

Sulamaa, Pekka; Widgrén, Mika

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Asian regionalism versus global free trade: A simulation study on economic effects

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No. 985

Pekka Sulamaa* – Mika Widgrén**

ASIAN REGIONALISM VERSUS GLOBAL FREE TRADE: A SIMULATION STUDY ON ECONOMIC EFFECTS

* The Government Institute for Economic Research (VATT)
Email: Pekka.Sulamaa@vatt.fi

** Turku School of Economics and Business Administration, Turku Finland,
CEPR and CESifo
Email: Mika.Widgren@tukkk.fi

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ABSTRACT: This paper evaluates and compares the economic effects of global liberalization of world trade and regional integration scenario in which an Asian trading block is emerging. The evaluation is based on computable general equilibrium model GTAP (global trade analysis project) that has been widely used in analyses of big regime changes in world economy. The results show that global free trade is better for all regions in the investigation. Compared to the current trade regime, that does not hold since e.g. the new EU member states would be worse-off. The biggest winners of global free trade are Asian countries, Brazil and developing countries.

Keywords: free trade, regionalism, GTAP model

JEL: F15, F17

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TIIVISTELMÄ: Tutkimuksessa arvioidaan Aasian regionalismin taloudellisia vaikutuksia ja verrataan niitä globaalin vapaakaupan skenaarioon. Analyysi perustuu laskettavaan yleisen tasapainon GTAP-malliin (global trade analysis project). Tulosten mukaan globaali vapaakauppa on Aasian regionalismia parempi vaihtoehto kaikkien tarkasteltavien alueiden osalta. Verrattuna nykytilanteeseen tämä ei kuitenkaan päde, koska esimerkiksi NAFTA:lle ja myös uusille EU-maille globaali vapaakauppa voi olla nykytilannetta huonompi. Globaalin vapaakaupan suurimpia voittajia ovat Aasian maat, Brasilia sekä kehitysmaat.

Asiasanat: vapaakauppa, regionalismi, GTAP-malli

JEL: F15, F17

1 Introduction

From the perspective of international trade, globalization means multilateral removal of all trade barriers. At extreme it implies formation of global free trade area. Although the General Agreement on Tariffs and Trade (GATT) system and its 1995 institutionalized form WTO have been working relatively well towards the goal of achieving free trade in the world, the number of regional and bilateral free trade agreements has recently increased dramatically. This has been due to emerging regionalism both in Asia and Americas and bilateral free trade agreements between the European Union (EU) and the former socialist countries in Central and Eastern Europe.¹ However, in 2004, the accession of eight ex-socialist countries, Cyprus and Malta to the EU reduced the number of bilateral free trade agreements but not the extent of regionalism.

In the recent trade literature, one very often posed question is whether regional arrangements work as building blocs or stumbling blocs in a way towards global free trade. Regional trading blocks do not necessarily have incentives to freer trade at multilateral basis as this might weaken their ability to exploit the outside countries by pursuing optimal tariff policy.² One reason why liberalization at multilateral global level might be successful is the reciprocity of global trade talks. As (big) exports markets are more important from politicians' point of view they are ready to exchange import protection to export market access. If all negotiators are doing the same reciprocity makes multilateral liberalization successful once it has started rolling (see e.g. Baldwin 2004).

Krugman (1991, 1993) builds a model where the World is divided into symmetric trading blocks that pursue optimal tariff trade policy against other trading blocks. He finds that the welfare minimizing number of trading blocks is three whereas welfare is maximized in global free trade (one trading block) or atomistic situation in which the World is divided into (infinitely) many small trading blocks. He thus argues that the World with no trade agreements at all or global free trade are both better from the World welfare point of view than any configuration of regional arrangements.

More optimistic view is represented by Ethier (1998) who argues that expanding regional integration might also boost multilateral trade negotiations at the global level. He argues that regionalism results from successful global multilateral integration. The domino theory of regionalism introduced by Baldwin (1995) states that falling trade barriers in one set of countries triggers a fall in the trade barriers of other countries. Applied to Asia Baldwin (2005) argues that if e.g. Japan and Korea form an FTA integration will spread all over the region leading to wider and wider Asian trading block.

