtaining the gravity equation is perfect product specialization, in the sense that each commodity is produced in only one country. However, the constant returns (CRS) H-O model requires that bilateral factor proportions differences to be very large to generate product specialization. On the other hand, when product specialization is the result of IRS, gravity equation can be obtained even when there are no factor proportions differences.

The difference between these two models means that in the H-O model, trade is exclusively inter-industry trade (trade in goods with different factor intensities). In the case of the IRS model at least some, and maybe all, trade is intra-industry trade (trade in goods with similar factor input requirements).

Technology differences could also be behind intra-industry trade, besides IRS. However, testing of the Ricardian models requires product-level estimates of production technologies across countries, which are not available. In addition, technology differences are not considered to be as important in generating product specialization as is IRS. There is ample evidence that the industries in which the share of intra-industry trade in total trade is high tend to be those where marketing, R&D, and other fixed costs lead to IRS in conjunction with product differentiation. Moreover, besides the special cases of product specialization discussed above, a more general formulation of the model would allow for the case where at least some goods are produced in

¹² Evenett, S. J., and W. Keller. *On Theories Explaining the Success of the Gravity Equation*. *Journal of Political Economy*, Vol 110, April 2002.

¹³ Leamer and Levinsohn 1995.

more than one country. While product specialization has recently emphasized to be an important phenomenon of the patterns of the world production, no doubt there are many commodities which are produced in several countries. Two of these trade models are the H-O model with imperfect product specialization, as well as its generalization to include IRS.

A simple example of the former model would be the case of an H-O model where two goods are homogeneous goods and are produced under CRS. The factor proportions differences imply that one country would be capital abundant while the other labor abundant. The capital-abundant country would therefore produce the capital-intensive good and the labor-abundant country would produce the labor-intensive good.

The simple example for the later model with imperfect product specialization and IRS, consists of one country that produces a homogeneous good under CRS and a second country that produces a differentiated good under IRS. Further, the capital-intensive good is produced under IRS and the labor-intensive good is produced under CRS.

Recent empirical work¹⁴ provides strong evidence that the volume of international trade is determined by the extent of product specialization, which in turn is due to IRS and factor proportions differences. The bilateral trade volume is higher, the more product specialization there is. Where there is little or no two-way trade between countries, The H-O model that predicts imperfect specialization explains trade flows better than a H-O model with perfect specialization. Also where there is two-way trade between countries, trade flows are better explained by a model that incorporates both factor proportions difference and IRS than by a model where IRS alone generates perfect product specialization. These findings highlight the significance of both factor proportions differences and IRS as determinants of the extent of specialization and international trade flows.

Gravity equation features

The simple gravity equation usually has the following symmetric form:

$$M_{ij} = s_i Y_j = \frac{Y_i Y_j}{Y_w} = s_j Y_i = M_{ji} \quad (1)$$

where M_{ij} are country i 's imports from country j , s_i is the share of country i 's GDP to the world GDP, and Y_i is country i 's GDP.

Gravity equation in (1) does not include trade barriers. Anderson and Wincoop decompose trade barriers into three components: (i) the bilateral trade barrier between country i and j , (ii) country i 's barrier to trade with all countries, and (iii) country j 's barrier to trade with all countries. Their gravity equation looks as follows:

$$M_{ij} = \frac{Y_i Y_j}{Y_w} \left(\frac{t_{ij}}{P_i P_j} \right)^{1-\sigma} \quad (2)$$

¹⁴ Evenett, S. J., and W. Keller: Antweiler and Trefler (1997); Davis and Weinstein (1996, 1997).

where t_{ij} is the trade cost factor between country i and j which is assumed to be symmetric, and P_i is the consumer price index of country i and represents country i 's barrier (resistance) to trade with all countries, and σ is the elasticity of substitution between all goods.

The trade cost factor t_{ij} is a function of the tariff-equivalent of the border barrier between country i and j , and their bilateral distance¹⁵. P_i also depends positively on trade barriers with all trading partners.

Gravity equation in (2) shows that bilateral trade, after controlling for size, depends on the bilateral trade barrier between country i and j , divided by the product of their multilateral trade resistance. In other words, trade between two countries depends on *relative* trade barriers, the bilateral barrier between them relative to average trade barriers that both countries face with all their trading partners.

