The Economics of the ASEAN Economic Community

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ABSTRACT

The ASEAN Economic Community (AEC) is the largest integration effort attempted in the developing world; if realized, it will create a single market with the free movement of goods, services, foreign direct investment and skilled labor, and freer movement of capital encompassing nearly 600 million people. The study finds that the AEC could yield benefits similar to those of the European Union, amounting to 5.3% of the region's GDP and more than twice that if, as expected, the AEC leads to free trade agreements with key external partners. Every ASEAN member will share in these benefits. There will be mild trade and investment diversion effects, but the world as a whole will benefit from the AEC. Nevertheless, the AEC poses political challenges: the study finds that the project will imply significant structural adjustment in several ASEAN economies.

Keywords: ASEAN, ASEAN Economic Community, regional economic integration, free trade areas.

JEL codes: F12, F13, F14, F15, O2.

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In January 2007, ten Southeast Asian nations agreed to implement the ASEAN Economic Community (AEC) by 2015 (with some extra time for transitional-economy members), committing to the free movement of goods, services, foreign direct investment (FDI) and skilled labor, and freer flows of capital. In November 2007 they followed up with a detailed implementation plan, the *ASEAN Economic Community Blueprint* (ASEAN 2007).

Spanning a region of 574 million people and many rapidly growing economies, the AEC is arguably the most ambitious and sophisticated initiative of its kind, save the European Single Market, and the only project on this scale in the developing world. Much hard work lies ahead: realizing the AEC will require overcoming huge technical and political obstacles. The region's leaders and citizens need to be convinced that the economic benefits will be worth it.

This study estimates the likely impact of the AEC.[1] We use a computable general equilibrium model as is usual in such work, but given the scope of the AEC, we attempt to model a broader range of effects than most other studies. Thus, we incorporate several "new" channels of benefits from integration that have been identified in the literature. First, we take into account multiple policy measures that comprise the AEC, including the elimination of tariffs and non-tariff measures, trade facilitation, and improvements in the investment climate. Second, we use a model specification that tracks benefits derived from producing a wider range of varieties and from productivity gains associated with economies of scale and changes in the distribution of firms by productivity. Third, we explore the impact of attracting new external partners into the ASEAN's "hub and spoke" network of free trade agreements.

While the approach is unusually comprehensive—we believe appropriately, given the AEC's ambition—the parameter values that we use to implement the model are conservative in terms of generating welfare results. In other words, we try to estimate realistic (and perhaps even lower bound) magnitudes for likely gains. Even so, the results suggest substantial benefits from implementing the AEC, on the order of 5 percent of ASEAN GDP. Moreover, these benefits should grow over time as the ASEAN economies mature and their economies evolve to make economic integration still more productive. Thus, while our estimates are large compared to those typically estimated, we believe that they reflect reasonable minimum benefits that policymakers can expect if the AEC is implemented according to plan.

[1] This paper is based in part on a study commissioned by the USAID Regional Development Mission Asia. Earlier results were discussed in Plummer and Chia (2009) and Rashid et al. (2009). This paper presents a full description of the modeling approach and a comprehensive analysis of the results. Some of the analysis was conducted while Petri was a Visting Fellow and Zhai a Research Fellow at the Asian Development Bank Institute (ADBI) in Tokyo. The cooperation and support of USAID, the ASEAN Secretariat and ADBI are gratefully acknowledged. Of course, the results reflect only the views of the authors.

Not long after the AEC agreement was signed, the world economy plunged into deep and prolonged recession. Somewhat surprisingly—given the severe setbacks the ASEAN economies suffered in the Asian financial crisis of 1997-98—the region has so far managed to ride out the downturn reasonably well. Indonesia and some other countries grew throughout the crisis. Still others declined but bounced back dramatically. Having entered the recession with strong fundamentals—low debt ratios, fiscal surpluses and ample foreign exchange reserves—ASEAN economies were well positioned to deploy fiscal and monetary responses. Investment, including foreign investment, held up, contributing to an early and robust rebound. Arguably, the expectation of regional integration mapped out by the AEC was already helping to build confidence in the region's prospects. Our estimates suggest substantial benefits from the AEC, providing solid foundations for long-term development; if implemented as planned, the AEC should help to replace the relatively slow-growing markets of the United States and Europe by accelerating the growth of markets in the region itself.

The paper is organized as followed. Section I gives an overview of salient aspects of ASEAN trade that motivate gains from regional integration. Section II provides an overview of the model and simulations. Section III presents results for economic welfare, structural change at the sectoral level, and trade. Section IV concludes.

I. The Economic Setting

ASEAN's ten economies vary substantially in population, per capita income and economic structure. Their performance has been somewhat uneven, but strong on average; the region has grown at a 5% annual rate over the last two decades, despite two major crises (see Table 1). Growth was rapid before the Asian financial crisis and, after slowing in its aftermath, has begun to accelerate again. The upswing is especially noteworthy in Indonesia, the region's largest economy, which has undertaken wide-ranging political and economic reforms.

Table 1. ASEAN at a glance

	Population mill.	GDP 2010 US$bill.	Real GDP growth rate 1990-2010	(Exports +Imports) /GDP (%)
ASEAN	573.9	1,719.2	5.0	131
Brunei	0.4	12.0	1.8	127
Cambodia	14.6	11.5	7.3	121
Indonesia	227.3	670.4	4.6	45
Lao	6.2	6.3	6.6	37
Malaysia	27.0	213.1	5.7	192
Myanmar	49.6	28.7	8.7	27
Philippines	90.3	181.5	3.7	71
Singapore	4.8	194.9	6.0	421
Thailand	67.4	297.9	4.3	139
Vietnam	86.2	103.1	7.4	149

Source: IMF World Economic Outlook database, accessed 14 July 2010,
World Bank, World Development Indicators database, accessed 2 September 2010.

Projections envision continued good performance in the future. The consensus centers on 6% growth in the intermediate term (Petri 2010), but some observers foresee even faster growth and include several ASEAN countries among the world's high performing emerging economies (Goldman Sachs 2010). The region is also benefiting from competitive "courting" by its large economic and political partners, including China, Japan, the United States and the European Union (Chachavalpongpun 2010). These developments make ASEAN attractive from both production and market perspectives.

Trade Patterns

As Table 1 also shows, virtually all ASEAN economies are open to trade and investment; the trade/GDP ratio is 131% for the region as a whole and exceeds 400% for Singapore. Over the last two decades, the region's exports and imports have shifted from natural-resource-intensive goods to electronics and other relatively sophisticated manufactures. Manufacturing exports account for almost three-fourths of total ASEAN exports (up from less than two-thirds in 1990), and machinery and transport equipment constitute almost half of both exports and imports (see Table 2).

Table 2. Composition of ASEAN Trade
(percentage of total trade)

	Exports		Imports	
SITC Category	**1990**	**2006**	**1990**	**2006**
0 Food and live animals chiefly for food	9.0	4.5	4.8	3.7
1 Beverages and tobacco	0.8	0.4	0.8	0.4
2 Crude materials, inedible, except fuels	6.8	4.0	4.3	2.4
3 Mineral fuels, lubricants and related mater	20.3	14.5	11.4	17.7
4 Animal and vegetable oils, fats and waxes	2.4	2.0	0.4	0.3
5 Chemicals and related products, nes	3.6	7.4	9.7	8.5
6 Manufactured goods classified chiefly by r	11.1	8.5	15.7	12.3
7 Machinery and transport equipment	30.7	46.3	43.2	46.5
8 Miscellaneous manufactured articles	12.6	9.8	6.3	5.9
9 Commodities and transactions, nes	2.7	2.6	3.0	2.4

Source: UN COMTRADE.