In this paper, we simulate the relationship between regionalism and multilateral global free trade. Our points of departure are the current situation where the impact of EU enlargement has been taken into account and global free trade where all trade barriers have been abolished. In between, we evaluate the economic effects of different Asian regionalism scenarios that would create a three-polar trading system that was argued to be the welfare minimizing solution in Krugman (1991). We then compare these scenarios to the current state of affairs and global free trade and discuss potential implications.

¹ These are often called Europe agreements. The eastern enlargement of the EU has been analyzed in Baldwin et al. (1997), Sulamaa & Widgrén (2004) and Vaitinen (2004). The latter study also investigates the impact of liberalization of trade in agricultural products.

² Bhagwati and Krueger (1995) is an example of the stumbling block view, Summers (1991) and Baldwin (2005) are examples closer to the building block view.

2 The GTAP model and database

The Global Trade Analysis Project³ (GTAP) is a multi-region, computable general equilibrium (CGE) model. The inter-regional linkages originate from bilateral trade flows, while intra-industry linkages are captured by the regional input-output structure. The associated GTAP database covers bilateral trade data, structure of production, consumption and intermediate use of commodities and services. The latest version of the database, GTAP 6 Beta, includes 78 different regions⁴ and 57 different sectors of production.

Macroeconomic data (GDP, private consumption, government consumption, and investment) are used in updating the input-output tables to a common reference year – 2001. The primary source of 2001 macroeconomic data used in the GTAP 6 Data Base is the World Bank.

Reconciled bilateral 2001 merchandise trade data is based on COMTRADE data. Services trade data was updated to 2001 using the IMF Balance of Payments Statistics.

GTAP model computes money metric equivalent of aggregate per capita utility for a region (using the regional household's utility function). The regional household's Equivalent Variation (EV) which is the difference between the expenditure required to obtain the new, post-simulation level of utility at initial prices.

The standard GTAP-model is a multi-region, applied general equilibrium model, with perfect competition and constant returns to scale. Imports are differentiated by their source from domestic goods, that is, the Armington assumption is made on bilateral trade. The standard model has some salient features that distinguish it from other CGE models: a presentation of private household preferences with a non-homothetic constant-difference-of-elasticity (CDE) functional form, an explicit treatment of international trade and transport margins, and a global banking sector which intermediates between global savings and consumption.

Each industry is represented by a single homogeneous commodity. The basic model includes three factors of production: labor, capital, and land. Labor and capital are mobile across domestic sectors, while land is assumed to be used only in agricultural sectors. Capital is traded internationally like intermediate inputs, while labor and land are not mobile across borders.

The model gives users a wide range of closure options (choosing which variables are exogenous), including a selection of partial equilibrium closures which facilitate comparison of results to studies based on partial equilibrium assumptions.

Regional Household

In each region, there is a regional household whose Cobb-Douglas preferences are defined over composite private expenditures, composite public sector expenditures and savings. The regional household derives income from ownership and sales of primary factors of production - capital, skilled and unskilled labor, land and natural resources. It turns out that the inter-temporal, extended linear expenditure system could be derived from an equivalent, static maximization problem, in which savings enters the utility function (Howe, 1975). This result provides a justification for the inclusion of savings in the regional utility function.

³ See (<http://www.gtap.agecon.purdue.edu>)

⁴ Of which 56 are primary regions and 10 composite regions.

Private expenditures are governed by a Constant Difference of Elasticity (CDE) function which was first proposed by Hanoch (1975). The CDE function has the desirable property that the resulting preferences are non-homothetic and is more parsimonious in its parameter requirements than functional flexible forms. It can also be shown that the CES and the Cobb-Douglas are special cases of the CDE function. Government expenditures are governed by a Cobb-Douglas preference function. Finally, there is inter-industry demand whose technical specifications are described by the usual input-output matrix.

Production

Production is presented by a multi-level production function. The upper nest is a Leontief production function involving value added and intermediate inputs. Value added is produced through a Constant Elasticity of Substitution (CES) function of the three primary factors of production. Each intermediate input is in turn produced using domestic and imported components (the Armington assumption) with the technical process described by a CES function. Finally, imported components are a mix of imports from the other regions in the global model with the technical process again described by a CES function.