The size of the country also matters with respect to the effect of barriers on trade. Economic theory and empirical work identify two types of trades: international trade – trade between countries, and intranational trade – trade between regions within a country. Three important implications can be derived from (2) regarding the effect of trade barriers on two types of trades (intra and international) after adjusting for the size of the country:

1. Trade barriers reduce size-adjusted trade between large countries more than between small countries.
2. Trade barriers raise size-adjusted trade within small countries more than within large countries.
3. Trade barriers raise the ratio of size-adjusted trade within country i relative to size-adjusted trade between countries i and j by more the smaller is country i and the larger is country j .

Empirical estimation of the gravity equation

The empirical versions of the two theoretical gravity equations presented above are presented below. First is presented the simple version without trade barriers:

$$\ln M_{ij} = \alpha + \beta_1 \ln y_i + \beta_2 \ln y_j + \varepsilon_{ij} \quad (1.1)$$

Second, the version with trade barriers is presented:

$$\ln M_{ij} = \alpha + \beta_1 \ln y_i + \beta_2 \ln y_j + (1-\sigma)\rho \ln d_{ij} + [(1-\sigma)\ln b](1-\delta_{ij}) - \ln P_i^{1-\sigma} - \ln P_j^{1-\sigma} + \varepsilon_{ij} \quad (1.2)$$

subject to:

$$P_j^{1-\sigma} = \sum_i P_i^{\sigma-1} \theta_i e^{a_1 \ln d_{ij} + a_2 (1-\delta_{ij})} \quad (1.3)$$

¹⁵ To date there is relatively little theory on what form the gravity equation takes in the presence of transportation costs.

where b_{ij} is equal to one plus the tariff-equivalent of the border barrier countries i and j , d_{ij} is the bilateral distance, and α , β_1 , β_2 , $\beta_3 = (1-\sigma)\rho$, and $\beta_4 = (1-\sigma)\ln b$, are the parameters to be estimated.

Uses of the gravity equation

The discussion about the gravity equation above has concentrated on the use of the gravity equation for measuring the effect of international borders on the flow of trade both within a country and between countries. Examples of empirical work about this use of the gravity equation include:

1. James E. Anderson and Eric van Wincoop: "Gravity with Gravitas: A Solution to the Border Puzzle."

This paper shows that the gravity model usually estimated does not correspond to the theory behind it. The paper solves the "border puzzle" by modifying the model to account for trade barriers and country size. The paper also provides results for the border trade between the US and Canada.

2. James E. Anderson and Eric van Wincoop: "Borders, Trade and Welfare."

This paper shows that policies associated with borders are very costly, even in a world with low formal trade policy barriers. The potential for deep integration even between such closely associated countries as Canada and the US remains astonishingly large. Small countries have much more to gain from integration than large countries, but even huge countries such as the US will earn substantial benefit from deep integration. The large size of the estimated border barriers points to the need for more research to understand what the costs are and why they are so high. The benefit of currency unions provides a useful clue, but the implied costs are very high compared to intuitive notions of the cost of exchange rate uncertainty and foreign exchange.

Methodologically, the paper indicates that further development and use of the gravity model is likely to yield useful insights. Its attractiveness combines ease of estimation, success in prediction and the consistency and power of readily understood general equilibrium structure.

3. John McCallum: "National Borders Matter: Canada-U.S. Regional Trade Patterns."

This paper also provides results for the border trade between the US and Canada.

4. James E. Anderson and Stephen Smith: "Do National Borders Really Matter? Canada-U.S. Regional Trade Reconsidered."

This paper reconsiders the Canada-US border's effect on trade. The paper finds that the "border effect" may be substantially less than previously measured--up to 50% smaller--but remains surprisingly large. Transportation equipment offers a natural explanation, as North American trade has been completely liberalized for several decades. The paper also finds a higher border effect for these freely traded goods, which rules out standard protection as the border effect's cause.

5. Natalie Chen: "Intra-National Versus International Trade in the European Union: Why Do National Borders Matter?"

Based on the estimation of a theoretically consistent gravity equation, together with a careful computation of transportation costs across countries and industries, the paper first provides estimates of 'border effects' among EU countries. The second objective is to examine the reasons for border effects. Contrarily to the previous findings reported in the literature, the paper shows that national trade barriers do provide an explanation. In particular, technical barriers to trade, together with firm and product-specific information costs, increase border effects, whereas non-tariff barriers are not significant. Our results however suggest that these barriers are not the only cause since the spatial clustering of firms is also shown to matter.