Top ASEAN exports and imports include various advanced manufactures, such as SITC 776 - thermionic valves (see Table 3). This sector's export value has increased ten-fold from $12.1 billion in 1990 to $119.6 billion in 2006, accounting for 16 percent of total ASEAN exports ($759 billion) and one-third of world exports ($379 billion). Success in this sector reflects the region's integration into global production chains, which rely heavily on international exchanges of goods, capital and expertise.

Table 3. ASEAN's Top Exports and Imports

SITC	Commodity category	1990 $bill.	SITC	Commodity category	2006 $bill.
Exports					
333	Petroleum oils and crude oils	12.1	776	Thermionic valves and tubes, etc.	119.6
334	Petroleum products, refined	11.5	334	Petroleum products, refined	47.4
776	Thermionic valves and tubes, etc.	9.5	752	Automatic data processing machines	47.3
752	Automatic data processing machines	7.5	759	Parts of office machines	38.7
764	Telecommunications equipment	6.2	333	Petroleum oils and crude oils	32.3
341	Gas, natural and manufactured	6.0	764	Telecommunications equipment	29.9
751	Office machines	4.2	341	Gas, natural and manufactured	20.9
232	Natural rubber and latex	3.8	931	Special transactions nes	16.0
931	Special transactions nes	3.7	772	Electrical apparatus, switches etc.	14.7
634	Veneers and plywood	3.6	232	Natural rubber and latex	13.6
Imports					
333	Petroleum oils and crude oils	11.8	776	Thermionic valves and tubes, etc.	109.9
776	Thermionic valves and tubes, etc.	10.8	333	Petroleum oils and crude oils	61.7
334	Petroleum products, refined	6.3	334	Petroleum products, refined	41.3
764	Telecommunications equipment	6.2	759	Parts of office machines	28.2
792	Aircraft and equipment	4.3	764	Telecommunications equipment	25.0
728	Machinery and equipment, specialized	4.0	772	Electrical apparatus, switches etc.	15.0
751	Office machines	3.9	752	Automatic data processing machines	12.7
674	Universals, plates and sheets of steel	3.7	778	Electrical machinery nes	12.4
931	Special transactions nes	3.2	792	Aircraft and equipment	10.0
772	Electrical apparatus, switches etc.	2.9	728	Machinery and equipment, specialized	9.3

Source: UN COMTRADE.

Trade in services constitutes roughly one-fourth of ASEAN's trade. The sector is important in its own right and also facilitates trade in goods and FDI. ASEAN service exports grew from $29 billion in 1990 to $130 billion in 2007, by 350 percent. Travel, transport, and other business services constitute 84 percent and 75 percent of ASEAN services exports and imports, respectively (see Table 4). Imports of services grew even faster over this period. Hence, the trade balance in services has moved from a slight surplus in 1990 to a $24 billion deficit in 2006.

Table 4: Composition of ASEAN's service trade
(percentage of total ASEAN service trade)

	Exports		Imports	
Service Category	**1990**	**2006**	**1990**	**2006**
Transport	17.3	26.6	46.8	39.8
Travel	45.3	30.1	19.7	15.8
Communications	0.0	2.5	0.0	1.6
Construction	0.0	2.0	0.0	2.1
Insurance	0.4	1.6	4.9	3.9
Financial services	0.0	3.4	0.0	1.0
Computer and information services	0.0	1.1	0.0	1.0
Royalties and licence fees	0.0	0.6	0.7	9.6
Other business services	33.3	27.0	24.9	19.3
Personal, cultural, recreational services	0.0	0.9	0.0	1.2
Government services nes	2.3	0.7	1.8	0.7

Source: UNCTAD Statistical Handbook.

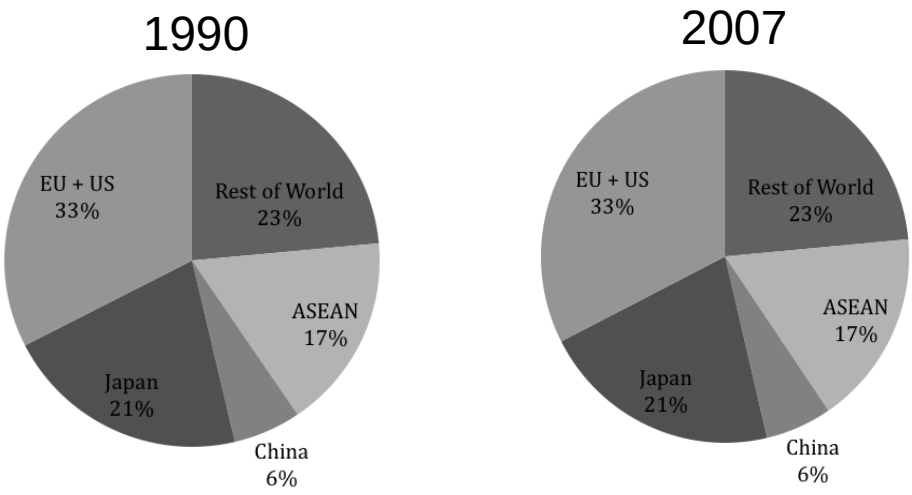
ADB (2007) argues that ASEAN's development more or less conforms to the Kuznets process: the contribution of agriculture to GDP falls over time; the contribution of manufactures peaks; and the contribution of services rises. Thus, the service sector had become the dominant contributor to GDP growth in the late 1990s in all large ASEAN countries except for Indonesia, where manufacturing was still slightly more important[2]. Since regional cooperation has progressed less in services than in other sectors, the sector is singled out as a particularly important priority in the AEC.

The geographical pattern of ASEAN trade is summarized in Figure 1. ASEAN's intra-regional trade is still modest at one-fourth of the region's total trade, but its share has risen by over 50 percent from 1990 to 2007. Given that the region consists of small and medium-sized developing countries strong global production links, it is not surprising that most of its trade also involves extra-regional partners. But controlling for the region's size, intra-ASEAN trade is four times as high as it would be if the region's trade flows were randomly distributed across partners.[3] Evidently, production chains and specialization are targeting regional partnerships. ASEAN markets are especially important for smaller member states, including Vietnam, Laos

[2] Clemes and Gani (2002).
[3] This type of normalization is done by dividing the intra-regional trade shares by the shares of ASEAN trade in global trade.

and Brunei. Every ASEAN economy now does at least one-fifth of its trade within the region, while a quarter of a century ago only a few did that much.

Figure 1. Geographical Distribution of ASEAN Trade



Source: UN Comtrade.

The region's trade pattern is essentially symmetric: the shares of ASEAN, the US and EU, China and Japan, and the rest of the world each account for about one-fourth of the overall ASEAN trade (see Figure 1). The continuing importance of trade with the rest of the world underscores the region's stake in global integration. A "Fortress ASEAN" would raise the cost of imports, undermine ASEAN's role in global production chains, and alienate important external partners. Thus, the AEC Blueprint is externally focused: one of its four pillars calls for building stronger global relationships.

Commercial Policy

As much of East Asia, ASEAN economies have relied on outward-oriented trade and investment strategies.[4] Their policies have focused on macroeconomic stability, trade liberalization, infrastructure investments in ports and roads, human capital development, and support for technology. The region's applied tariffs are relatively low (see Table 5). A more detailed view of the trade policy environment suggests that:

- Protection is relatively high in agriculture and beverage products relative to manufactures (with the exception of chemicals, transport equipment and clothing for some countries).

