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A Wave of Protectionism? An Analysis of Economic and Political Considerations

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Abstract

In light of the U.S. current account deficit, pressure is high on Asian countries to revalue their currencies. The calls from some U.S. policymakers for tariffs on imports from China has sparked fears that this could trigger a world-wide surge in protectionism. This study evaluates the risk of protectionism, considering two dimensions: first, the economic effects of tariffs; second, the incentives for policymakers to adopt tariffs. Following the political economy literature, we distinguish ‘benevolent’ policymakers – who care about long-term GDP – and ‘myopic’ policymakers, for whom short-term considerations are important. An analysis of the economic effects using the Bank of Canada’s *Global Economy Model* shows that the gains from import tariffs are small: in the short-term, tariffs raise the price of imports and shift consumption toward domestically-produced goods; but they also lead to a real appreciation. This improves the terms of trade, but falling export volumes lead to a reduction in GDP in the long-run. As regards the political dimension, we conclude that a ‘benevolent’ policymaker would not adopt tariffs, because of negative long-term economic consequences, but ‘myopic’ policymakers might be tempted to exploit short-term political gains. Given the potentially high costs of protectionist trade policies, protectionism is therefore rightly viewed as an important risk.

JEL classification: E66, F32, F47

Bank classification: International topics; Recent economic and financial developments; Regional economic developments

Résumé

Devant l’imposant déficit de la balance courante des États-Unis, les pays asiatiques sont soumis à de fortes pressions pour réévaluer leur monnaie. Les appels lancés par des responsables américains pour assujettir les produits chinois à des droits de douane ont fait craindre le début d’une vague de protectionnisme à l’échelle mondiale. Nous évaluons le risque posé par les mesures protectionnistes en abordant la question sous deux angles. Nous nous intéressons d’abord à l’incidence économique des tarifs douaniers, puis aux motivations qui peuvent pousser les décideurs à élever des barrières tarifaires. À l’instar d’autres chercheurs en économie politique, nous distinguons parmi les décideurs les *bienveillants* – focalisés sur la croissance à long terme du produit intérieur brut (PIB) – et les *myopes*, chez qui dominent les considérations de court terme. Comme le révèle l’analyse conduite à partir du modèle de l’économie mondiale de la Banque du Canada (BOC-GEM), l’imposition de tarifs sur les importations apporte peu de bénéfices économiques : à court terme, elle a pour effet de majorer les prix des importations et de favoriser la consommation des biens fabriqués au pays, mais elle donne lieu également à une

appréciation réelle de la monnaie. Il en résulte une amélioration des termes de l'échange, tempérée toutefois par la baisse du PIB que le recul des exportations provoque en longue période. S'agissant des motivations d'ordre politique, nous concluons que les décideurs bienveillants ne céderont pas aux sirènes du protectionnisme en raison de ses conséquences économiques négatives à long terme, tandis que la perspective de gagner rapidement du capital politique pourra séduire les myopes. Compte tenu des coûts élevés qu'il peut entraîner, c'est à juste titre que le protectionnisme est considéré comme un risque important.

Classification JEL : E66, F32, F47

Classification de la Banque : Questions internationales; Évolution économique et financière récente; Évolution économique régionale

1 Introduction

The post war period has been characterized by successive waves of trade liberalization, but now the risk of protectionist trade policies has increased. As China's trade surplus with the United States expands (the surplus for the first half of 2007 amounts to about \$113bn), U.S. policymakers have repeatedly called upon China to revalue its currency. So far, however, Chinese policymakers have been reluctant to let the yuan appreciate quickly. Consequently, some members of the U.S. Senate Finance Committee advocate a tariff to be introduced on all Chinese goods imported into the United States if China does not let its currency appreciate more rapidly. But this is not the only recent case where politicians are considering protectionist actions: Newspapers report that congressional Democrats are poised to veto the proposed U.S. free trade agreement with South Korea.¹ In 2006, the European Union imposed limits on imports of Chinese apparel. Moreover, several countries are currently thinking about imposing strict rules for foreign investment if this investment is conducted by government-owned investment companies (often called sovereign wealth funds).² In the words of Angel Gurría, then Director General of the World Trade Organization, a key risk to the global economy is 'a wave of protectionism that reasonable politicians will find hard to counter' (Gurría, 2006).

But how bad is the situation really? Few empirical studies have investigated the potential consequences of a uniform U.S. tariff on imports from China, nor whether the introduction of protectionist measures is economically rational for policymakers. Using Kim (2007)'s language, we ask whether a 'wave of protectionism' – i.e. a series of actions whereby countries impose import tariffs on each other to retaliate on previous protectionist actions – could be triggered if the United States introduced tariffs on imports from Emerging Asia. Our approach is to evaluate the economic consequences, and explore the conditions under which policymakers would have incentives to impose tariffs or to retaliate. To this end, we follow the political economy literature and distinguish between 'benevolent' and 'myopic' policymakers: while 'benevolent' policymakers focus on long-term economic growth, 'myopic' policymakers care about short-term considerations (e.g. because they face an election soon). Note that our objective is not to predict individual countries' trade policies; rather we discuss how 'attractive' the introduction of import tariffs is under different assumptions for policy-

¹Financial Times, July 17, 2007. In a recent poll it was found that six out of 10 Republicans believe that free trade hurts the U.S. economy. This is a remarkable shift, given that in 1999 (when the poll was last conducted) 63 percent of Republicans were convinced that free trade is either positive or neutral for the U.S. economy see The Globe and Mail, October 9, 2007.

²Financial Times, August 7, 2007.

makers' objective functions.

To simulate the economic consequences of protectionism, we use the Bank of Canada's version of the IMF's *Global Economic Model*. This 5-countryblock DSGE model features tradable and nontradable goods sectors, and can be used to study different trade policy options. To assess whether policymakers have incentives to adopt tariffs, we evaluate our findings in light of the political economy literature.

We find that *benevolent* policymakers are not likely to adopt protectionist policies, as the long-term gains for countries adopting tariffs are small (if not negative). Protectionist policies hurt economic growth in countries upon which they are imposed, but even the country imposing them does not gain economically in the long term. This is because tariffs on imports trigger movements of the real exchange rate, such that the negative volume effect on exports will eventually lead to a fall in exports of the protectionist country. This means that in the long run, countries hurt themselves by adopting protectionist policies. As countries gain from imposing tariffs in the short-term, however, there is some scope for *myopic* policymakers to exploit political gains. This means that we cannot fully exclude the possibility of a wave of protectionism. Note that our effects are in line with the predictions of standard trade theory - tariffs have a negative impact on the country that faces them; while countries that impose tariffs suffer output losses if the country facing the tariff can retaliate effectively with its own tariffs – but an important advantage of using a fully specified DSGE model is that we can provide quantitative estimates of these effects.

We proceed as follows. In section 2 we sketch the recent international debate on Emerging Asia's exchange rates. In section 3 we outline the main features of the model we use for simulating the consequences of import tariffs. Section 4 discusses various scenarios, and explores the probability of tariffs being introduced, in light of different assumptions about policymakers' objective functions. The final section summarizes our main results.

2 The international debate

China's trade surplus with the United States has become a major issue on the international policy agenda in recent years (Mussa, 2007). China's exports to the United States grow so fast that China's trade surplus with the United States in the first half of 2007 – about \$113bn – already exceeds the surplus for the entire year 2005 (left panel of figure 1; note that China also runs large current account surpluses vis-à-vis other regions such as the EU). Manufacturing groups in the United States attribute this trade

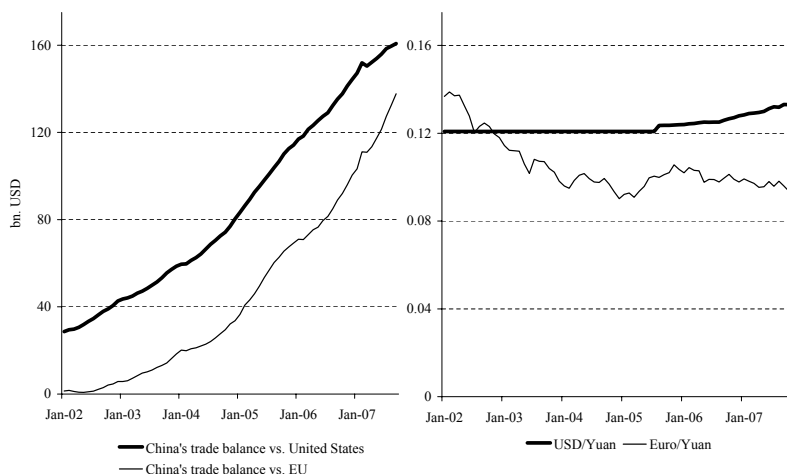


Figure 1: Left panel: Chinese trade balance vs. United States and Europe; right panel: nominal bilateral exchange rates Yuan/USD and Yuan/EUR

imbalance to China keeping the value of the yuan artificially low. In their view, this makes Chinese goods unfairly cheap on world markets, thereby ‘stealing’ American jobs (interest groups claim that as many as 3 million jobs in U.S. manufacturing might have been lost to China between 2000 and 2005).³ And indeed, the pace at which the Chinese currency appreciates can only be called modest, given China’s large current account surpluses (right panel of figure 1).

Dooley et al. (2003) argue that by keeping the exchange rate undervalued, China is pursuing a policy of export-led growth. This has resulted in high Chinese current account surpluses and high Chinese growth, but a policy of export-led growth is not without risk to both the surplus and the deficit countries: risks to the surplus economy include rising inflationary pressures or difficulties to sterilize the increase of foreign reserves to maintain the undervalued currency; risks to the trade deficit country include the sustained need to attract capital inflows.⁴

To ‘correct’ this imbalance, and the effects of keeping an exchange rate undervalued, introduction of a uniform tariff on exports of the surplus country is apparently an option with considerable appeal for politicians. The Schumer/Graham bill, intro-

³See ‘Schumer-Graham announce bipartisan bill to level playing field on China trade’, United States Senate, Press release February 3, 2005. Note that Japan’s rise, and the success of the Japanese car industry in particular, sparked a similar debate in the United States in the 1980s and 1990s (see McGee, Robert W. and Yoon, 1996).