Households own all factor supplies - land, natural resources, capital, skilled and unskilled labour and sell their services to firms. In the GTAP model, sluggishness of some factors is allowed so that it is possible for factor prices not to be equalized within a region. Firms are supposed to sell output and purchase inputs (whether primary factors or intermediates) in competitive markets. Hence, firms make no economic profits.

Labor and capital are mobile across domestic sectors, while land is assumed to be used only in agricultural sectors. Capital is traded internationally like intermediate inputs, while labour and land are not mobile across borders.

The GTAP model allows for factor taxes, production and consumption taxes, export taxes and import tariffs which are in turn distinguished by production sector, by agent (regional household, firm, government) and by region.

Savings and Investment

Given the Cobb-Douglas assumption about preferences of the regional household, savings are a constant proportion of regional household income. The pool of savings is what becomes available for investments. There is a capital goods sector in each region, which produces the investment goods. The rate of return on capital goods is assumed to be inversely related to the stock of capital. The allocation of investment across regions and sectors is done in such a way that expected regional rates of return change by the same percentage. In the model, the pooling of savings and the global allocation of investment are costless.

The GTAP model does not contain a financial sector. An investment is therefore represented by a unique investment good that is not form-specific, sector-specific, or region-specific. As such, the model framework has a limitation in the flow analysis of FDI. The model is strongly relevant, though, to general equilibrium analyses of an FDI-related increase in a region's capital stock, and of a technology spillover.

Macro Framework

In the GTAP model, private households and government are treated as a single decision-making economic agent called the regional household. Private households supply productive

factors (land, labour, and capital) to producers, and obtain factor income in return. Government revenues come from household income taxes, producers' taxes, and taxes on international transactions (minus subsidies if they exist). Regional income is defined as the sum of private households' factor income and government revenues minus capital stock depreciation. Regional income in excess of regional expenditures is saved and used as investments by producers. Two global sectors complete the system. The global transportation sector provides services that account for the difference between FOB and CIF values for a particular commodity shipped along a specific route. The global banking sector is designed in such a way as to secure the global savings-investment consistency.

3 Policy simulations

The GTAP model was used for simulation of four different regional integration scenarios. These scenarios were used to assess the economic effects of different Asian regional trading arrangements. Also, a global free trade scenario was simulated and this acted as a benchmark to all other simulation results.

In total there are 15 sectors of production and 16 different regions. The EU was divided into three separate blocks: new EU members, the EMU block and EU3 block the latter consisting of non-EMU old EU members.

The following simulations were carried out

1. ASIAFTA

This scenario simulates the impact of wide intra-Asian FTA trade agreement. All import and export subsidies within the Asian block (Japan, India, rest SAARC, China, Hong Kong, Korea-Taiwan, ASEA, Australia-New Zealand) are supposed to be abolished.

2. ASIA-C FTA

This scenario is identical to the above ASIAFTA, except that now China is left out of the Asian FTA agreement. The purpose of this scenario was to investigate China's influence in the Asian regional integration.

3. China4

This scenario involves simulation of the Asian FTA agreement (scenario 1) and imposing four percent total factor productivity shock. This scenario investigates the effects of the potential productivity increase in the Chinese economy.

4. ASIA-NAFTA

The Asia-NAFTA scenario considers an FTA between NAFTA and the Asian country block (see ASIAFTA).

5. World FTA

All the above scenarios are compared to the world FTA simulation results. The world FTA scenario was simulated by removing all import and export tariffs between all the regions in the model. This simulation represented an extreme case of the 'multilateral approach' to trade negotiations.

4 Simulation results

Table 1 indicates real GDP changes in the four Asian FTA scenarios with respect to the world FTA scenario. For example the first leftmost entry of -0.201 indicates that the long run equilibrium real GDP of Finland is at 0.201 per cent lower level in the Asian FTA scenario than in the global FTA scenario. In general, it is natural that all the entries are negative; one would expect higher output level under global FTA than under regional FTA scenario. The only exception is the case where China's total factor productivity is exogenously increased by 4 per cent. In this scenario the long-run total output level of China is higher than in the world FTA scenario. Otherwise the output effects of the four scenarios are constant. The countries that lose most compared to the World FTA are surprisingly Asian countries excluding Hong Kong and Japan. In general, Asian countries, thus, lose more from Asian regionalism than non-Asian countries. This does not hold, however, for Russia, who loses output approximately at the same magnitude as Asian countries.