6. Carolyn Evans: "The Economic Significance of National Borders Effects."

7. John Helliwell: "Do National Borders Matter for Quebec's Trade?"

Based on a gravity model this paper asks how Quebec trade patterns compare with those of other provinces. The results, based on revised data for 1988, 1989 and 1990, show that while the typical province trades more than 20 times as much with other provinces as with comparable U.S. states, for Quebec the multiple is even greater. Thus trade between Quebec and the United States appears to be an even less viable alternative to interprovincial trade for Quebec than it is for the rest of Canada. The implications of these results for international economics are considerable, as they show that trade linkages within a national economy are far greater than previously imagined. If these results are confirmed, they imply that the fabric of national economies is far tighter than that of the global trading system, even for countries operating without substantial trade barriers.

8. Shang-Jin Wei: "Intra-national versus Inter-national Trade: How Stubborn are Nations in Global Integration?"

This paper examines the home country bias in the goods market among OECD countries. An average country imports about two and a half times as much from itself as from an otherwise identical foreign country, after controlling for sizes of exporter and importer, their direct distance, geographic positions relative to the rest of the world and a possible linguistic tie. If one believes that the substitutability among goods produced in OECD countries is high, as it seems reasonable, the observed bias implies relatively small non-tariff barriers. Over 1982-94, the home bias of OECD countries as a whole exhibited a slow but steady decline. The bias in a typical member country of the European Community relative to its imports from other member countries showed a fifty percent decline during the period.

Other uses of the gravity equation include:

a) Economic integration and FDI flows

11. Paul Brenton, Francesca Di Mauro, and Matthias Lucke: "Economic Integration and FDI: An Empirical Analysis of Foreign Investment in the EU and in Central and Eastern Europe."

Recent evidence suggests that regional economic integration provides an important stimulus not only to trade, but also to FDI. In contrast, the available theory on FDI does not yet provide empirically testable propositions on the effects of concurrent trade and investment liberalization. Moreover, given the limits of simulation models, which rely heavily upon parameter choice, in assessing the impact of such liberalization, there is a need for empirical

analysis to identify the principal features of FDI. This paper uses a "gravity model" approach to assess the impact of the deepening integration between the EU and the CEECs on FDI flows in terms of three key issues. First, it provides systematic estimates of the expected long-term level of FDI in the CEECs. Second, it investigates whether FDI in the CEECs, on the one hand, and source country exports and imports, on the other hand, are complements or substitutes. Finally, it enquires whether an increase in the attractiveness of the CEECs to foreign investors has affected the magnitude of FDI going to other European countries.

b) Effects of customs unions or trade unions on trade;

9. Jeffrey A. Frankel, Ernesto Stein and Shang-Jin Wei: "Continental Trading Blocs: Are They Natural or Supernatural?"

Using the gravity model, the paper finds evidence of three continental trading blocs: the Americas, Europe and Pacific Asia. Intra-regional trade exceeds what can be explained by the proximity of a pair of countries, their sizes and GNP/capita's, and whether they share a common border or language. If transport costs are low, continental Free Trade Areas can reduce welfare. Such blocs are called super-natural. Partial liberalization is better than full liberalization within regional Preferential Trading Arrangements, despite the GATT's Article 24. The super-natural zone occurs when the regionalization of trade policy exceeds what is justified by natural factors. Estimates suggest that trading blocs like the current EC are super-natural.

c) Effects of monetary unions on trade:

10. Andrew Rose: "One Money, One Market: Estimating the Effect of Common Currencies on Trade."

The paper finds that trade among countries in a monetary union is three times the size of trade among countries that are not in a monetary union, holding other trade costs constant.

d) Measuring migration flows;