⁴Feenstra and Hong (2007) show that exports have played a large role in stimulating employment in China, but that similar gains could have been obtained from growth in domestic demand, especially for tradable goods.

duced in February 2005, threatened China with the imposition of a 27.5 percentage points tariff on its exports to the United States, if they do not revalue its exchange rate. This bill was opposed by the Bush administration and business groups, but a revised version of the bill was re-introduced in June 2007. This bipartisan bill still contained the notion of imposing tariffs on imports from China, if the Chinese currency is not revalued.⁵ And the two front running Democratic candidates of the presidential election 2007, Hillary Clinton and Barack Obama, have agreed ‘...to co-sponsor legislation that would levy punitive duties on Chinese goods to cajole Beijing into revaluating its currency’ (Financial Times, July 6, 2007).⁶

While many economists are sceptical about the benefits that protectionist trade policies can offer, empirical evidence on the effects of uniform tariffs along the lines of the Schumer and Graham bill is scarce.⁷ Some simulations on protectionism have been done by Faruquee et al. (2005). These authors analyze whether protectionism could help ‘defuse’ global imbalances, and find that protectionist measures reduce global economic growth without substantially improving the U.S. current account deficit.⁸ Other studies do not examine the costs of uniform, ‘across-the-board’ tariffs imposed on *one* trading partner, but rather the costs of one country’s tariff structure on *all* trading partners. For example, Feenstra (1992) finds that existing barriers to trade imply costs for the United States between 0.38 and 0.72 percentage points of GDP. And using a gravity model, Wall (1999) estimates the welfare costs of U.S. protectionism to be about 1.45 percentage points of GDP in 1996.

⁵This revised bill was introduced by Senators Baucus, Grassley, Schumer and Graham on June 13, 2007. The authors claim that their bill complies with existing WTO regulation. Under the WTO’s ‘Agreement on Subsidies and Countervailing Measures’, a policy can be challenged as subsidy, if satisfies three criteria: it must be ‘specific’, provide its recipient with a ‘benefit’, and it must entail a governmental ‘financial contribution’. In practice, the U.S. Treasury would have to file a WTO case claiming that China is a ‘currency manipulator’ (currency manipulation is illegal under WTO law). So far, though, the U.S. Treasury has refrained from calling China a ‘currency manipulator’ in its semi-annual report to Congress (see Financial Times, June 13, 2007).

⁶Similar sounds are heard in Europe, as the once modest trade deficit with China is growing rapidly (it is expected to grow to EUR 150-160 billion). Note that although the Chinese currency is slowly appreciating against the U.S. dollar, it has depreciated against the euro in 2007, further boosting Chinese exports to the euro area. The President of the European Commission warned China recently of ‘protectionist pressures which would be very difficult to contain’ if China did not undertake action to reduce the EU’s large trade deficit with China (The Economist, December 1, 2007).

⁷Agreement among economists is usually limited, but in a survey 93 percentage agreed, at least to a limited degree, with the statement that tariffs and import quotas usually reduce general economic welfare’ (Alston et al., 1991). Vousden (1990) discusses the theoretical aspects of trade protection.

⁸Faruquee et al. (2005) use a very similar model to the one we employ (the IMF-version of the *Global Economic Model*), but since their main focus is the debate about global imbalances, they calibrate the model to recreate a scenario in which the United States runs a large current account deficit. As such, the results of our study are not directly comparable to those reported in Faruquee et al. (2005), because some of the shocks these authors introduce affect the new long-run steady-state.

3 The model

3.1 The Bank of Canada-version of the IMF's *Global Economy Model*

We examine whether policymakers have incentives to implement protectionist measures by analyzing the effects of import tariffs on their respective economies. For the simulations we use the *Global Economy Model (GEM)*. *GEM* is a nonlinear,⁹ stochastic dynamic general-equilibrium (DSGE) model with highly developed theoretical and microeconomic foundations. It was originally developed by the IMF; our simulations are carried out using the Bank of Canada's version (*BoC-GEM*).¹⁰ Both *GEM* and *BoC-GEM* have been documented extensively (see Faruquee et al., 2005, for the IMF version and Lalonde and Muir, 2007, for *BoC-GEM*), so we keep the description of the model relatively short and non-technical.¹¹

BoC-GEM has five 'country blocks' representing Canada, the United States, a country block for Emerging Asia, a country-block representing commodity-exporting countries (mainly OPEC countries), and a country-block 'Rest of the World' (which is mostly comprised of Europe and Japan).¹² Each region features three main types of agents: firms, households, and the government.

Firms A continuum of firms combine capital and labour to produce raw materials, intermediate, and final goods. Given the importance of natural resources for Canada, *BoC-GEM* features tradable and nontradable goods sectors, the oil and gas sector, and other commodities. The production structure is as follows: Tradable goods, nontradable goods, and gasoline, are combined to produce a final consumption good, while tradable and nontradable goods are required for the investment good. Firms are characterized by CES production functions and

⁹*BoC-GEM* is a nonlinear model, but permanent shocks – such as the tariff shocks we are analyzing – are not easy to solve. Therefore, we use numerical linearization to solve the model.

¹⁰The Bank of Canada's version of *GEM* differs from the IMF version in the following important respects. First, Canada is included as a separate region, and conversely, the country composition of the other regions is also slightly adjusted to reflect that change. Second, the structure of the model is richer, because two sectors of great importance for the Canadian economy are added: oil and non-oil commodities. In *BoC-GEM* prices of oil and non-oil commodities – like all other prices in the model – are endogenous.

¹¹The Bank of Canada uses *BoC-GEM* to study issues from a global perspective, see Maier et al. (2007).

¹²At this point it is worth stressing that our simulations are conducted for Emerging Asia as a whole, not just for China. This is because the model we use does not have China as separate country or country block. Clearly, putting all Emerging Asian countries together has a number of shortcomings; for instance it disregards that countries like India have let their currency appreciate substantially (more than 8 percent in the first half of 2007). In that sense, the political debate does not map directly into our economic analysis. Nevertheless, we believe that the main arguments of our study continue to hold qualitatively, even though we simulate a tariff hike for imports from all Emerging Asian countries, rather than only for imports from China to the United States.

Rotemberg (1982) pricing. Frictions at the firm level include adjustment costs for capital, investment, the share of imported goods, and the production and use of oil. The market structure is characterized by monopolistic competition.

Households Two types of consumers exist: the first class owns all of the firms and has access to capital markets; the second class is liquidity-constrained and can only consume out of their labour income. The first class of consumers can hold a domestic and an internationally traded bond. All consumers have habit persistence in consumption and labour supply, and there are nominal rigidities in wages.

Government Governments in each region consume nontradables, financed through taxes or borrowing. Government consumption does not enter the utility function of households. Fiscal policy targets a stable long-run debt-to-GDP ratio. There are seven sources of taxes, including taxes on capital, labour, tariffs, oil royalties and gasoline.

The monetary authority defines the objective for monetary policy, and controls a short-term interest rate to achieve this goal. All country blocks follow an inflation-forecast based monetary rule, except for Emerging Asia, where the central bank targets the nominal exchange rate. Emerging Asia's monetary policy thus reflects a policy aimed at keeping the nominal exchange rate fixed to the U.S. dollar.

As regards the open-economy side of the model, *BoC-GEM* features international trade in oil, commodities, and tradable goods for consumption and investment (including intra-industry trade). There is also trade in an international bond, and positions in this bond determine the net foreign asset (NFA) position of each region. The NFA position is maintained through a financial friction (an exogenously determined NFA-to-GDP ratio), and a risk-adjusted uncovered interest rate parity condition, defined in terms of the bilateral exchange rates with the United States.

The model's parameters are calibrated by using data and microeconomic studies, or by drawing on other DSGE models (for details on the calibration see Lalonde and Muir, 2007). Of particular interest for this study is the treatment of international trade in the model. Trade flows are calibrated on a bilateral basis for all tradable goods (consumption, investment, oil, and commodities) to match actual trade flows, as reported by the *COMTRADE* database of the United Nations. A complete map of the trade links is given in figure 2. Gains from trade arise as prices of factors and goods are not identical across country blocks. Opening to trade allows consumers to demand those goods that are produced more cheaply in another country block. This entails a more efficient allo-

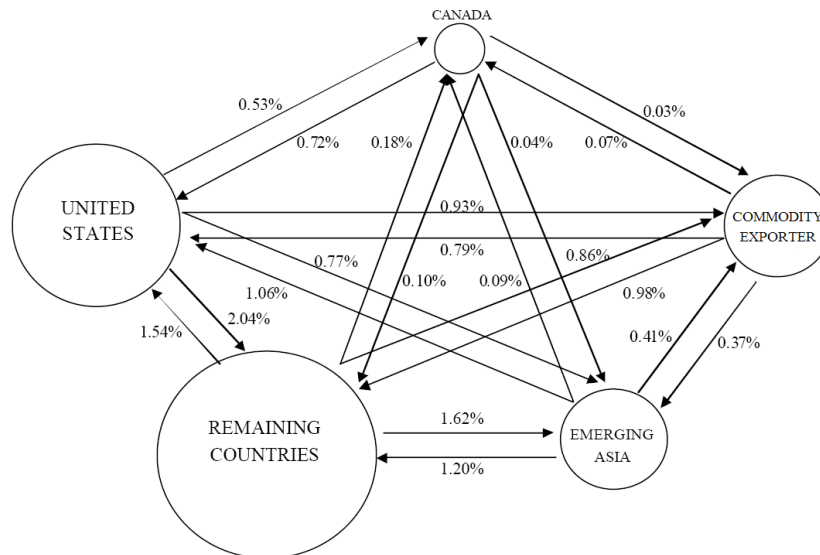


Figure 2: The trade links in *BoC-GEM*

cation, as countries can specialize in line with their comparative advantages.¹³ In the trade literature, this effect is known as static gains from trade (Anderson, 2005): Static gains occur as countries can benefit from specialization of production to exploit their comparative advantage. Additional benefits from trade liberalization can occur over time, as more open countries tend to grow faster. Such dynamic gains are not captured in *BoC-GEM*.¹⁴

3.2 Transmission of trade policy shocks

Figure 3 is a highly stylized overview of the main transmission channels and the expected signs following the introduction of trade tariffs (the relative importance of the effects and their signs are discussed when the tariff shock is analyzed in the next section). Assume the introduction of a tariff on imports from Emerging Asia by the United States. The direct effects of higher import taxes are summarized in the white boxes;

¹³Piermartini and Teh (2005) discuss different modelling approaches to analyze trade policies.