Table 1 GDP quantity index results: Asian integration scenarios compared to the world FTA scenario.

GDP quantity index				
	Asian FTA	Asian FTA without China	China TFP 4%	Asia-NAFTA FTA
Finland	-0.201	-0.181	-0.200	-0.210
RestEU15	-0.076	-0.068	-0.075	-0.087
NewEU10	-0.089	-0.095	-0.091	-0.082
India	-1.017	-1.079	-1.017	-0.940
EU3	-0.098	-0.095	-0.097	-0.105
Japan	-0.086	-0.160	-0.084	-0.084
RestSaarc	-0.479	-0.631	-0.476	-0.522
China	-0.937	-1.130	3.044	-0.829
Hong Kong	-0.108	-0.092	-0.109	-0.120
KRTW	-0.708	-1.616	-0.691	-0.686
ASEA	-0.316	-0.424	-0.314	-0.280
ANZERTA	-0.030	-0.066	-0.027	-0.021
Russia	-0.668	-0.634	-0.662	-0.679
NAFTA	-0.017	-0.013	-0.016	-0.003
Brazil	-0.312	-0.297	-0.312	-0.326
ROW	-0.372	-0.351	-0.368	-0.393

KRTW consists of Korea and Taiwan and ANZERTA consists of Australia and New Zealand.

Table 2, figures 1 and 2 show the economic welfare effects of Asian regionalism compared to global free trade. Table 2 gives the effects at the level of our model aggregation and figure 1 shows the global aggregate effect. Figure 2 considers Asian regionalism from the point of view of three main actors: EU, NAFTA and Asian FTA plus the rest of the World. Like the GDP figures above economic welfare effects of Asian regionalism are mainly negative. There are, however, some exceptions. Most notably ANZCERTA is gaining regardless of the scenario chosen and the same holds to lesser extent to Russia as well. NAFTA is gaining from Asian regionalism but not on Asia-NAFTA integration. In terms of economic welfare, Asian countries are worse-off in Asian regionalism scenario than they would be in global free trade. China and also Japan form an exception in the scenario where TFP in China is assumed to experience a four per cent upward jump. One reason why Asian regionalism or Asia-NAFTA

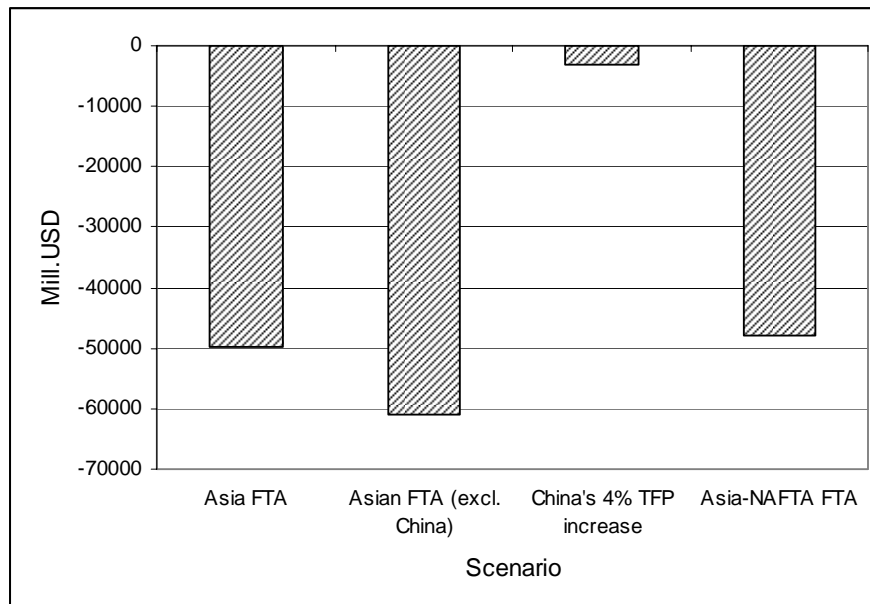
regionalism does not seem to be beneficial for participating countries might be due to the heterogeneity of Asian region. Asian countries are not necessarily natural trading partners. The same holds for Asia-NAFTA integration in which an additional reason for losses might be simply the geographical distance.