- Protection is reasonably symmetric otherwise; in any given country, tariffs are similar across most commodity categories. This limits distortion effects.

[4] ADB (2008) gives a survey of these studies.

- Protection tends to fall with income. The region's wealthiest economies—Singapore and Brunei—have essentially free-trade regimes; those with intermediate incomes—Indonesia, Malaysia, the Philippines and Thailand—have mostly low tariffs; and its low-income economies—Cambodia, Laos and Vietnam—have relatively high tariffs. (Myanmar is an anomaly with low tariffs.)

Table 5. ASEAN Tariff Regimes
(applied MFN rates, 2008)

	Brunei	Cambodia	Indonesia	Lao	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
Animal Products	0.0	27.8	4.4	24.9	0.5	10.7	21.3	0.0	28.1	20.1
Dairy Products	0.0	25.8	5.5	8.5	3.4	3.4	3.9	0.0	15.8	21.9
Fruit, Vegetables, Plants	0.0	14.0	5.9	30.3	4.2	11.5	9.4	0.0	27.6	30.6
Coffee, Tea	1.5	26.7	8.3	24.2	9.0	14.0	15.8	0.0	23.1	37.9
Cereals and Preparations	0.1	19.8	6.3	9.2	5.1	8.7	10.9	0.0	19.4	27.4
Oilseeds, fats & oils	0.0	9.1	4.0	12.0	1.7	1.7	5.6	0.0	19.1	13.4
Sugars and Confectionery	0.0	7.0	10.4	12.5	2.8	5.4	16.0	0.0	32.2	17.7
Beverages & Tobacco	138.1	33.1	51.8	31.3	136.6	23.2	8.2	2.1	33.4	66.6
Cotton	0.0	7.0	4.0	8.0	0.0	0.8	2.6	0.0	0.0	6.0
Other Agricultural Products	0.0	15.5	4.3	9.8	0.6	3.1	3.4	0.0	10.3	7.8
Fish & Fish Products	0.0	18.9	5.8	12.7	2.2	8.2	8.0	0.0	14.5	31.3
Minerals & Metals	0.2	10.9	6.6	5.8	10.9	3.4	4.7	0.0	5.9	10.2
Petroleum	0.3	14.8	0.5	14.9	1.1	1.8	2.9	0.0	9.4	17.5
Chemicals	0.4	9.6	5.2	6.8	3.3	2.3	3.8	0.0	3.8	5.2
Wood, Paper, etc.	4.4	11.8	5.0	14.1	10.7	6.5	6.9	0.0	6.8	17.2
Textiles	0.9	9.6	9.3	8.9	10.5	8.4	9.3	0.0	8.1	30.4
Clothing	0.0	28.5	14.4	10.0	16.0	17.2	14.9	0.0	24.5	49.3
Leather, Footwear, etc.	3.4	18.0	9.0	11.0	13.9	5.3	6.7	0.0	12.7	19.0
Non-Electrical Machinery	7.0	14.6	2.3	6.0	3.6	1.7	2.3	0.0	4.7	5.4
Electrical Machinery	14.4	24.2	5.8	6.8	6.5	4.3	3.8	0.0	8.3	12.8
Transport Equipment	10.0	16.3	11.6	13.5	11.4	4.2	9.0	0.0	20.7	22.2
Other Manufactures	5.0	14.6	6.9	10.3	4.9	6.5	4.8	0.0	11.0	15.2

Source: WTO Tariff Profiles 2008.

Data on non-tariff barriers (NTBs) are difficult to obtain. Conceptually NTBs include import quotas and less well-defined impediments such as licensing requirements, restrictive product standards, and anti-dumping protection. Some studies measure NTBs by "scoring" known impediments, while others impute barriers by estimating the shortfall in trade relative to expected levels (say, as predicted by gravity model estimates). The Uruguay Round replaced quotas with tariffs in agricultural products and phased out "orderly-marketing arrangements" in textiles and clothing, but useful as these steps are, they made the measurement of remaining NTBs even more challenging.

Feridhanusetyawan (2005) has estimated trade restrictiveness indices for Asia by categorizing the incidence of NTBs. His estimates suggest patterns similar to those observed in tariff data: Brunei and Singapore economy receive a clean bill of health for NTBs, while Indonesia, Malaysia, the Philippines and Thailand fall in the intermediate range, and Vietnam, Laos and Myanmar fall in the restrictive range.

Bora et al. (2002) provide more disaggregated NTB tabulations for seven ASEAN countries. In the aggregate, NTBs applied to a small percentage of product lines in ASEAN in 2001. Thailand and Brunei had the highest NTB coverage at approximately three percent, while others had 2.5 percent or less. NTBs were concentrated in agricultural products, with the salient exceptions of iron and steel in Vietnam and Malaysia, and textiles and clothing in Malaysia. NTBs have declined since the measurements of that study, in part due to agreements achieved in the context of the accession of several economies to ASEAN and the WTO.

Protection in services is also hard to measure, partly because the delivery of services can require freedom for investment (Mode 3) and the movement of people (Mode 4). Table 6 provides estimates of tariff equivalents for five service sectors in six ASEAN countries.[5] These rates are used in our model discussed below. Protection is estimated to be nil in electricity, gas and water, high in other private services (including financial services) for all countries save Singapore, and high in trade and transport in the Philippines and Thailand. Thus, liberalization of trade in services in the AEC could have significant effects on services trade and on other linkages that depend on services as inputs.

[5] These data were provided by the "Michigan Model", the trade model maintained at the University of Michigan. We thank Alan Deardorf, Robert Stern and Kozo Kiyoto for providing these data to us.

Table 6. Ad Valorem Equivalents in Services

(percent)

	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
Electricity, Gas and Water	-	-	-	-	-	-
Construction	6.0	4.0	15.0	-	13.5	6.0
Trade and Transport	12.0	4.5	17.0	2.5	17.0	7.5
Other Private Services	21.5	3.5	17.5	3.0	17.0	9.5
Government Services	10.5	5.5	10.5	5.5	13.0	10.5

Note: Data not available for other ASEAN countries.

Source: Michigan Model

The AEC Project

ASEAN has steadily reformed its commercial policies, roughly in line with its rising per capita incomes. Moreover, most of the region's transition economies have now adopted market-oriented commercial policies, stimulated in part by accession to ASEAN. But the data also suggest that significant tariff and non-tariff barriers remain. Given an increasingly competitive global context, their elimination has become the focus of the AEC project. Table 7 summarizes the principal initiatives of the Blueprint as well as the modeling methodologies we use to represent these in our CGE analysis (which will be discussed in further detail in Section II).