¹⁴To capture the dynamic effects, we could add a productivity shock. Trade liberalization is generally found to increase productivity (through higher competition), so restrictive trade policies would presumably lead to lower trend productivity growth. This means that to capture dynamic effects, we would have to impose a negative productivity shock. This would make our key results even stronger, as import tariffs would be even more harmful.

the grey boxes contain indirect effects, and the red arrows show spillovers to the rest of the world. In the short term, the United States reaps fiscal revenues from the tariffs, and their terms of trade improve. This means that the United States earns more for their exports. At the same time, tariffs drive up the price of imported goods. This relative price change has a temporary upward effect on inflation. The price increase of imported goods induces expenditure switching, as domestic consumption goods become relatively cheaper. This boosts U.S. GDP and, given the import price increases, triggers a more restrictive monetary policy.

In the medium term, the U.S. dollar appreciates. By reducing the demand for imports, a U.S. import tariff causes the prices of Emerging Asia's exports to fall on the world market, relative to U.S. exports, improving U.S. terms of trade. This is a welfare improvement for the United States, but note that at the same time, as U.S. goods become more expensive for other countries, the volume of U.S. exports falls. If the volume effect dominates the improvement of the terms of trade – i.e. if the price elasticity of exports is smaller than the 'volume' elasticity of exports – a negative effect on U.S. GDP results. Note the similarities between this DSGE model and traditional trade theory (Heckscher, 1919; Ohlin, 1933): in both cases, countries can attempt to improve their terms of trade by imposing import tariffs, and in both cases the overall effect on GDP depends on whether or not the effect on trade volumes dominates the terms of trade effect. Lastly, both the change to the U.S. economic outlook and the (real) U.S. exchange rate are important transmission mechanisms of the tariff shock to the rest of the world.

Lastly, note that *BoC-GEM* provides two options to spend the revenues of the import tariffs: first, they can be used to lower taxes on labour income. This reduction in distortionary taxes boosts labour efforts and employment. The political reality is probably more accurately captured by assuming that the tariff revenues are (largely) used to increase government spending. As the simulation results in the next section show, the decision how to use the revenues affects the results for the country levying the tariff, but hardly changes transmission of the shock to the rest of the world.

4 Will there be a wave of protectionism?

4.1 Benevolent and opportunistic policymakers

The main questions we ask are the following: suppose that the United States adopts a tariff on imports from Emerging Asia, then

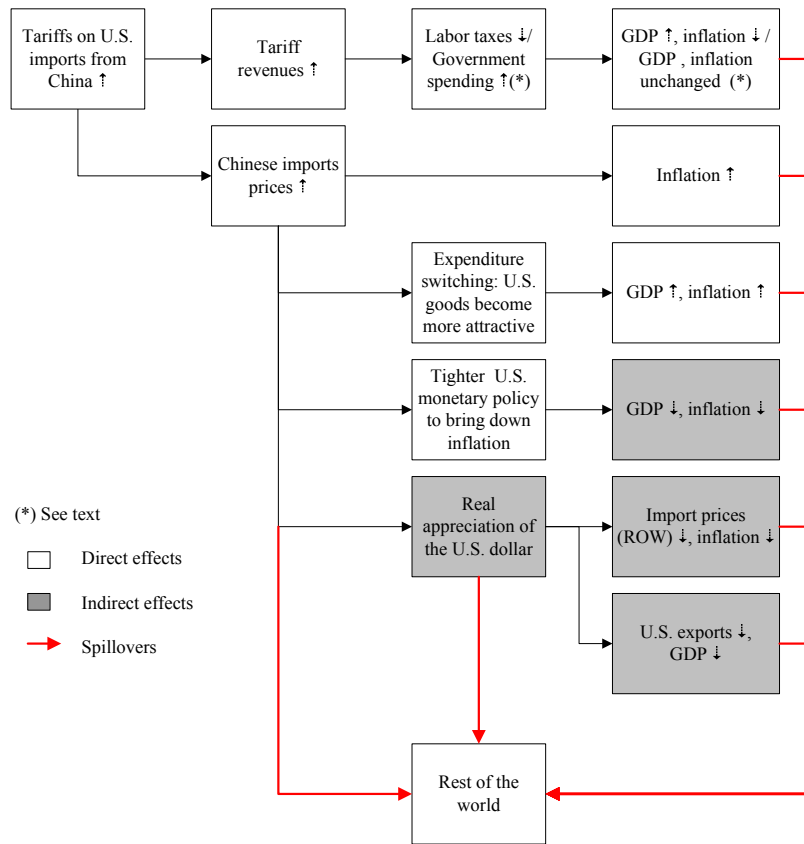


Figure 3: Main transmission channels in *BoC-GEM*

1. under which conditions would this policy be ‘politically sensible’ (i.e. under which conditions will policymakers have incentives to adopt tariffs), and
2. would such a policy lead to a worldwide surge of protectionist actions?

To answer whether tariffs are economically and politically sensible, we need to define policymakers’ objective functions. This is not without ambiguity. For instance, policymakers’ time horizons play an important role in determining whether or not to adopt protectionist policies, as some measures can yield benefits for two or four quarters, but with long-term costs. Also, for policymakers it may be particularly important that economic benefits occur to specific interest groups, say, the export industry. Hence, it is not straightforward to define a policymaker’s objective function.

Drawing on the political economy literature, we can provide insights by exploring two extreme cases of policymakers.

Short vs. long time horizon Policymakers can differ in terms of their time horizon.

Nordhaus (1975) introduces the idea of *myopic* or *opportunistic* policymakers, who only care about being re-elected. In light of this we assume that opportunistic policymakers look at GDP over a short time horizon (max. 2 years); whereas *benevolent* policymakers care about long-run effects to GDP.

Sectoral interests vs. general welfare A similar distinction can be made for sectoral

vs. general economic welfare. A large body of studies has found that paying attention to the desires of interest groups can greatly enhance the chances of being relected (Mueller, 2000). In view of this, we assume that *benevolent* policymakers aim at maximizing overall economic growth (i.e. total GDP), while *opportunistic* policymakers put special emphasis on specific sectors (e.g. the export industry or a threatened import-competing industry).

The distinction between myopic and benevolent policymakers could, for instance, be justified by the fact that opportunistic policymakers care about short-term effects because of electoral considerations (Nordhaus, 1975). Similarly, the political economy of elections indicates that providing benefits to smaller, clearly defined groups might secure more votes than increases in total GDP (Drazen, 2000).

Next, we define a *wave of protectionism* as a series of actions, whereby policymakers impose tariffs on imports from one or more countries in response to other countries' protectionist policies. We assume that such a chain-reaction could occur if (benevolent or opportunistic) policymakers have incentives to 'retaliate' or 'follow' a protectionist country by introducing similar import tariffs (i.e. the 'wave' does not stop, but keeps moving or even gains strength, leading – potentially – to larger negative economic effects). As an example, a 'wave of protectionism' occurs if introduction of tariffs by country A on imports from country B leads to retaliation, that is, country B adopts tariffs on imports from country A, because this yields economic benefits in line with policymaker B's objectives. The 'wave' keeps moving if other countries have incentives to retaliate or to follow the protectionist actions of one of the two players, as the world-wide level of protectionism keeps rising.

One can think about our study as a multiperiod decision tree (see figure 4). In the first period, the United States has to decide whether or not to initiate legislation to introduce tariffs. As a wave of protectionism requires that other countries take similar actions, we check for each subsequent period whether other countries should consider

retaliating or following, if protectionist policies are implemented. Hence, in the second period, Europe and Japan, in light of possible spill-overs, can decide on whether or not to follow the U.S. example. As we will see, Europe and Japan are not likely to follow the United States. In the third period, Emerging Asia must decide whether or not to retaliate against U.S. tariffs. And if retaliation takes place, Europe and Japan might rethink their trade policies, considering again whether or not to adopt tariffs, in period 4. The ‘wave’ would have maximum adverse economic effects if, at the end, all countries were to adopt some form of protectionist policies.

Throughout these considerations, we distinguish between the two types of policy-makers defined above. This allows examining the conditions under which tariffs will or will not be introduced. A caveat of this exercise is that policymakers may decide to adopt protectionist measures even if the economic benefits are uncertain, for instance, because of more general strategic or political considerations. To discuss these issues, we put our economic simulations into a broader political economy context at the end of this section.