Table 2 *Equivalent Variation: Asian integration scenarios compared to the world FTA scenario mill. USD*

Equivalent variation				
	Asian FTA	Asian FTA without China	China TFP 4%	Asia-NAFTA FTA
Finland	-558	-465	-555	-563
RestEU15	-9849	-7736	-9703	-10944
NewEU10	-1473	-1415	-1463	-1569
India	-4106	-4046	-4114	-3308
EU3	-3392	-2948	-3349	-3671
Japan	-175	-7702	359	2386
RestSaarc	-1914	-1929	-1911	-2254
China	-8232	-12002	36237	-5559
Hong Kong	-2076	-3336	-1686	-1507
KRTW	-6093	-14135	-5696	-3776
ASEA	-3160	-3034	-3036	-1320
ANZERTA	2008	2722	2051	2590
Russia	34	273	87	97
NAFTA	238	4198	478	-6106
Brazil	-5597	-5314	-5607	-5771
ROW	-5534	-4225	-5299	-6695

KRTW consists of Korea and Taiwan and ANZERTA consists of Australia and New Zealand.

Figure 1. *Total economic welfare effect (equivalent variation) of Asian regionalism compared to global free trade in four scenarios*



Figures 1 and 2 present a more aggregated view. Not surprisingly, the global impact of Asian regionalism is negative compared to global free trade. This is in line with most theoretical results (e.g. Krugman 1991). In China4 scenario the negative effect is negligible but this is due to the gain that China gets from the improvement of its TFP. There is a small positive spill-over effect from China's improving TFP to Asia, which is off-set by negative effects in Europe and North-America.

Figure 2. *Regional economic welfare effect (equivalent variation) of Asian regionalism compared to global free trade in four scenarios*

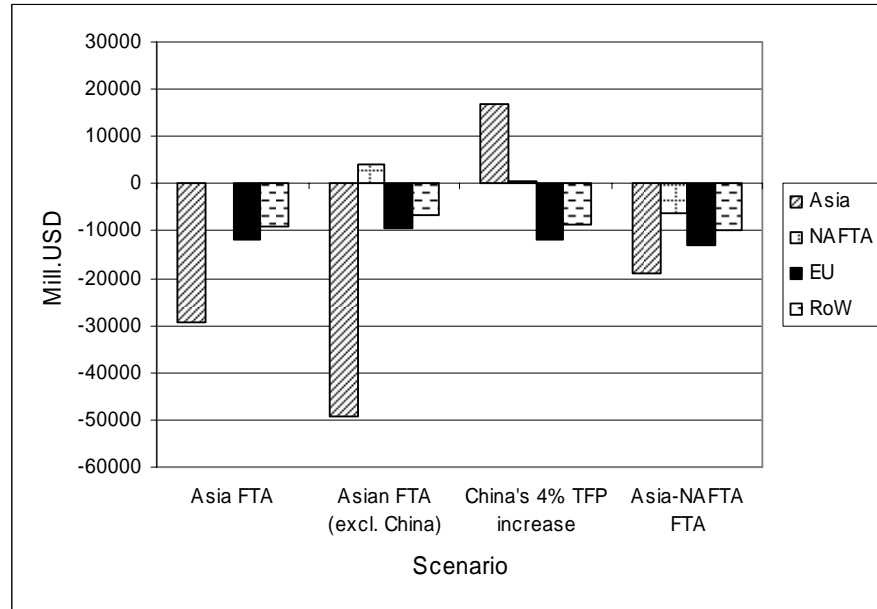


Table 3 *Equivalent Variation: Asian integration and global FTA scenarios compared to the current situation mill. USD*

	Asia FTA	Asia-C FTA	China4	Asia-Nafta	World FTA
Finland	-142	-50	-139	-147	416
RestEU15	-4263	-2150	-4117	-5358	5586
NewEU10	-142	-83	-131	-237	1332
India	-521	-460	-529	278	3586
EU3	-1111	-667	-1068	-1389	2282
Japan	26950	19422	27484	29512	27125
RestSaarc	-571	-586	-567	-911	1344
China	2024	-1746	46494	4697	10256
Hong Kong	1528	268	1917	2097	3604
KRTW	10443	2402	10841	12760	16537
ASEA	5651	5777	5774	7490	8811
ANZERTA	4207	4921	4251	4790	2199
Russia	-330	-91	-278	-268	-365
NAFTA	-7500	-3540	-7260	-13844	-7738
Brazil	-468	-185	-478	-642	5130
ROW	-3449	-2141	-3215	-4611	2085

KRTW consists of Korea and Taiwan and ANZERTA consists of Australia and New Zealand.