13. John Helliwell: "National Borders, Trade and Migration."

The paper first extends and reconciles recent estimates of the strikingly large effect of national borders on trade patterns. Estimates comparing trade among Canadian provinces with that between Canadian provinces and U.S. states show interprovincial trade in 1988-90 to have been more than twenty times as dense as that between provinces and states, with some evidence of a downward trend since, due to the post-FTA growth in trade between Canada and the United States. Using approximate data for the volumes and distances of internal trade in OECD countries, the 1988-92 border effect for unrelated OECD countries is estimated to exceed 12. Both types of data confirm substantial border effects, even after accounting for common borders and language, with the directly-measured data for interprovincial and province-state trade producing higher estimates." Initial estimates from a census-based gravity model of interprovincial and international migration show a much higher border effect for migration, with interprovincial migration among the Anglophone provinces almost 100 times as dense as that from U.S. states to Canadian provinces. Effects of migration on subsequent trade patterns are found for international but not for

interprovincial trade, suggesting the existence of nationally-shared networks the large national border effects for trade flows.

e) Measuring equity flows;

14. Richard Portes and Helene Rey: "The Euro and International Equity Flows."

The paper explores a new panel data set on bilateral gross cross-border equity flows between 14 countries, 1989-96. It shows that a "gravity" model explains international transactions in financial assets at least as well as goods trade transactions. Gross transaction flows depend on market size in both source and destination country as well as trading costs, in which both information and the transaction technology play a role. Distance proxies some information costs, and other variables explicitly represent information transmission, an information asymmetry between domestic and foreign investors, and the efficiency of transaction.

Additional uses of the gravity equation include:

- f) Effects of exchange rate mechanisms on trade;
- g) Effects of ethnic ties on trade;
- h) Effects of linguistic identity on trade;

4. Conclusion

The discussion of the economic integration from the perspective of traditional theories and the more recent developments highlights important policy considerations for the countries going through an integration process. Economic theory suggests that free trade and the broader economic integration framework should provide long run benefits in the form of increased welfare and more efficient allocation of the resources. On the other hand, possible negative consequences could result in the short run.

Some of the consequences that needs to be given particular attention include:

- the (high) import and (low) export elasticities and their negative effects on the current account;
- the possibility of concentration of economic activities in more developed areas of a free-trade area;
- the possibility of low-competitive countries to lose the chance of industrialization by the lack of a certain level of protection;
- the macroeconomic and political sustainability of the free trade areas.

Theoretical discussion notes that without ignoring long run benefits to economic integration, it is important for countries going through this process to understand possible negative consequences in the short run. This will provide for better policy measures in trying to eliminate or minimize these consequences. Finally, there is a cautionary note regarding careful application of the integration theory for the case of 'transition' economies.

The paper also reviews the recent work that attempts to provide a theoretical background to the empirical success of the gravity equation. Tests of two competing theories, the H-O (factor proportions differences) theory and the IRS theory provide support for a combination of the two theories in the presence of two-way trade. In the case of little or no trade the evidence supports an H-O theory with imperfect product specialization. These findings highlight the significance of both factor proportions differences and IRS as determinants of the extent of specialization and international trade flows.

Further the paper presents recent theoretical and empirical developments on the gravity equation for incorporating trade barriers in the equation. This work shows that bilateral trade, after controlling for size, depends on the bilateral trade barrier between the two countries and on each country's trade barriers with its trading partners. Further, it shows that it is the relative trade barriers, the bilateral barrier between two countries relative to average trade barriers that both countries face with all their trading partners, what really matters.

The paper presents a series of empirical work related to economic integration. These presentations serve two purposes. First, they illustrate the use of different empirical methods in analyzing different aspects of the integration process. Second, their findings contain important information with regard to policy implications.

The nature of the integration aspect to be studied plays an important part in determining which method of analysis to use. However, sometimes data availability could constraint the choice of the method. Econometric models require data about a number of economic variables although there are also model versions with a small number of equations. More importantly is the need for historical data for periods without important structural changes, which for some countries may not exist. On the other hand, it is well known the large data requirement for CGE modeling. Moreover, CGE modeling requires data on variables that need to be estimated by using econometric models. In this sense, the gravity equation is favored since it requires mostly trade data, which are more easily available.

Some of the most important findings from the empirical studies include:

- Economic integration has a positive effect on growth;
- Economic integration with EU will provide substantial welfare gains to the candidate countries although some sectors in these countries will shrink;
- The effects of the “deep” integration are larger than those resulting only from the removal of trade barriers;
- Improvement of economic institutions has very significant effects on growth;
- Protection of property rights and efficient economic policies, mainly open trade should be the priorities for developing countries;
- Reduction of border barriers has positive effects on incomes and welfare.

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