4.2 Scenario 1: The United States imposes tariffs on imports from Emerging Asia

We first analyze a uniform tariff imposed by the United States on all imported goods from Emerging Asia. The first decision we need to take concerns the tariff rate. The political debate suggests that U.S. tariffs on imports from Emerging Asia would be substantial. To calibrate the tariff, we take the proposed value of the original Schumer/Graham bill of 27.5 percent.¹⁵ Also, we assume that the revenues from this tariff are used to increase government spending (to investigate the robustness of our results, we change both assumptions later).

Figure 5 shows the effects on key economic variables.¹⁶ We first look at the consequences for the United States first (the dotted black lines). The tariffs on imports from Emerging Asia cause a relative shift in U.S. import prices, as Asian imports become more expensive. This has three important consequences: Firstly, it leads to a rebalancing of U.S. imports toward Canada and Europe/Japan. Secondly, U.S. GDP increases in the short-run, as consumers are wealthier, and more domestically-produced goods are consumed (a ‘beggar-thy-neighbour’ effect).¹⁷ Thirdly, the U.S. real effective exchange

¹⁵The 27.5 percent reflects the midpoint of a range of estimates that China undervalues the yuan relative to the US dollar by 15 to 40 percent, see Tatom, 2007.

¹⁶To save space, we do not discuss the results for the commodity-exporting countries. More detailed simulation for all country blocks results are available upon request.

¹⁷These two effects correspond to both an income and a substitution effect of lower prices for Emerging

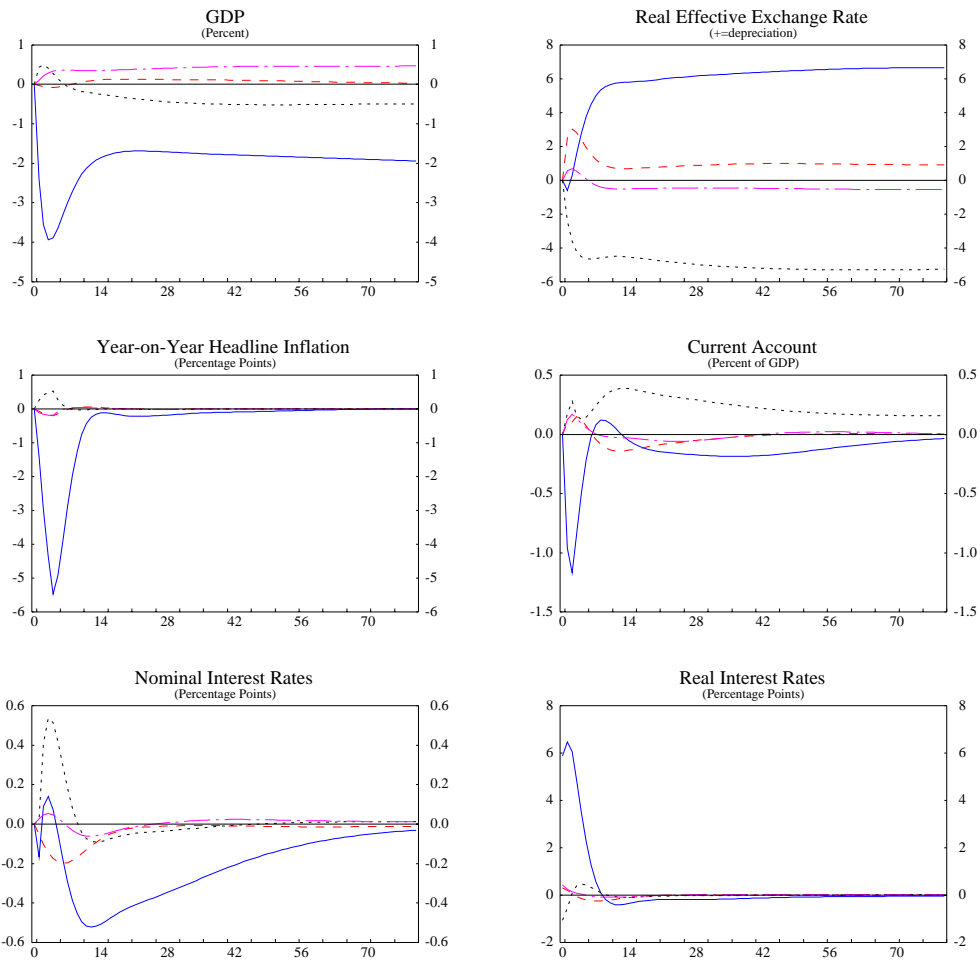


Figure 5: United States imposes a 27.5 percentage points tariff on imports from Emerging Asia (Solid Blue= Emerging Asia; Dashed Red= Europe/Japan; Dotted Black= United States; Dotted Dash Magenta= Canada)

rate appreciates. As it turns out, the exchange rate is a key transmission channel of the shock in the long run. The exchange rate appreciates (alternatively, the U.S. terms of trade rise), because the tariff allows the United States to exercise some of its monopsony power and drive prices for imports from Emerging Asia down. Although the cost of Emerging Asia's goods to the United States goes down, the (average) price of an imported good for the U.S. consumer has gone up, because of the tariff. Given that consumer goods are imperfect substitutes, U.S. consumers will contain their purchases of imported goods from Emerging Asia.

In the long run, the U.S. nominal effective exchange rate appreciates by 4.6 percent, as the U.S. dollar strengthens nominally against all countries except Emerging Asia (who maintains a fixed nominal exchange rate). In the short run (first 4 quarters) U.S. GDP increases, as consumers shift to domestically-produced goods. But this positive effect on consumption of about 0.5 percentage points is, over time, dominated by the fall in exports. As the negative effect of the higher U.S. dollar materializes, U.S. exports to all countries fall by almost 7 percent. Around 90 percent of this fall in exports is due to a fall in export volume (nominal exports fall by 6.73 percent; real exports fall by 6.17 percent). This means that the welfare improvement through the positive terms of trade effect does not increase U.S. GDP, as the fall in U.S. export volumes is larger than the price effect. On balance, the drop in exports leads to a permanent decline of U.S. GDP (about -0.7 percentage points in the long run).¹⁸ Lastly, a temporary effect is that prices for imported goods increases. This pushes up U.S. inflation, prompting a (temporary) monetary tightening.

Emerging Asia's GDP falls substantially. In the short run, the fall amounts to almost 4 percentage points; in the long run, the effect moderates to almost 2 percent. As a result, Emerging Asia experiences a severe deflationary shock (more than minus 5.5 percentage points at the peak). Given its policy of maintaining a fixed nominal exchange rate vis-à-vis the United States, its *real* effective exchange rate depreciates. Exports to Canada and Europe/Japan increase sharply (11.8 and 7.3 percentage points in the long run), as these countries have not imposed import tariffs on Emerging Asia. Exports to the United States fall by more than 20 percentage points.

The flipside of this trade diversion is that Canada benefits from the U.S. tariffs on Emerging Asia. As the United States' main trading partner, exports to the United States increase by 1.5 percentage points in the short term and 2.4 percentage points in

Asian imports.

¹⁸Note that this does not mean that the United States has a permanent output gap. Domestic prices and wages adjust to close the domestic output gap; however, the level of GDP is permanently lower, reflecting the fall in export volume induced by the permanent appreciation of the U.S. exchange rate.

the long run (most notably exports of consumption goods rise). Consequently, Canadian GDP increases by roughly 0.6 percentage points in the long run. Canada's real effective exchange rate appreciates in the long run by 0.5 percentage points (resulting in a moderately negative effect on the trade balance). This long-run impact reflects the strong Canadian export performance, over-compensating for a moderate fall in world commodity prices (-2 percentage points in real terms, because of lower growth in Emerging Asia). The country effects of the Canadian exchange rate movement are interesting: Canada experiences a real depreciation against the United States, and a real appreciation against all other countries. Consequently, Canada exports more to the United States, but less to all other countries.

Lastly, the combined GDP of Europe and Japan falls temporarily by up to 0.1 percentage points in the fourth quarter, but increases by 0.1 percentage points in the long run. The effects are small, despite a permanent fall in their real effective exchange rates by around 0.8 percentage points (also, they benefit from lower commodity prices). Their combined exports first experience a boost due to increased demand from the United States (plus 5 percent), but then drop due to the higher real exchange rate. Ultimately, they almost return to their pre-shock value (minus 0.4 percent); while imports remain permanently lower. Consequently, the trade balance improves temporarily, even though the long-run value remains largely unchanged.

Comparing these results to traditional trade theory, *BoC-GEM* generates relatively strong effects on export volumes. The positive terms-of-trade effect is a welfare improvement for the United States, but given that they export less after their currency has appreciated, export volumes fall sharply, as consumers in all other countries cut back their expenditures of U.S. goods.

Given these results, under which conditions would U.S. policymakers have incentives to adopt tariffs on imports from Emerging Asia? *BoC-GEM* does not compute a welfare criterion. However, we can evaluate our findings in two ways:

- first, using the distinction between benevolent and myopic policymakers introduced above, a benevolent U.S. policymaker is not likely to adopt tariffs, because U.S. GDP falls in the long run. However, an opportunistic policymaker – i.e. one who bases policy decisions on short-term effects – could consider adopting tariffs, because of the positive effects on U.S. GDP (the maximum GDP increase is 0.5 during the first two quarters). Also, tariffs have a positive effect on the U.S. trade balance (the trade balance improves up to 0.3 percentage point in the short run, although in the long run the effect vanishes), and improve the situation of the domestic tradable goods industry: the output of the domestic tradable

goods industry increases by 1.2 percentage points; and in addition, production of domestic nontradables increase by 0.4 percentage points.