Table 3 and figure 3 show the economic welfare effects of Asian regionalism and global FTA compared to the current situation. The results in table 2 clearly demonstrate that Asian regionalism tends to be beneficial for participating Asian countries with an exception of India and a residual group of Asian countries (RestSaarc, see Appendix). In terms of economic welfare, China has no reason to stay out from Asian FTA. If Asian regionalism boosts TFP in China its welfare gain increases considerably. This would also spill over to Japan, Korea and Taiwan but not to the other member states of the Asian FTA.

Another clear indication of the results in table2 is that the rest of the World is losing from Asian regionalism. The losses are somewhat bigger for NAFTA than they are for the EU. Among the EU countries the new member states lose less than the EU15 countries. An FTA between NAFTA and Asia would have similar effects. Most of the Asian countries would be better-off but NAFTA and the EU would lose.

A closer look at the results in tables 2 and 3 together reveals that Asian regionalism would increase economic welfare in most countries of the region but decrease economic welfare in the rest of the world. Emerging Asian FTA would boost EU countries incentives to negotiate on global free trade. That does not hold for NAFTA especially if Asian FTA is formed without China. From NAFTA's viewpoint the current state of affairs would be the best. Australia, New Zealand and Russia are also better-off in Asian regionalism scenario than in global free trade scenario. It is worth noting, however, that if Asian FTA emerges and China participates in it NAFTA and Russia have no strong incentives to act against global free trade.

Figure 3. Regional economic welfare effect (equivalent variation) of Asian regionalism compared to the current situation in four scenarios

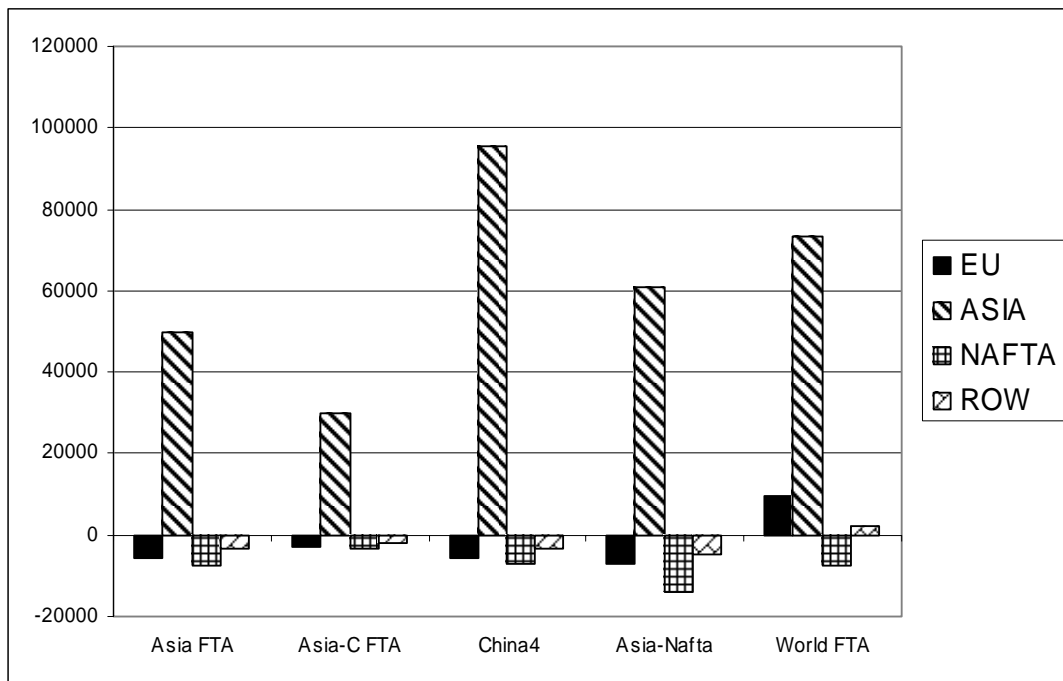


Figure 3 summarizes the effects of considered scenarios from the viewpoint of the EU, NAFTA, Asian FTA and the rest of the world. Interestingly, Asia-NAFTA FTA would be the worst scenario for NAFTA, the EU and the rest of the world whereas the current state of affairs is the worst for Asian block. From the world's welfare point of view the current state