Table 7. Overview of the AEC Blueprint

Core Elements	Actions	Model Representation
A. Single Market and Production Base		
1. Goods	• Eliminate duties, NTBs • Simplify ROOs • Trade facilitation, customs integration, single window • Harmonize standards and regulations	• Lower tariffs • Lower goods non-tariff barriers
2. Services	• Remove restrictions on service trade • Allow at least 70% equity participation • Schedule commitments for Mode 4 • Extend MRAs, liberalize financial services	• Lower service non-tariff barriers • Higher FDI flows
3. Investment	• Investment protection, facilitation, promotion, liberalization • Non-discrimination, national treatment	• Higher FDI flows
4. Capital	• Harmonize regulations • Promote cross-border capital raising	
5. Labor	• Facilitate movement of skilled and professional labor in cross-border trade • Enhance movement of students	• Lower service non-tariff barriers

	• Work toward harmonizing qualifications	
6. Priority sectors	• Projects in 12 priority sectors	
7. Food, agriculture, forestry	• Harmonize best practices, SPS, safety and quality standards, chemical use, regulation of products derived from biotechnology • Promote technology transfer	• Lower goods non-tariff barriers
B. Competitive Economic Region		
1. Competition policy	• Introduce competition policies and develop regional networks and guidelines	• Lower goods non-tariff barriers
2. Consumer protection	• Develop regional networks and guidelines	
3. Intellectual property rights	• Implement ASEAN IPR Action Plan • Promote regional cooperation	• Higher FDI flows
4. Infrastructure	• Facilitate multimodal transport • Complete Singapore-Kunming rail link • Integrated Maritime Transport, open sky policies, single aviation market • High-speed IT interconnections • ASEAN power grid, gas pipeline	• Lower service non-tariff barriers
5. Taxation	• Complete bilateral agreements	
6. E-commerce	• Adopt best practices and harmonize legal infrastructure	• Lower service non-tariff barriers
C. Equitable Economic Development		
1. SMEs	• ASEAN Blueprint of best practices	
2. Initiative for integration	• Technical assistance and capacity building in CLMV countries	
D. Integration in to the Global Economy		
1. Coherent approach	• Review FTA/CEP commitments • Establish coordination and possibly common external approaches	• FTAs with other economies
2. Supply networks	• International best practices and standards • Technical assistance	

Source: based on ASEAN (2007).

The Blueprint targets four objectives: (a) a single market and production base; (b) a highly competitive economic region; (c) a region of equitable economic development; and (d) a region integrated into the global economy. Within these areas, it identifies 17 core elements and 176 priority actions. For many actions, the Blueprint sets explicit implementation sub-periods within the overall 2008-2015 timeline. It sometimes references even more detailed plans and

agreements. For example, much additional planning has been already completed on initiatives such as the Singapore-Kunming railway, the ASEAN Power Grid, and the ASEAN Open Skies Agreement.

The implementation of such a comprehensive undertaking would be challenging under any conditions, but in ASEAN it must proceed in the context of rapidly transforming national policy structures and wide regional gaps in development and capacity. Moreover, the principal coordinating mechanism of the ASEAN integration effort, the ASEAN Secretariat, is very small; its operating budget in 2008 was only US$9 million and it was restricted by ASEAN's policy of funding common expenditures with equal contributions by all members. Although leaders recognize the implications of these constraints, they have yet to agree on a way to relax them.

To stimulate progress in this setting, the Secretariat has drafted an "AEC Scorecard" to assess implementation of the measures scheduled under the Blueprint at the end of each sub-period. The first Scorecard report released in March 2010 summarized progress until the end of 2009 and found that implementation of the scheduled measures (110 in all) had reached 82%, 50%, 100% and 100% in the four Blueprint areas.

The effectiveness of implementation may not be clear for some time. The sub-period that ended in 2009 did not address the most difficult steps, yet it is already evident that the implementation of "behind the border" reforms (many of which fall in the second Blueprint area, the "competitive region" target) will be especially challenging. Some recent studies attempt to measure the full barriers remaining in each target area (Urata ERIA 2010). Monitoring such comprehensive measures, in addition to the Scorecard's approach of measuring the percentage of scheduled measures implemented, will be important for assessing progress.

II. Modeling Methodology

As a comprehensive strategy for deepening economic integration, the AEC comprises initiatives ranging from lowering barriers to trade and investment to harmonizing regulations and policies. This kind of deep integration promises to generate gains well beyond what could be obtained through the tariff liberalization objectives of AFTA, and as already noted, the anticipatory effect of the AEC may already be paying dividends through encouraging investment.

What ultimate benefits can ASEAN expect from these efforts? Despite the political and economic importance of this question, we are not aware of any study that has attempted to estimate the full effects of the implementation of the AEC Blueprint. We begin with a brief summary of existing work and then present the modeling approach we use to assess the potential impact of the AEC.

Previous CGE Studies of Deep Integration

Several past studies have examined the implications of reducing tariffs and NTBs in the ASEAN Free Trade Area (AFTA), which forms the core of the AEC. However, the measures articulated in the AEC Blueprint go well beyond the elimination of border barriers to create a "single market," encompassing also initiatives in trade facilitation (such as the alignment of standards),

improving the climate for FDI, liberalizing services trade, and concluding new trade agreements with external partners. The example of European integration suggests that a single market created through such initiatives not only generates gains from trade based on comparative advantage, but also gives rise to new horizontal trade based on economies of scale. Hence, comprehensive modeling approaches are needed to estimate the implications of deeper integration efforts such as the AEC.

An estimate of the differences between narrow measures of liberalization, such as the removal of tariff and obvious non-tariff barriers, and broad measures, such as improving customs clearance, aligning standards, lower transaction costs, and facilitation of international market access, is provided by Brooks, Roland-Holst and Zhai (2005). They use simulations to compare the impact of narrow and broad liberalization efforts on real income, exports, and terms of trade.[6] Under a narrow scenario limited to tariff changes, real income rises in the range of 0.9-2.9 percent for East Asia, 1.9-6.6 percent for Southeast Asia, and 0.3-0.6 percent for South Asia. Such magnitudes are typical of the literature. In the broad scenario they assume that non-tariff-related trade costs are around 120 percent and also cut these impediments into half over a twenty-year period for East Asia, Southeast Asia and South Asia.[7] These assumptions make the gains many times as large, in the ranges of 8.1-53.8 percent, 35.5-116.6 percent, and 10.4-22.4 percent for the three sub-regions, respectively. The AEC aims at efficiency increases similar to those in this broad scenario, and the comparison suggests that the gains could be a multiple of those obtained through AFTA.

Other studies of trade facilitation also show large gains. De Dios (2006) estimates that a 10 percent savings in transport costs will increase trade by approximately 6 percent. Wilson and Shepherd (2008) show that the gains from improvements in trade facilitation in ASEAN will yield far greater gains than comparable tariff reforms. For example, improving port facilities alone in ASEAN should expand trade by 7.5 percent, or $22 billion. Infrastructure improvements noted in the AEC Blueprint in Indonesia, Malaysia, the Philippines and Thailand should increase per capita GDP by 2-12 percent.[8]

A natural experiment for gauging the benefits of AEC is the EC's Single Market Programme (SMP). At the time the SMP was adopted, the EC was already a customs union, but it did not have a common commercial policy[9] and its markets were still segmented in various ways. The "Cecchini Report" (Cecchini 1988) estimated that the SMP would be to increase EC GDP by up to 6.5 percent. This gain would come on top of integration measures already in place after 30 years of regional cooperation. Economies of scale, seen as a key motivation for the EC single

[6] Brooks, Roland-Holst and Zhai (2005) model the Scenario 2 liberalization as an "iceberg effect," in which a fraction of goods and services "melt away in transit due to the trade costs" (p. 4, fn 4).
[7] It is important to note that this value is a guesstimate and is not derived systematically or empirically.
[8] As is discussed at length in Chapter 5, this assumes converge to the level of efficiency of the best performing ASEAN countries in this regard, which is Singapore. While 2-12 percent is a wide range (which is to be expected, given the difficulties associated with measuring efficient in this context), even the most conservative results are large: a 2 percent increase in per capita income is greater than estimates of the effects of AFTA, for example.
[9] The European Community did have a Common External Tariff, but NTBs and other controls varied widely across member countries. For example, while Italy and Germany applied the same tariff on Japanese auto imports, Italy only allowed in 3,000 Japanese cars per year, while Germany had no quantitative restrictions at all. This kind of diversity leads to significant market segmentation.

market and production base, accounted for a 2 percent increase in EC GDP. A direct comparison is not possible; the European project included measures that go beyond those incorporated in the AEC, and the AEC envisions steps that were not required in Europe. ASEAN has further to go, and potentially more to gain, from integration that Europe at the time of the Single Market. The AEC also places more emphasis on best practices than mere national treatment, and its effects might well be larger for some countries and areas.