- Alternatively, we can only focus on the effects on GDP for the first, say, ten years. We ask: what value of the discount factor would result in zero discounted sum of GDP effects? We find that a policymaker with a discount factor above 9.5 percent would favor the introduction of tariffs, as the discounted sum of GDP effects is greater than zero, whereas a policymaker with a discount factor below 9.5 would not impose tariffs.

Taken together, the more short-term or sectoral considerations are important drivers of trade policy (or the higher the policymaker's discount rate), the more an opportunistic U.S. policymaker might consider the introduction of across-the-board tariffs on imports from Emerging Asia (even though a benevolent policymaker would refrain from doing so).¹⁹

Robustness checks Before we proceed, it is worth mentioning some other scenarios we ran to check the robustness of the simulations. First, we changed the size of the tariff: an important finding of this scenario is that U.S. GDP is falling in the long run. Is this because 27.5 percentage points is not an optimal tariff rate? As it turns out, varying the tariff changes the size of the effect, but does not alter the results qualitatively. As mentioned above, *BoC-GEM* is a nonlinear model, but tariff simulations are done using numerical linearization. Therefore they have relatively linear effects (i.e. a 10 percentage points tariffs has roughly twice the effects of a 5 percentage points tariff etc.). In any case, a different tariff rate does not change the sign, and the appreciation of the real exchange rate continues to be the main reason for why U.S. GDP is falling, not rising, in the long run. Put differently, although the United States can benefit from higher terms of trade, the volume effect on U.S. exports dominates the price effect, leading to lower U.S. exports and, eventually, lower U.S. GDP. So while the literature suggests that there might be an optimal tariff rate, our results will not change qualitatively, even if our tariff rate turns out to be somewhat too high or too low.

Second, we have assumed that the tariff revenues are used to increase government spending. An alternative assumption would be that revenues are used to lower taxes. Changing this assumption improves the picture in terms of U.S. GDP, as the fall in GDP in the long-run is smaller. This reflects positive effects from reducing distortionary

¹⁹Note that if we used consumption, rather than GDP, as main decision variable for U.S. policymakers, the case for introducing tariffs would be very strong: U.S. real consumption increases by 0.4 percentage points in the first period and almost 0.7 percentage points in the long run.

Table 1: The long-term effects of lower labour taxes vs. higher government spending

Long-term effects	Lower labour taxes	Higher government spending	Difference
<i>United States</i>			
GDP	-0.31	-0.68	-0.37
Inflation	-0.01	-0.01	0.00
Exchange rate ^a	-4.89	-5.10	-0.21
<i>Emerging Asia</i>			
GDP	-1.86	-1.88	-0.02
Inflation	-0.01	-0.01	0.00
Exchange rate ^a	6.03	6.10	0.07
<i>Canada</i>			
GDP	0.63	0.57	-0.06
Inflation	0.00	0.00	0.00
Exchange rate ^a	-0.52	-0.41	0.11
<i>Europe/Japan</i>			
GDP	0.02	0.01	-0.01
Inflation	0.00	0.00	0.00
Exchange rate ^a	0.90	1.02	0.12

^a Real effective exchange rate

labour taxes and boosting labour effort. However, in the long run, U.S. GDP continues to fall (about -0.3 percentage points if taxes are lowered, compared to -0.7 percentage points if revenues are used to increase government spending). All other results are very similar (see table 1), in particular for other countries: for instance, if revenues from tariffs are used for lowering taxes, the increase on Canadian or European GDP is only about 0.05 and 0.01 percentage points higher, respectively.

4.3 Scenario 2: Would Europe/Japan follow the United States and impose tariffs on Chinese imports?

As seen, Europe and Japan are hardly affected by the United States imposing tariffs on Emerging Asia (only very moderate negative effects on GDP). However, the U.S. tariff leads to a re-direction of trade: Given the higher import prices, U.S. consumers are more reluctant to consume goods from Emerging Asia. Conversely, Emerging Asia's exports to Europe/Japan increase by more than 2.5 percentage points (a permanent effect), and at the same time, Europe and Japan's export sector get hit (at the peak, their exports to Emerging Asia fall by more than 10 percent). This requires substantial sectoral adjustment. It is therefore not inconceivable that the two countries consider joining the United States in their adoption of tariffs on Chinese imports. Such a sit-

uation could, for instance, occur if labour markets are not sufficiently flexible to shift labour away smoothly from import-competing industries. In the next scenario, we evaluate whether Europe and Japan have incentives to follow the United States and levy a 27.5 percentage points tariff on goods from Emerging Asia.

In the long run, adopting tariffs is not a good idea for Europe and Japan (see figure 6). Firstly, adoption of European/Japanese import tariffs does not boost their GDP effect in the long term. Secondly, and more importantly, the European and Japanese export sector suffers even more when imposing tariffs. This is because under this policy, their exchange rate appreciates, rather than depreciates, on real effective terms (for the same reasons as the U.S. dollar appreciated after the introduction of tariffs by the United States). Again, however, there is a positive effect on European/Japanese GDP in the short run (due to the fall in relative prices of domestically produced goods), which might tempt opportunistic policymakers to adopt tariffs, but the gains are very small (less than 0.3 percentage points, peaking after 2 quarters).²⁰ Given that U.S. import tariffs hardly affect Europe and Japan's economic performance, and given that import tariffs imposed by Europe and Japan would not improve the situation for their export industry (but might come at high political costs, which are not captured in the model), we consider it highly unlikely that Europe and Japan follow the United States. In what follows we therefore assume that they will not adopt protectionist policies at this stage.

Regarding spillovers to the rest of the world, if Europe and Japan join the United States, they create a deep recession in Emerging Asia (GDP dropping by more than 9 percentage points at the peak); while marginally improving the situation for the United States. The main winner in this scenario is Canada, as its GDP increases by more than 0.5 percentage points in the long run.

4.4 Scenario 3: Emerging Asia retaliates and imposes tariffs on U.S. imports

An introduction of U.S. import tariffs on Emerging Asia's exports hurts the Asian economy both in the short- and in the long-run. To mitigate the negative economic effects, the region has two options: first, Emerging Asia might attempt to avoid import tariffs by letting its currency appreciate. The ongoing policy debate suggests that Emerging Asia could avoid U.S. protectionist policies altogether if they let their nominal exchange rate appreciate (i.e. the 'wave of protectionism' would not even start). Is it likely that

²⁰As before, the gains from tariffs would increase somewhat if we assume that revenues from tariffs are used to reduce labour taxes.

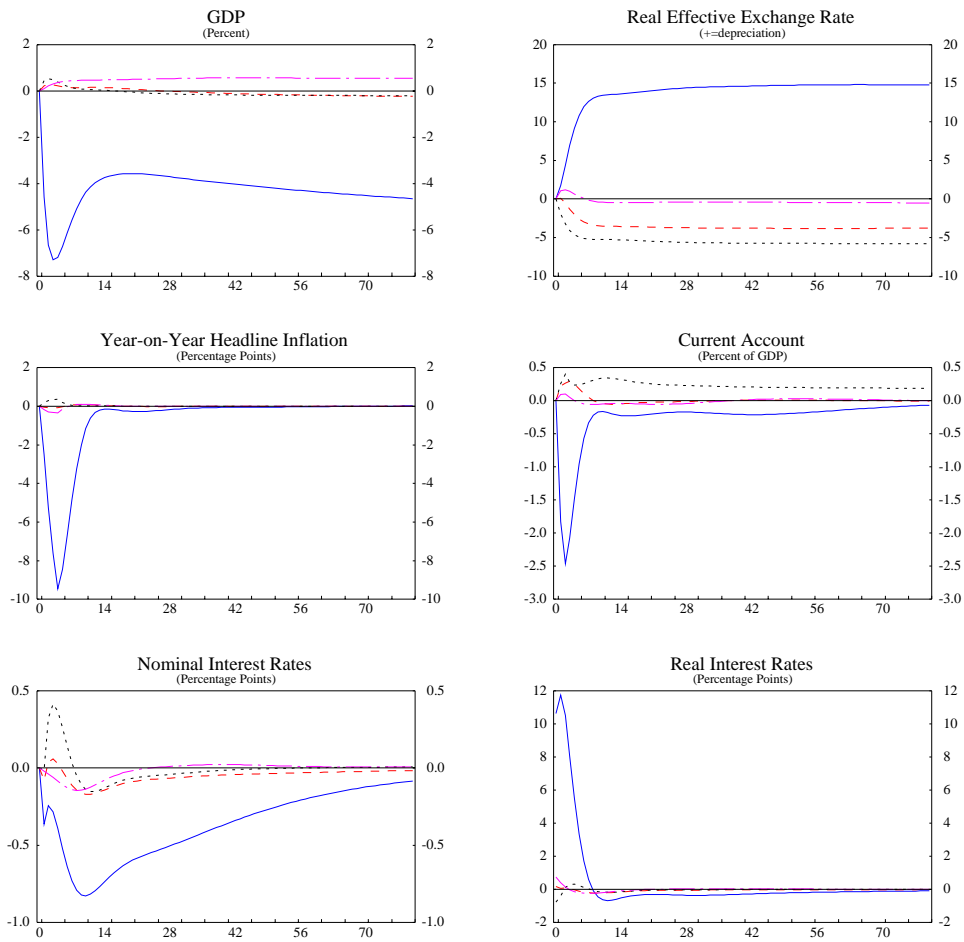


Figure 6: Europe joins the United States and adopts a 27.5 percentage points tariff on imports from Emerging Asia (Solid Blue= Emerging Asia; Dashed Red= Europe/Japan; Dotted Black= United States; Dotted Dash Magenta= Canada)

Emerging Asia prevent the introduction of tariffs by letting its exchange rate adjust? Simulating this scenario is challenging, but we provide detailed results in Appendix A. The main intuition of an Asian revaluation is that on the one hand, it improves Emerging Asia's terms of trade, resulting in higher consumption in Asia. On the other hand, however, a revaluation implies that Emerging Asia's exchange rate increases against *all* other countries, not just the United States. As our results show, Emerging Asia's export sector gets hit even worse than under the U.S. tariff, resulting in a further fall of GDP. In light of the uncertainty surrounding the revaluation scenario, a sufficiently cautious policymaker in Emerging Asia would probably not attempt to prevent the introduction of U.S. tariffs by letting its exchange rate appreciate.