of affairs is the worst among the investigated scenarios and global free trade the best. Compared to the current situation the welfare gain of Asian regionalism to Asian countries is much larger than the consequent welfare loss in other parts of the world. The best scenario for the EU would be global free trade, for NAFTA it would be the current state of affairs and for Asia a strong regional FTA added with TFP increase in China. There is, thus, a clear contradiction in preferences of the three trading blocks.

The overall impact of Asian regionalism to the other parts of the world economy is, however, relatively small. As Asian regionalism would support incentives to global free trade our simulations suggest at least to some extent that regionalism can act as a building block in a way to global free trade.

5 Conclusions

In this paper, we have evaluated the economic effects of Asian regionalism and compared its implications to those of global free trade. We considered four different regionalism scenarios. Three of them were tri-polar regionalism scenarios where a wide FTA was emerging in Asia covering geographically the whole region. China's impact on Asian regionalism was assessed more in detail comparing the impact of its membership in Asian FTA and potential spill-over effects of TFP increase in Chinese economy to the region. The fourth scenario assumed a bi-polar world economy where Asian FTA and NAFTA were supposed to form an FTA.

In terms of economic welfare, the simulation results suggest that almost all Asian countries have strong incentives to form an FTA India being the most notable exception. For the Asian region as a whole and for most Asian countries the exclusion of China from the Asian FTA has a negative impact. TFP increase in China has mostly a positive welfare effect on its fellow FTA-members' economies. From the viewpoint of NAFTA and the EU the formation of Asian FTA has a small negative impact which is at its smallest if China stays out from Asian FTA. Hence, China's membership in Asian FTA is good for Asia but bad for the rest of the world.

The simulation results suggest that the preferences of the three major trading blocks the EU, NAFTA and Asian FTA are different. In terms of economic welfare, the ranking of assessed scenarios is very different. The welfare maximizing solution is global free trade and bi-polar regionalism the welfare minimizing solution. Given that Asian FTA emerges the EU should have strong incentives to act as an initiator towards global free trade. From NAFTA's point of view the ranking is different: the current state of affairs gives the highest welfare, bi-polar regionalism the lowest. If Asian FTA is formed the further welfare effects of global free trade to NAFTA are practically zero and in the case of Asian FTA without China even negative. Therefore, NAFTA does not necessarily have strong incentives to initiate global multilateralism. From Asian point of view the ordering is somewhat ambiguous. If China experiences TFP growth in Asian FTA that would beat global free trade in terms of economic welfare. Without TFP growth in China global free trade is the welfare maximizing scenario for Asia and the current state of affairs the welfare minimizing scenario.

The simulation results on the welfare implications of the considered scenarios suggest that Asian countries should have incentives to create a regional trading block. Given this both the EU and Asian FTA might have incentives to proceed to global free trade whereas the third big

player NAFTA should be indifferent. In this case regional integration could work as a building block in a way towards global free trade. If Asian regionalism turns out to be very successful having positive impact on China's and some other Asian countries' TFP Asian regionalism could work as a stumbling block of global free trade.

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Appendix Regional Aggregation

Indonesia	ASEA		Bangladesh		RestSaarc
Malaysia	ASEA		Sri Lanka		RestSaarc
Philippines	ASEA		Rest of South Asia		RestSaarc
Singapore	ASEA		Rest of Oceania		ROW
Thailand	ASEA		Rest of East Asia		ROW
Vietnam	ASEA		Rest of Southeast Asia		ROW
Australia	AUSNZL		Rest of North America		ROW
New Zealand	AUSNZL		Colombia		ROW
Brazil	BRAZIL		Peru		ROW
China	China		Venezuela		ROW
Denmark	EU3		Rest of Andean Pact		ROW
United Kingdom	EU3		Argentina		ROW
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India	India		Central America		ROW
Japan	Japan		Rest of the Caribbean		ROW
Korea	KRTW		Switzerland		ROW
Taiwan	KRTW		Rest of EFTA		ROW
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THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
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Puh./Tel. (09) 609 900
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