Hertel, Walmsley, and Itakura (2001) analyze the potential gains from the Japan-Singapore FTA, a "new age", deep-integration initiative that has many of the measures outlined in the Blueprint. Moreover, since Japan's average tariff is less than 2 percent in manufactures and Singapore has a zero average tariff, all of the effects come from other dimensions of liberalization, making the exercise comparable to moving from AFTA to the AEC.[10] They develop a dynamic CGE model using an *ex ante* simulation but with some *ex post* features to estimate dynamic policy changes associated with a deep-integration accord. These include the harmonization of e-commerce standards, the liberalization of services, automating customs services in Japan (to be consistent with Singapore), and an improved climate for investment flows. Interestingly, this "new age" agreement leads to gains in *all* regions of the world, not only Japan and Singapore.

A CGE Model of the AEC

The CGE model we use in this study is based on a global general equilibrium model developed by van der Mensbrugghe (2005) and Zhai (2008). The model has its intellectual roots in a long tradition of multi-country, applied general equilibrium models (Shoven and Whalley, 1992; Hertel, 1997). A novel feature of the model is its incorporation of recent innovations in heterogeneous-firms trade theory into an empirical global CGE framework. The model features intra-industry firm heterogeneity in productivity and fixed cost of exporting, which enables us to investigate the intra-industry reallocation of resources and the exporting decision by firms, and thereby capture both the intensive and extensive margin of trade.

This model is especially appropriate for assessing the implications of deep integration efforts. Since the AEC addresses market impediments ranging from border barriers and restrictions on foreign investment to the harmonization of standards and policies across the economies, its successful implementation should bring major changes in the region's industrial structure. The model's monopolistically competitive industrial structure enables it to track how these changes will lead to additional varieties of goods becoming available to consumers in each market. Its scale-sensitive production function allows it to track productivity gains associated with the growth of the average firm. And its treatment of productivity variations among firms enables it to track how increased competitive pressures shift production from relatively unproductive firms to relatively productive ones. Thus, the model reflects gains associated with several recent advances in trade theory, including gains from adding varieties, achieving greater scale, and changing intra-industry distributions of firm productivity.

[10] Of course, this does not make them completely comparable, as external tariffs are greater than zero in the post-AFTA commercial policy regimes of the ASEAN Member States. Still, the point here is that tariff changes are insignificant for the simulation results.

The full specification of the model is described in Appendix I. It is calibrated to the GTAP Version 7 database (released in November 2008) and the 2004 base year of that dataset is updated to 2015 (the scheduled implementation date of the AEC) using IMF growth projections. The AEC, as earlier described in Table 7, is modeled in terms of these effects:

- Elimination of all remaining tariffs on goods trade. This is provided for by AFTA and by new AEC provisions that accelerate tariff reductions by progressively limiting the number of "excluded" categories.

- Reduction of non-tariff measures in goods. We simulate this effect with reference to disaggregated trade restrictiveness indexes (which express barriers as tariff equivalents) estimated by the World Bank.[11]

- Improvements in the climate for FDI. We handle these effects outside the CGE framework, by estimating how upgrading the investment climate to regional "best practices" is likely to increase FDI in each ASEAN economy. The methodlogy is described in Appendix 1. We then introduce the estimated FDI effects in the CGE model, where the investment generates additional production and exports.

- Liberalization of trade in services. We reduce estimated barriers in five sectors: utilities, construction, trade transport, private services (including financial services), and government services. Our initial levels of protection are based on tariff equivalents in service trade calculated by the Michigan Model team (see Table 5).[12]

- Trade facilitation to reduce trade costs. We assume that trade costs will fall by 5 percent of the value of trade as a result of the AEC. This is a conservative assumption—the other studies cited indicate that the impact of trade facilitation could be larger—but consistent with our effort to generate "lower bound" estimates. The reduction in trade costs is modeled using an "iceberg" approach.

III. Implications of the AEC

The scenarios show, in a sequential manner, how the components of the AEC contribute to overall benefits. The relationship of Blueprint target areas to modelling representations is shown in Table 7.

Scenarios

We conduct the analysis by comparing five scenarios that introduce the elements of the Blueprint and new international agreements with external partners. As we earlier noted, an important objective of the AEC is to make the region more attractive as a partner for other countries and regions and the benefits of these efforts will be fully realized if ASEAN concludes additional

[11] http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21085342~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html

[12] We are grateful to Alan Deardorff, Robert Stern, and Kozo Kiyota for supplying these data to us.

free trade agreements. This possibility is addressed in scenarios that explore FTAs between ASEAN and EAS partners, the United States and the European Union. Negotiations with EAS partners have been mostly concluded and are underway with Europe. The United States has also expressed increased interest in deepening relations with ASEAN; it signed a Treaty of Amity and Commerce with ASEAN in 2009 and is likely to join the East Asian Summit.

The five scenarios are summarized in Table 7. They were implemented relative to an estimated 2015 baseline which incorporates the general expansion of ASEAN economies (based on IMF estimates) but freezes trade policy at 2004 levels.

Table 8. Scenario Definitions

No.	Name	Description
1	AFTA	Completion of the AFTA agreement through the elimination of remaining intra-ASEAN tariffs. Since the base year of the data is 2004, these effects may include changes that have been already implemented by the time of this writing.
2	AFTA+	Intensification of AFTA through the removal of NTBs, including regulatory barriers such as diverging standards and testing requirements. In the absence of detailed information on such barriers, they are modelled by assuming a horizontal reduction in trade costs of 5 percent of trade values.
3	AEC	Reforms that improve the investment climate. They are modeled by increasing FDI inflows to levels expected in "model" countries with a strong investment climate (the methodology is described in Annex II).
4	AEC+	Bilateral FTAs between the AEC and East Asian Summit countries (Australia, New Zealand, India, Japan, China, South Korea). Barriers remain in place among the non-ASEAN partner economies (these too would be eliminated under the proposed Comprehensive Economic Partnership of East Asia).
5	AEC++	Further bilateral FTAs between the AEC and the United States and the European Union. Barriers remain in place among non-ASEAN partners.

Welfare gains from implementing the AEC

The welfare effects of the five scenarios are presented in Table 9 in US$ billions and as percentages of GDP.[13] The estimated benefits are substantial—similar in magnitude to those estimated for the European Single Market.

[13] All numbers are based on an "equivalent variation" approach to estimating the changes in welfare.