If the United States impose tariffs, a second response could be that Emerging Asia considers 'retaliation' by imposing a tariff on exports from the United States to Emerging Asia (a 'tit for tat'-response). This is the scenario we evaluate next. For simplicity, we assume that the tariff on U.S. export to Emerging Asia will be of similar magnitude; that is, we simulate the consequences of a 27.5 percentage points tariff on Emerging Asia's exports to the United States and on U.S. exports to Emerging Asia (again the main intuition of the results carries through for different tariff rates).

'Retaliation' substantially dampens the negative effect on Emerging Asia's GDP in the short run, essentially halving it from minus 4 to minus 2 percentage points (see figure 7). In the long term, however, the negative effects are even higher, resulting in a fall of GDP of around 3.8 percentage points (compared to a fall of GDP of 1.9 percentage points without retaliation). This is because retaliation dampens Emerging Asia's real depreciation; consequently, its exports decline much more (in the long run, total exports fall by 11.6 percent, up from 4.8 percentage points without retaliation). Hence, retaliation is attractive if the goal is to reduce the negative short-term effects on Emerging Asia's GDP, but retaliation is *not* attractive, if protection of the export industry is an important economic goal, or if policymakers care about long-term effects on GDP. This means that a benevolent policymaker is not likely to retaliate, and even an opportunistic policymaker might not retaliate, given the importance of Emerging Asia's export industry.²¹

How would retaliation affect the rest of the world? Retaliation worsens the outcome

²¹Retaliation would expose Emerging Asia's export sector to two negative shocks: first, exports are directly hit by U.S. import tariffs, but second, retaliation also effectively reduces the real exchange rate devaluation which is needed to restore competitiveness. This is clearly not in line with a policy of export-led growth. The case for tariffs is stronger, if we assume that policymakers care about real consumption, rather than GDP: without retaliation, Emerging Asia's consumption falls substantially in the short- and long-run (the maximum decline is 2.6 percentage points in the fourth quarter; after ten years consumption is still 1.7 percentage point lower). With retaliation the fall in GDP is mitigated: the maximum fall is 0.7 percentage points, and after ten years, real consumption is 0.3 percentage points lower.

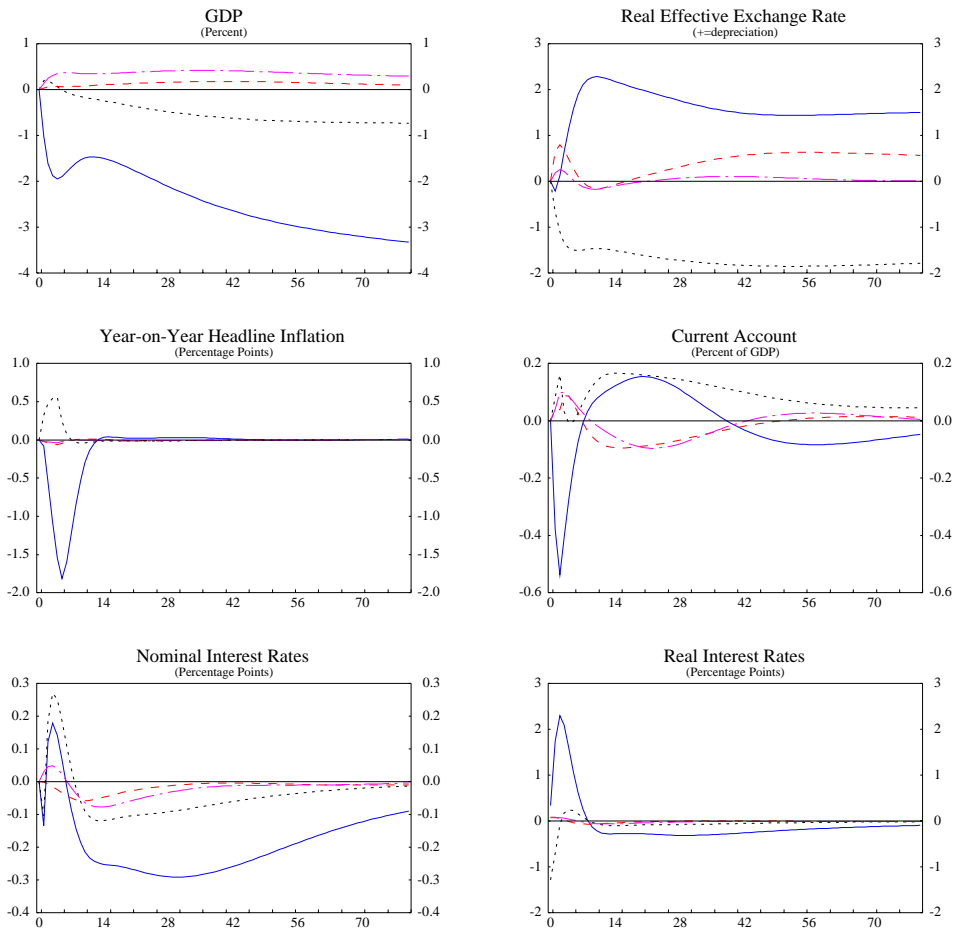


Figure 7: Emerging Asia retaliates and imposes a 27.5 percentage points tariff on imports from the United States (Solid Blue= Emerging Asia; Dashed Red= Europe/Japan; Dotted Black= United States; Dotted Dash Magenta= Canada)

for the United States, though not much: U.S. GDP drops by 0.6 percentage points under retaliation and 0.5 percentage points without retaliation. Also, Canada continues to benefit from the adoption of protectionist measures, as its GDP continues to increase on a permanent basis. Again, the beneficial effects of protectionism for Canada reflect that the United States imports more from Canada to compensate for the fall in imports from Emerging Asia. The small negative long-term effects resulting from U.S. tariffs for Europe and Japan turn into small long-term benefits if Emerging Asia retaliates, as their exports to the United States increase (benefiting from the region's real depreciation). Hence, in this 'trade war', the two countries imposing tariffs hurt primarily each other.

4.5 Scenario 4: Will Europe/Japan retaliate?

Lastly, suppose that – contrary to our 'recommendation' above – Emerging Asia's policymakers decide to retaliate. In this last scenario we examine whether Europe and Japan have incentives to impose tariffs after Emerging Asia's retaliation. We examine three situations, as European and Japanese policymakers can consider adopting tariffs on imports (i) from Emerging Asia, (ii) from the United States, or (iii) from both.

As all simulations yield relatively similar qualitative results, we summarize the main points in table 2. We report the effects on GDP in the short- and long-term, and the long-term effects for the export sector, for tariffs on imports from the United States, from Emerging Asia (EA), or both. All forms of retaliation yield positive economic benefits for Europe and Japan in the short run, but negative effects on GDP in the long run. As before, the size of the effects is largely determined by the degree to which domestically produced goods become cheaper in relative terms – i.e. the magnitude of the exchange rate appreciation. Note that the export sector would suffer substantially under all retaliation scenarios (in fact, the export sector never benefits, neither in the short, nor in the long run, in any of the retaliation scenarios). Therefore, if sectoral considerations matter (such as concerns about the export performance), they would clearly argue against retaliation.

Taken together, no retaliation is the best response for Europe and Japan in the long term. If policymakers were opportunistic, rather than benevolent, they might consider retaliation; however, the option that yields the highest short-term benefits includes levying duties on imports from the United States. Taking into account the broader political context, this is not a very likely scenario. Considering that the positive short-term effects on taxing imports from Emerging Asia are relatively small, we can probably dismiss all three retaliation scenarios for Europe and Japan as relatively unlikely.

Table 2: Will Europe and Japan retaliate in Step 4?

Effects for Europe/Japan	Short-term GDP^a	Long-term GDP	Long-term Export sector^b
No retaliation	-0.08 (4)	0.01	-0.38
Import tariffs on US	0.71 (2)	-0.38	-11.78
Import tariffs on EA ^c	0.37 (2)	-0.42	-7.36
Import tariffs on US and EA ^c	1.07 (2)	-0.45	-18.28

^a Max. effect after x quarters (quarters in brackets)

^b Long-term effects

^c EA = Emerging Asia

4.6 Evaluation

As stated before, we assume that a ‘wave of protectionism’ is likely if policymakers see benefits from imposing tariffs on imports from other countries. Our simulations indicate that such a wave would not only entail negative long-term consequences for the country on which tariffs are imposed, but also for the country introducing the tariff. Although the country imposing tariffs benefits through better terms of trade, the volume effect on exports dominates the price effect in *BoC GEM*.²² This means that through the real exchange rate channel, import tariffs also punish the countries that introduce them. Figure 8 summarizes our key results: benevolent U.S. policymakers would not adopt tariffs, as their long-term GDP falls, but opportunistic policymakers might. If the United States adopted tariffs, Europe/Japan would not follow, and it is only under rather specific assumptions in the economic interest of Emerging Asia to retaliate. And even if Emerging Asia retaliated, Europe and Japan still have very limited economic incentives to adopt tariffs on imports from Emerging Asia, the United States, or both. So essentially, if trade decisions are purely based on longer-term economic considerations, a world-wide surge in import tariffs would represent serious trade policy mistakes. There are, however, possible political gains, if policymakers are short-sighted.