Table 9. Welfare Gains Relative to the Baseline (2015)

A. US$billions, 2004 price, EV

	AFTA	AFTA+	AEC	AEC+	AEC++
ASEAN	10.1	38.0	69.4	115.6	151.0
Cambodia	0.3	0.5	0.6	0.7	1.2
Indonesia	1.0	6.2	27.6	36.5	43.2
Laos	0.0	0.1	0.2	0.2	0.2
Myanmar	0.0	0.2	0.6	0.7	1.4
Malaysia	2.7	2.9	5.7	21.1	27.9
Philippines	0.9	2.2	4.5	4.4	5.9
Singapore	2.6	14.0	15.1	18.1	19.0
Thailand	1.6	9.8	12.2	19.5	25.8
Vietnam	0.9	1.6	2.4	13.8	25.7
Brunei	0.2	0.4	0.5	0.6	0.7
Partners					
China	0.4	-4.6	-7.8	-6.5	-12.2
Japan	0.1	-1.3	-1.6	9.2	7.3
Korea	-0.2	-1.4	-2.7	10.6	9.1
India	0.8	0.1	-0.8	23.9	23.5
Australia	0.0	-0.2	0.2	0.3	0.1
New Zealand	-0.1	-0.1	-0.1	-0.1	-0.2
USA	0.2	-2.8	-1.8	-3.7	-3.6
Europe	-0.3	-7.1	-2.3	-5.4	-6.2
World	11.4	19.4	52.7	143.4	166.8

B. EV as % of baseline GDP

	AFTA	AFTA+	AEC	AEC+	AEC++
ASEAN	0.8	2.9	5.3	8.9	11.6
Cambodia	2.7	5.4	6.3	7.2	12.3
Indonesia	0.2	1.4	6.2	8.2	9.7
Laos	0.6	2.5	3.6	3.8	4.6
Myanmar	0.3	1.2	4.4	4.8	9.3
Malaysia	1.4	1.5	3.0	11.2	14.7
Philippines	0.6	1.6	3.2	3.2	4.3
Singapore	1.6	9.0	9.7	11.6	12.2
Thailand	0.6	3.9	4.9	7.8	10.4
Vietnam	1.1	1.8	2.8	16.0	29.8
Brunei	2.6	5.4	7.0	9.3	10.6
Partners					
China	0.0	-0.1	-0.2	-0.1	-0.3
Japan	0.0	0.0	0.0	0.2	0.1
Korea	0.0	-0.1	-0.3	1.1	0.9
India	0.1	0.0	-0.1	1.7	1.6
Australia	0.0	0.0	0.0	0.0	0.0
New Zealand	0.0	-0.1	-0.1	0.0	-0.1
USA	0.0	0.0	0.0	0.0	0.0
Europe	0.0	0.0	0.0	0.0	0.0
World	0.0	0.0	0.1	0.3	0.3

Consider first the effects of realizing the benefits of the AEC excluding the "knock on" effects that derive from strengthening relations with extra-regional partners. These effects are summarized in the first three columns of Tables 9. Some key implications:

- The full implementation of the AEC (simulated by Scenario 3 and reported in the middle column of Table 9) would raise ASEAN real incomes by $69.4 billion, or 5.3 percent over 2004 baseline income. As suggested by the earlier review, these are large magnitudes compared to those usually estimated in FTA studies.

- Much of the increase in real incomes is attributable to features of the AEC that go beyond AFTA. The overall income effects of the AEC are seven times as large as those attributable to the remaining liberalization under AFTA. Roughly half of this difference comes from trade facilitation (difference between AFTA and AFTA+) and half from investment facilitation (difference between AFTA+ and the AEC).

- All ASEAN members gain from the AEC, with largest experiencing the largest absolute gains. The percentage gains range from 2.8 percent increase in real income (Vietnam) to 9.7 percent (Singapore)[14]. The benefits do not appear to be related to per capita income levels; for example, Cambodia and Singapore, countries at opposite ends of the ASEAN income spectrum, both have unusually large gains.

- Although ASEAN's external partners experience losses due to the AEC's trade and investment diversion effects, these are small ($16.7 billion) compared to ASEAN's gains and thus the AEC generates a substantial net global benefit ($52.7 billion). Among external partners, China, Korea and Europe experience the largest losses, but in no case does the loss exceed one-tenth of one percent of GDP.

Welfare gains from external partnerships

As we emphasized, AEC seeks to accelerate the region's integration into global markets. These benefits are explored in the last two scenarios that envision FTA agreements between the strengthened ASEAN and its principal partners (AEC+ and AEC++). The results show:

- FTAs with major partners more than double the benefits of the AEC to $151.0 billion, or 11.6 percent of ASEAN GDP. Slightly more than half of the additional benefits (or about 30% of total benefits) derive from agreements with EAS partners and slightly less than half from FTAs with the United States and Europe.

- The benefits from deepening external integration are larger, as expected, for ASEAN economies with the strongest linkages outside the region (for example, Malaysia, Thailand

[14] To give an insights into the model's operation, Singapore's large projected gains derive from three factors: (1) given the openness of the Singaporean economy, the reduction in trade costs generates a large benefit, roughly 40 percent of the county's total gain; (2) Singapore's NTBs in agriculture are reasonably high (13.2) and their elimination produces significant benefits; and the comprehensive tariff removal under AFTA provides Singaporean exporters with a significant terms of trade improvement.

and Vietnam) and smaller for those that are mainly regionally oriented (for example, Brunei and Laos).

- Most of the external economies that form FTAs with ASEAN now show benefits; in other words, their direct gains overcome the trade and investment diversion effects from the AEC. Global gains rise to $166.8 billion and exceed the gains of ASEAN, indicating that the AEC project, once leveraged through external partnerships, also produces net benefits for the rest of the world.

- Foreign partners that especially benefit from the AEC's external agreements include India, Japan and Korea. However, some countries (especially China) would be negatively affected, since AEC agreements would make the region more competitive relative to China in US and European markets. But the slight losses that appear under this scenario (for China, the United States and Europe) could have the silver lining of stimulating agreements that open markets worldwide.

These findings underscore the importance of keeping the AEC open and testify to the wisdom of leaders in ensuring that the AEC not only promotes regional connections but also the region's integration into the global economy.

Implications for international trade

Consider next the implications of the AEC for international trade. The results of the five scenarios are summarized in Table 10, which reports percentage changes for exports and imports. Some key results are:

- ASEAN exports will expand by 42.6% with the implementation of the AEC, while imports will expand by 35.4%. The result will be a small increase in the region's steady-state trade surplus, caused by the increased FDI inflows that the AEC is assumed to generate. Those inflows will give rise to steady-state outflows of investment income (profits), which need to be covered by a larger trade surplus.

- At the country level, the projections indicate a relatively low export increases (10.4-43.7%) for the region's most export-oriented economies (Brunei, Malaysia, Thailand, Singapore) and relatively high increases (55.4-101.1%) for the CLMV economies.

- As in the case of welfare gains, adding FTAs with major trade partners roughly doubles the effects of implementing the AEC alone. Now ASEAN's exports would increase by 88.9%, with Vietnam's increases exceeding 200%. Again the results are largest for the CLMV economies.

Table 10. Effects on International Trade (2015)

A. Change in exports, % from baseline

	AFTA	AFTA+	AEC	AEC+	AEC++
ASEAN	6.5	31.2	42.6	70.9	88.9
Cambodia	37.0	70.3	77.6	86.8	113.9
Indonesia	6.5	22.5	53.6	84.0	109.5
Laos	41.0	85.0	101.1	103.6	110.3
Myanmar	8.7	43.9	65.8	100.7	163.2
Malaysia	4.5	26.4	35.6	56.3	65.4
Philippines	2.9	25.4	45.4	67.3	82.4
Singapore	4.5	39.7	43.7	61.1	64.9
Thailand	8.8	27.8	33.6	63.5	85.5
Vietnam	15.4	49.0	55.4	160.1	239.5
Brunei	2.1	9.8	10.4	8.6	13.7
Partners					
China	0.0	-0.7	-0.8	7.5	6.9
Japan	-0.1	-0.6	-0.5	8.4	7.6
Korea	-0.2	-1.1	-1.5	7.1	6.6
India	0.1	-0.1	-0.3	57.4	57.0
Australia	-0.1	-0.5	-1.0	5.3	4.4
New Zealand	-0.3	-0.5	-0.6	6.1	5.1
USA	0.0	-0.3	-0.8	-1.4	2.9
Europe	-0.1	-0.3	-0.9	-1.3	0.6
World	0.4	1.8	2.1	6.4	8.4

B. Change in imports, % from baseline

	AFTA	AFTA+	AEC	AEC+	AEC++
ASEAN	7.0	32.7	35.4	67.8	86.4
Cambodia	39.5	76.5	82.0	93.4	135.3
Indonesia	7.1	24.3	17.6	60.0	86.0
Laos	32.8	70.0	73.3	75.7	82.3
Myanmar	7.8	39.7	45.1	78.9	132.9
Malaysia	6.0	34.2	40.6	70.9	81.4
Philippines	3.0	27.2	34.0	55.8	69.9
Singapore	4.4	34.5	38.1	54.5	58.1
Thailand	9.8	31.5	34.7	72.2	97.8
Vietnam	14.3	43.1	47.1	129.8	197.4
Brunei	6.1	28.1	30.1	27.2	41.8
Partners					
China	0.0	-0.8	-0.8	7.7	6.9
Japan	0.0	-0.5	0.1	10.8	9.9
Korea	-0.1	-0.9	-1.2	8.1	7.6
India	0.1	0.0	-0.2	40.8	40.8
Australia	-0.1	-0.4	0.3	7.5	6.6
New Zealand	-0.4	-0.5	-0.3	8.4	7.3
USA	0.0	-0.1	0.2	0.3	3.3
Europe	0.0	-0.1	0.1	0.4	2.4
World	0.4	1.8	2.2	6.6	8.6

This suggests that the AEC, as intended, would stimulate trade and the integration of ASEAN's economies with each other and with the global economy. Importantly, its effects would be strongest for the region's newest and poorest economies. Thus, the deepening of regional and global linkages could also help to address the ASEAN's political goal of reducing regional inequalities.

Implications for sectors

The AEC project will also have important structural implications. Table 11 shows changes in sectoral output under each scenario for ASEAN as a whole. The changes are large enough to suggest significant adjustments in employment and investment patterns. They also provide insight into the types if political challenges that are likely to be involved in implementation. The principal results are:

- Manufacturing output—spanning highly tradable sectors in which integration will create more trade and new sources of comparative advantage—is likely to boom. The modern manufacturing industries—electrical equipment, machinery, metals—should lead the expansion with increases in the 30 percent range.

- Raw materials output will mostly shrink relative to the baseline. (Note that since the baseline projects growth, these negative values imply less rapid growth rather than output declines.) ASEAN economies will become more specialized in products that they produce at relatively low cost (manufactures) at the expense of those which they produce are relatively high cost (raw materials).

- The service sectors will mostly increase relative to the baseline, reflecting their general growth and linkages with manufacturing. But despite the service initiatives built into the AEC, they do not appear to benefit as extensively as manufacturing.

- The specialization effects noted would be amplified by external FTAs. The additional trade that would result from the AEC+ and AEC++ scenarios is likely to increase demand for manufactures (especially textiles, apparel, electrical equipment and machinery) while producing mixed to decreased demand for raw materials and some services (relative to the baseline).

Table 11. Effects on Sectoral Output, 2015
(% change from baseline)

	AFTA	AFTA+	AEC	AEC+	AEC++
Primary materials					
Paddy rice	-1.2	-3.5	-4.6	-3.8	-1.6
Grains, other	-2.7	0.7	-5.0	-13.4	-24.5
Crops, other	0.0	-1.0	-2.8	4.3	1.6
Livestock	1.8	0.1	-0.2	5.8	6.5
Natural resources	-0.3	-2.5	-3.1	-4.1	-5.3
Mining	0.1	-0.5	-1.1	-2.3	-2.8
Manufacturing					
Food	8.6	9.8	12.8	53.7	50.8
Textiles	5.8	8.2	27.3	35.4	81.4
Wood products	1.8	-4.7	3.0	-11.1	-16.7
Apparel	5.7	9.0	18.4	90.0	194.3
Chemicals	2.0	4.1	12.6	13.8	13.4
Metals	1.1	18.2	31.9	4.1	9.2
Electrical equipment	-1.9	23.4	35.9	47.0	51.8
Machinery	1.2	21.3	34.3	39.2	37.7
Vehicles	3.6	13.9	22.8	-5.7	-6.8
Other manufactures	0.3	2.3	10.3	7.3	7.0
Services					
Utilities	0.4	1.4	8.6	4.9	5.7
Construction	0.2	3.6	7.3	13.0	14.5
Trade, transport	-0.7	-3.2	1.9	0.3	0.3
Private services	-1.5	-7.7	1.7	-3.9	-9.4
Government services	0.0	-0.6	-0.9	-1.0	-1.0

These effects suggest that the implementation of the AEC and the external agreements that would multiply its benefits will have implications for structural adjustments within ASEAN economies. We have not studied the distributional implications fully, but the slow growth of traditional sectors (agriculture, raw materials and services) and the fast growth of modern manufacturing could adversely affect the income distribution. These effects should not be viewed as an argument against the AEC, but they do have implications for national social policies and deserve additional study.

IV. Conclusions

The AEC is a highly ambitious effort to enhance ASEAN's global competitiveness. Through the free flow of goods, services, and skilled labor, the project intends to establish a efficient "single market and production base" encompassing nearly 600 million people and $2 trillion in production.

Estimating the economic effects of such a comprehensive project is difficult and speculative. While the implications of the liberalization of goods trade are relatively well understood, the effects of reducing varied impediments to flows of services and investment are less so. Other aspects of the AEC project—the free movement of skilled labor, extended cooperation in capital market development, and the implications of ASEAN increased clout for international

negotiations—are even more difficult to assess. This study is based on a more comprehensive model than is the case with most other studies of regional integration, but the results are still best viewed as rough, lower-bound estimates of a complex undertaking.

Our main conclusions are:

- The value of the AEC is likely to be large. ASEAN economic welfare could rise by 5.3 percent, or seven times as much as would be the effect of completing AFTA alone.

- Stronger links with the rest of the world—an indirect effect of a successful AEC—would more than double the gains to 11.6 percent. A little more than half of these additional gains would come from FTA agreements with East Asian neighbors and a little less than half from FTAs with the United States and the European Union.

- All ASEAN members would benefit from the AEC. There is no clear income pattern to these gains but some results suggest that the AEC will help to speed the integration of the CLMV countries into the region.

- Despite some trade and investment diversion effects, the world as a whole would also benefit from the AEC and especially so if the AEC leads to new external FTAs. In the latter case, the AEC would generate net gains for many partners.

- The AEC should lead to robust growth in trade with both ASEAN partners and third countries. The AEC is also likely to result in a marked increase in ASEAN's manufacturing output and some decrease in its raw materials output (relative to the baseline). Effects on services would be mostly positive but more mixed.

Overall, the AEC would yield benefits similar to those of the European Union. This is surprising, since the ASEAN economies are less closely integrated today—and are arguably less complementary—than were those of the EU at the outset of the EU initiative. But given the relatively early stage of development of some ASEAN members, existing barriers to trade are greater and their elimination could yield larger productivity gains relative to current trade. These benefits appear to outweigh the effect of lower initial integration.

As ASEAN's economies continue to mature and work more closely together, the benefits of the AEC should grow. With rising incomes and trade, ASEAN is also likely to develop the horizontal, inter-industry linkages that have come to characterize the later stages of the European single market effort. This promises further benefits in the future, in addition to those captured in our modeling.