That said, given the economic benefits of trade liberalization, the most compelling explanation for the presence of tariffs is not economic, but political. It is therefore interesting to contrast our findings with the political economy literature on protectionism. We are not aware of political-economy studies on the adoption of tariffs along the lines of the Schumer and Graham bill. However, there is a large body of literature on the political economy of sector-specific tariffs. If we can identify the main motives for

²²Recall that trade flows in *BoC GEM* are calibrated using trade data. The fact that the volume effect dominates the price effect for the country blocks in *BoC GEM* does not preclude the possibility that for individual countries, the price elasticity of exports might be large enough to dominate the volume effect.

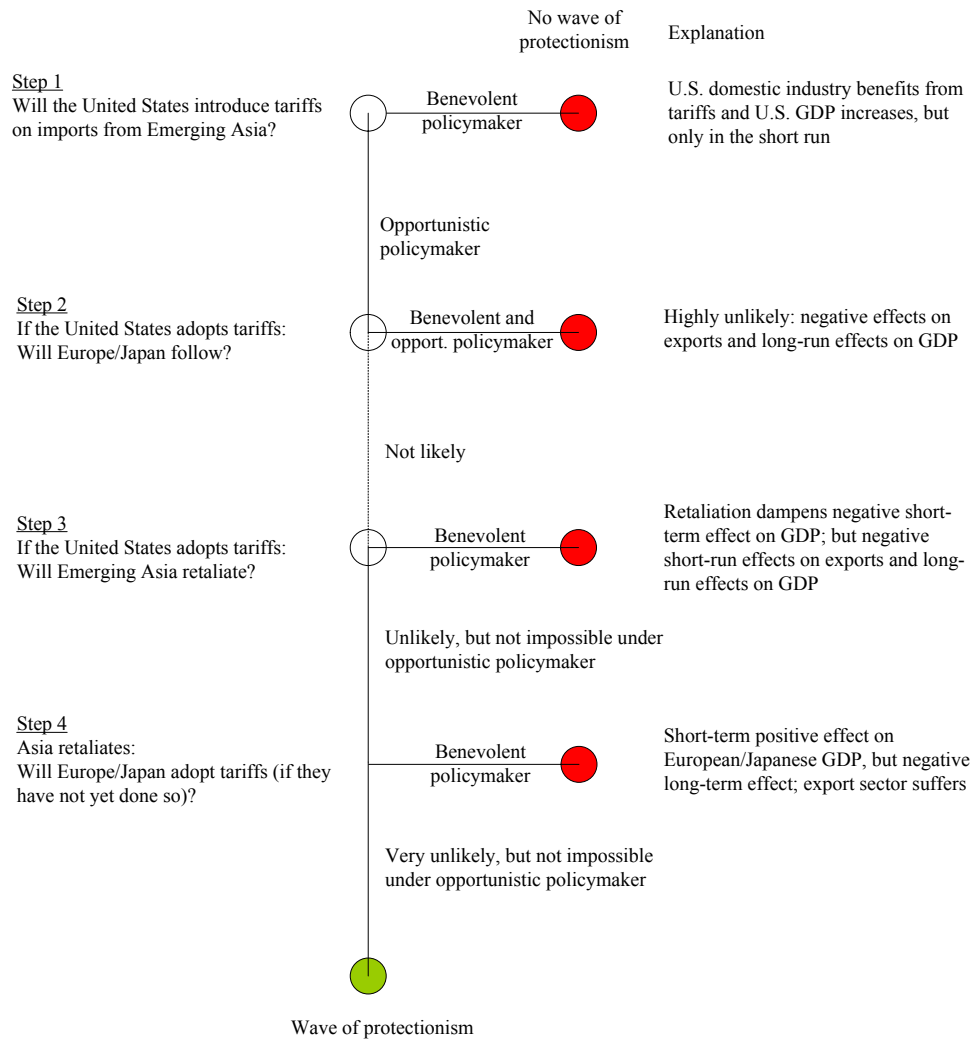


Figure 8: Will there be a wave of protectionism?

applying sector-specific tariffs, we can also draw conclusions about the likelihood of introducing tariffs on emerging Asia.

Trade policy in democracies is the result of a competitive political process involving voters, parties, and organized groups. Various models have analyzed the motives of these actors. Trade policy models explain the level of protection as a function of macroeconomic and political variables, which are viewed as indicators of the demand for protection and the propensity of the government to supply it (Baldwin, 1985).²³ Gawande and Krishna (2003) survey the literature and show that industries with low wages and a high level of labour per unit tend to be highly protected. Also, there is evidence suggesting a positive link between the levels of protection of domestic industries, and the ease at which industries can organize politically (Baldwin, 1985; Treffer, 1993). And Baldwin (1985), Tosini and Tower (1987), and Kang and Greene (1999) present evidence that political considerations – as well as campaign donations of powerful industries – affect voting behaviour on trade policy.

Taken together, political economy considerations suggest that introduction of tariffs is primarily motivated by concerns about specific sectors. The better the sector can organize lobbying or the larger the impact in terms of political votes, the more likely it is that calls for barriers to free trade will be picked up by policymakers. In this regard, the current U.S. debate about imposing tariffs on all imports from China is different from calls for more selective tariffs to protect e.g. the apparel industry. A uniform tariff yields dispersed economic and political gains, and is not well suited to overcome free-riding among interest groups.

Does this mean that implementation of tariffs along the Schumer and Graham bill is not very likely? Nollen and Iglarsh (1990) analyze the voting records of U.S. senators on international trade bills. They find that local constituent interests are more important for commodity-specific issues, but ‘ideology’ is the more important force in generic protectionism issues. In a similar vein, Evenett and Meier (2006) show that in the 2006 elections various ‘trade-friendly’ members of the Senate or Congress were replaced by ‘trade-sceptics’, but in no case was a ‘trade-sceptic’ replaced a ‘trade-friendly’ member in either chamber.²⁴

²³Grossman and Helpman (1994) model lobbying as influencing governments in power, regardless of their political colour. This suggests that free trade arrangements are formed when the benefits to consumers are so large that they allow governments to ignore lobbying for protection. Various theoretical contributions have attempted to predict tariff structures, based on the political considerations shaping protectionist policies. For instance, Esfahani (2005) emphasizes the importance of earning capacity per industry as a determinant for political contributions. Grossman and Helpman (1996) argue that sunset industries can better overcome the free-rider problem than sunrise industries, entry of new firms in sunset industries is limited. This makes it easier to identify the beneficiaries of protectionist policies; an important factor to secure political support.

²⁴Other studies emphasized the geographical element – typically, sponsors and supporters of bills favouring protectionist measures are from industrial states such as Pennsylvania, Michigan, or Ohio. Consultancy

5 Conclusion

In this study we have investigated the effects of uniform, across-the-board tariffs on imports. This issue has received a lot of attention recently, and there is no shortage of warnings: for instance, Peter Mandelson, the EU Trade Commissioner, fears that ‘...we are entering a period in which the bulwarks against protectionism are going to be severely tested’.²⁵

Our simulations put these concerns into perspective. First, the economic gains for countries adopting tariffs are relatively small, and only under very specific circumstances would it pay off for countries to impose such tariffs. This is because in the long run, the negative consequences of the appreciating real exchange rate dominate the domestic stimulus provided by the import tariff. Second, our exploration of the motives of policymakers has shown that they need to have a relatively restrictive objective function (i.e. being short-sighted and concerned about sectoral developments) to be willing to adopt tariffs. Third, even ‘myopic’ policymakers in Europe and Japan are not likely to adopt import tariffs, even if the United States were to introduce them. And lastly, if the United States introduces tariffs on Emerging Asia, it is not evident that Emerging Asia’s policymakers have incentives to retaliate.²⁶ Hence, we conclude that (economically) sensible policymakers would not adopt tariffs in the first place, and even if they were adopted, tariffs need not always trigger a wave of protectionism (in fact, if politicians are benevolent, a wave of protectionism would not happen).

So, are the alarmists wrong? While our conclusions are generally supportive of free trade, the concerns are not misplaced. First, our discussion of the political motives underlying the introduction of tariffs has revealed an additional consideration, namely that the ‘political gains’ from adoption of a uniform tariff are dispersed, but that (local) economic interests alone cannot explain adoption of broad-based tariffs. Second, a serious trade dispute need not unfold along the (admittedly simple) lines of a uniform, across-the-board tariff, but retaliation could be more directed at specific sectors or goods. And third, the concerns are justified, not because we think that an outbreak of protectionism is inevitable, but because the costs are likely to be high, if it were

firm *IDEAglobal* observed that the sponsorship of the 38 House and Senate bills targeting China since 2005 is bipartisan; and of the single-party sponsored bills, 9 were Democratic and 8 Republican. The common denominator of the bills’ sponsors was they had close links to industrial states (*IDEAglobal*, April 11, 2007).

²⁵Financial Times, June 7, 2005. In the same article, James Robinson – former chief executive of American Express and prominent business cheerleader during the last round of global trade negotiations – was cited comparing the rising protectionist pressures to ‘a descent into economic madness’.

²⁶An important caveat is that economies need not retaliate by imposing a similar tariff. Other possibilities of retaliation could include restricting foreign ownership in ‘attractive’ economic sectors, or moving slowly on the protection of intellectual property (other protectionist trade policies are outlined in Coughlin et al., 1988).

to occur. In fact, by not including dynamic effects, this study has probably underestimated the long-term costs of tariffs, protectionism harms trade: studies on the effects of NAFTA have found that intra-bloc trade has grown by more than 200 percentage points within the first ten years (Hufbauer and Schott, 2005). As trade has historically been an important force driving economic growth (Frankel and Romer, 1999), protectionism can harm economic growth in the long run.²⁷ Indeed, Wacziarg and Welch (2003) show that for the 1950-1998 period, more open countries have grown on average about 1.5 percentage points faster after they liberalized trade. Similarly, Sachs et al. (1995) report that between 1970 and 1989, relatively more open developing countries grew at 4.49 percent per year, whereas relatively more closed economies grew at 0.69 percent per year. Within the group of developed economies, the relatively more open economies grew at 2.29 percent per year, whereas the relatively closed economies grew at 0.74 percent per year. Therefore, protectionism rightly ranks among the important risks to economic growth: if this risk were to materialize, the potential negative impact on global economic growth could be very large.