There is little doubt, however, that the implementation the AEC will require great political commitment. In addition to its sheer complexity, the project will require structural adjustments that are bound to create political tensions. Yet our results show large returns to overcoming these challenges, and in today's difficult global environment, few policy alternatives could promise benefits on a similar scale.

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Appendix I

The CGE Model

Production and Trade

Agriculture, mining and government services sectors are assumed to exhibit perfect competition. In each of these sectors, a representative firm operates under constant returns to scale technology. Trade is modeled using the Armington assumption for import demand. Manufacturing and private services are characterized by monopolistic competition, and their structure of production and trade follows Melitz (2003). Each sector with monopolistic competition consists of a continuum of firms that are differentiated by the varieties they produce and their productivity. Firms face fixed production costs, resulting in increasing returns to scale. There are also fixed costs and variable costs associated with exporting activities. On the demand side, agents have Dixit-Stiglitz preference over the continuum of varieties. As each firm is a monopolist for the variety it produces, it sets the price of its product at a constant markup over marginal cost. A firm enters domestic or export markets if and only if the net profit generated from such sales is sufficient to cover fixed cost. This zero cutoff profit condition defines the productivity thresholds for firm's entering domestic and exports markets, and in turn determines the equilibrium distribution of non-exporting firms and exporting firms, as well as their average productivities. Usually, the combination of a fixed export cost and a variable (iceberg) export cost ensures that the exporting productivity threshold is higher than that for production for domestic market, so that only a fraction of firms with high productivity export. These firms supply for both domestic and export markets. The number of firms in the monopolistic sectors is assumed to be fixed.

Production technology in each sector is modeled using nested constant elasticity of substitution (CES) functions. At the top level, the output is produced as a combination of aggregate intermediate demand and value added. At the second level, aggregate intermediate demand is split into each commodity according to Leontief technology. Value added is produced by a capital-land bundle and aggregate labor. Finally, at the bottom level, aggregate labor is decomposed into unskilled and skill labor, and the capital-land bundle is decomposed into capital and land (for the agriculture sector) or natural resources (for the mining sector). At each level of production, there is a unit cost function that is dual to the CES aggregator function and demand functions for corresponding inputs. The top-level unit cost function defines the marginal cost of sectoral output.

Income Distribution, Demand and Factor Markets

Incomes generated from production accrue to a single representative household in each region. A household maximizes utility using Extended Linear Expenditure System (ELES), which is derived from maximizing the Stone-Geary utility function. The consumption/ savings decision is completely static. Savings enter the utility function as a "good" and its price is set as equal to the average price of consumer goods. Investment demand and government consumption are specified as a Leontief function. In each sector a composite good defined by the Dixit-Stiglitz aggregator over domestic and imported varieties is used for final and intermediate demand.

All commodity and factor markets are assumed to clear through price adjustment. There are five primary factors of production. Capital, agricultural land and two types of labor (skilled and unskilled) are fully mobile across sectors within a region. In natural resource sectors of forestry, fishing and mining, a sector-specific factor is introduced into the production function to reflect the resource constraints. For all primary factors, their stocks are fixed.

Macro closure

There are three macro closures in the model: the net government balance, the trade balance, and the investment and savings balance. We assume that government consumption and saving are exogenous in real terms. Any changes in the government budget are automatically compensated by changes in income tax rates on households.

The second closure concerns the current account balance. In each region, the foreign savings are set exogenously. With the price index of OECD manufacturing exports being chosen as the numéraire of the model, the equilibrium of foreign account is achieved by changing the relative price across regions, i.e. the real exchange rate.

Domestic investment is the endogenous sum of household savings, government savings and foreign savings. As government and foreign savings are exogenous, changes in investment are determined by changes in the levels of household saving. This closure rule corresponds to the "neoclassical" macroeconomic closure in the CGE literature.

Appendix II
The Effects of the AEC on FDI

How much of an increase in FDI can be expected from the AEC? An empirical estimate of the potential for enhancing ASEAN foreign investment inflows could be developed in two ways. The simpler method—the one feasible within the time constraints of this study—is to ask how ASEAN compares to "frontier" foreign investment levels, that is, to FDI levels that prevail in the world's most successful FDI-attracting economies. A more complex (but likely more accurate) method would involve estimating a structural model of FDI inflows that attributes variations in determinants that are likely to be affected by the AEC, including, for example, the region's effective scale, ranking on business indicators, and openness to trade.

In any case, our current analysis is limited to estimating frontier investment with reference to the global distribution of FDI stocks. To make the concept of the "frontier" operational, we estimated three different measures of state-of-the-art performance, all expressed in terms of the ratio of FDI stock to GDP. These measures are

- The average of the three highest years of FDI/GDP ratios experienced by a particular economy in the past;
- The 75^{th} percentile of the global distribution of FDI/GDP ratios; and
- The point half-way between the economy's current ratio and the 90^{th} percentile of the global distribution.

In all cases, economies with actual ratios exceeding the frontier estimate were assumed to remain at their higher ratios.

The results of applying these alternative measures of the frontier are reported in Table A1. The differences are substantial, ranging from 28 percent to 63 percent of baseline FDI stocks. Relative to actual 2006 inward FDI stocks, these would amount to a range of $117-$264 billion of additional stocks. Increases are especially large for Indonesia and the Philippines—both big economies that do not perform especially well with respect to FDI and could gain substantial productivity and credibility from deeper integration into ASEAN. All economies would gain FDI by moving to the frontier. The exception is Singapore under some measures as its inward FDI stocks are already near the very top of the global distribution.

Table A1. Effects of the AEC on FDI Stocks
($ millions)

	Actual FDI stock (2006)	Alternative estimated stocks (2006)		
		Top 3 years	75th percentile	1/2 to 90th
ASEAN	420,025	536,993	684,178	643,649
Brunei	9,861	19,057	15,312	15,312
Cambodia	2,954	3,245	3,481	3,969
Indonesia	19,056	77,545	178,794	134,655
Lao	856	1,209	1,686	1,599
Malaysia	53,575	90,704	73,067	78,074
Myanmar	5,005	7,165	6,378	7,280
Philippines	17,120	17,849	57,364	48,757
Singapore	210,089	211,070	210,521	210,521
Thailand	68,058	68,928	101,180	104,599
Vietnam	33,451	40,221	36,395	38,883

Source: UNCTAD and simulations described in text.

What could be the welfare gains associated with such increases in FDI stocks? Answering this question requires making further assumptions. The key point is that much of the return of FDI-invested companies represents gains that accrue to foreign investors rather than to the host economy. But the host economy will benefit too—through higher tax collections, technology transfers, human capital investments, connections to foreign markets, and possibly a wage premium that is often associated with foreign companies. Upstream or downstream links by the foreign-invested firm may generate further opportunities for income and profit in the host country. Overall a rough estimate might be that host-economy benefits amount to an annual 5 percent return on FDI stocks. Given this, the benefits associated with the FDI increases calculated in Table A1 will be in the annual $6-$13 billion range, or in the range of 0.5-1 percent of annual ASEAN GDP.

The dynamic effects of serving as a magnet for FDI might be greater. Sustained connections with leading foreign companies and markets are likely to increase not just current productivity but also the rate of productivity growth. They should also ensure an increased flow of "economic intelligence" that is, information that might help the region adapt more rapidly to changing markets and technologies around the world. And close links with foreign companies could also help to cement the region's relations with their source economies, helping to ward off the bouts of criticism and protectionism that sometimes accompany intense commercial relationships.