A Appendix: Will U.S. tariffs ever be introduced?

In section 4.4 we investigated a scenario where Emerging Asia retaliates by imposing tariffs on exports from the United States to Emerging Asia. This is one trade policy option available to Emerging Asia. There is, however, a second policy option: According to the ongoing policy debate, Emerging Asia could prevent the adoption of tariffs on their exports by the United States altogether by letting their nominal exchange rate appreciate. Hence, to avoid the 27.5 percent tariff on imports from Emerging Asia to the United States altogether, Emerging Asia might decide to revalue its currency ‘pre-emptively’, as a means to reduce the trade surplus with the United States. The price of Emerging Asia’s exports to the United States will increase in both cases, regardless of whether the underlying trade policy change is a higher nominal exchange rate for Emerging Asia, or whether it is because of U.S. import tariffs (but as we show, the welfare consequences are quite different). Given this, ‘the lesser of two evils’ could be to let the nominal exchange rate appreciate. This is a different angle to see how likely the introduction is of a uniform tariff on imports from Emerging Asia to the United States. In terms of the decision tree, one way to think of this is that in ‘step 0’, when the United States threatens to introduce tariffs, Emerging Asia can choose between tariffs and an appreciation (see figure 9).

²⁷Protection can turn a positive rate of growth into a negative one’ (Corden, 1977, p. 188).

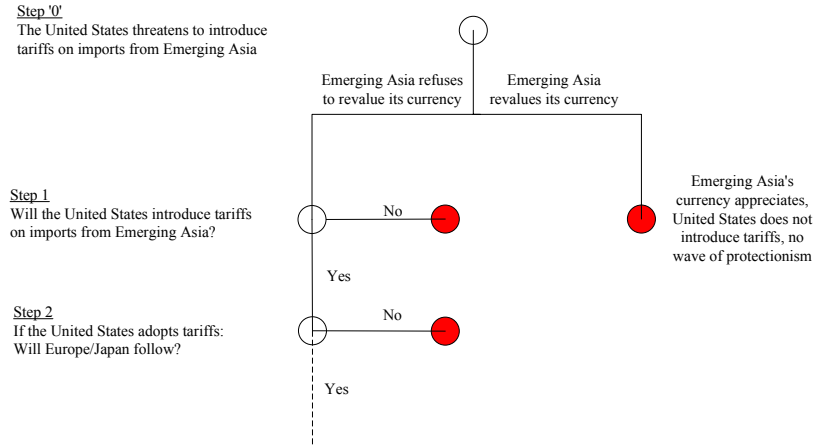


Figure 9: Decision tree if Emerging Asia decides to revalue its currency

To investigate this issue, we need to compare the outcome of two scenarios: firstly, a scenario where the United States imposes a tariff on imports from Emerging Asia. This baseline scenario was evaluated in detail in section 4.2. Against this scenario we compare a situation in which Emerging Asia revalues its currency, effectively eliminating the ‘need’ for the United States to adopt tariffs. If the economic outcome (in terms of GDP or the export sector) is more favourable for Emerging Asia under the revaluation scenario than under the tariff scenario, a revaluation is the more likely option (put differently, if Emerging Asia’s policymakers decide purely on the basis of economic considerations, a revaluation could be likely, if the effects of a nominal exchange rate appreciation for Emerging Asia are more favourable than a U.S. import tax).

Assume for simplicity that Emerging Asia would let its currency appreciate by 27.5 percent (the import tariff rate), such that the options ‘revaluation’ and ‘import tariff’ would result in similar effects on the prices of Emerging Asia’s goods in the United States. Before we discuss the simulation in detail, note that the two options ‘revaluation’ and ‘import tariffs’ differ in two important respects: on the one hand, a revaluation makes Emerging Asia richer by changing the price of tradable versus nontradable goods *in Emerging Asia*. This gives a boost to domestic consumption; an effect that is absent in a case where the United States adopts tariffs on imports from Emerging Asia.²⁸ On the other hand, in a world of flexible exchange rates, it is not

²⁸Put differently, a revaluation improves Emerging Asia’s terms of trade, whereas an import tariffs worsens them. This difference has welfare implications: a revaluation makes Emerging Asia richer, whereas an import tariff lowers the price Emerging Asia can command for its exports.

possible to revalue one's nominal exchange rate against one currency only. Hence, a *bilateral* nominal revaluation of Emerging Asia's currency against the U.S. dollar will effectively result in a *multilateral* revaluation of Emerging Asia against all other currencies. Therefore, Emerging Asia's export sector becomes less competitive worldwide, not just in the United States. This reinforces the downward pressure on Emerging Asia's export performance.

An important caveat is that simulating a revaluation in a DSGE context is not straightforward. First, keeping an exchange rate undervalued creates distortions in the economy. In a DSGE model, these are captured by a (relatively) higher risk premium.²⁹ When simulating a revaluation, this elevated risk premium should drop – leading to lower domestic interest rates – but economic theory does not give clear guidance by how much and how fast. To get an idea how powerful the risk premium channel is, we can simulate a revaluation in *BoC-GEM* both with and without risk premium shock. This is the route we explore here to gauge the sensitivity of the results.

Second, we need to decide what monetary regime Emerging Asia will follow after the revaluation. In theory they could switch to inflation targeting. To keep things simple, however, we assume that they maintain a fixed exchange rate regime, but at a higher bilateral exchange rate vis-à-vis the United States.

Lastly, if Emerging Asia were to revalue its currency by 27.5 percent against the U.S. dollar, its NFA-to-GDP position would also drop by 27.5 percent, because its U.S. dollar holdings would fall in value. It is not clear whether economic policy would be directed toward restoring the 'old' NFA-to-GDP ratio (which would make large savings necessary, resulting in a huge drop in consumption), or whether the economy would stay at the lower, 'new' NFA-to-GDP ratio. To be able to better trace the effects, we attempt to minimize the number of shocks imposed. Therefore, we assume that Emerging Asia does not attempt to rebuild the old NFA-to-GDP ratio.

In light of these considerations, we report two simulations. In the first, Emerging Asia revalues its currency, but there is no adjustment to the risk premium. In the second simulation, we also reduce Emerging Asia's risk premium by 1 percent after the revaluation (the shock seems small, but its effect is very powerful, as we will see). The results are given in figures 10 and 11. Comparing the two graphs, we see a number of striking results. First, a revaluation of Emerging Asia's currency *without* risk premium shock has a larger short-run negative effect on Emerging Asia's GDP than the introduction of U.S. import tariffs. This is not surprising: as said before, in a world

²⁹In this context, the term 'risk premium' should not only be thought of as the premium investors receive for holding a risky asset. The risk premium in *BoC-GEM* captures other country-specific elements of the economy, such as – in this case – distortions arising from maintaining an undervalued exchange rate.

of flexible exchange rates, a bilateral revaluation of Emerging Asia's currency against the U.S. dollar will effectively result in a multilateral appreciation. Emerging Asia's exports to all countries fall sharply (by more than 20 percentage points on impact), reflecting that its exchange rate has appreciated against *all* other countries. As before, an important long-term adjustment channel is the real exchange rate. In this case, in the long run, the revaluation does not have negative real consequences, as Emerging Asia's real exchange rate remains unchanged in the long run. In the long run, a revaluation has therefore a smaller negative impact on GDP than a U.S. tariff (a revaluation reduces GDP by 0.05 percentage points in the long run, whereas a U.S. import tariff lowers Emerging Asia's GDP by almost 2 percentage points).

Second, a revaluation of Emerging Asia's currency *with* a negative risk premium shock dampens the negative short-term effects on its GDP (essentially halves it), bringing it more in line with the results obtained from the U.S. import tariff scenario. In the medium run, the reduction in the risk premium even boosts Emerging Asia's GDP by more than one percent (driven by higher investment), leading to a small, but permanent, increase in Emerging Asia's GDP by around 0.1 percent in the long run. This illustrates how powerful the channel through the risk premium is.³⁰

Lastly, as regards the effects on the rest of the world – Canada, Europe/Japan, and the United States – the benefits from a revaluation of Emerging Asia's currency seem rather small. For instance, the effects on U.S. GDP in the long run is only about 0.1 percentage point, with or without risk premium shock. Comparing the revaluation to U.S. import tariffs, the spillovers to the rest of the world are somewhat different: the currencies of Canada and Europe and Japan appreciate, rather than depreciate as in the case of the U.S. import tariff, on real effective terms (although they return to their pre-shock levels in the long run), primarily because the real effective exchange rate movement of the U.S. dollar is much more muted (a moderate appreciation). Positive spillovers in the form of higher exports to the United States from these countries carry through, but they are not large (the net effect on Canada and European and Japanese GDP is almost zero).

Taken together, and again assuming that trade decisions are taken based on economic and political reasons, the decision for Emerging Asia to revalue its currency, as opposed to letting the United States introduce import taxes, depends on policymaker's assumptions about changes to the currency's risk premium. As mentioned before, we take a 'conservative' approach by assuming a relatively small reduction. If Emerging

³⁰These results confirm our initial caution to provide a precise quantification of the possible reduction in Emerging Asia's risk premium, following a revaluation of the currency. The magnitude we employed – a 1 percent reduction – is certainly not implausibly large.

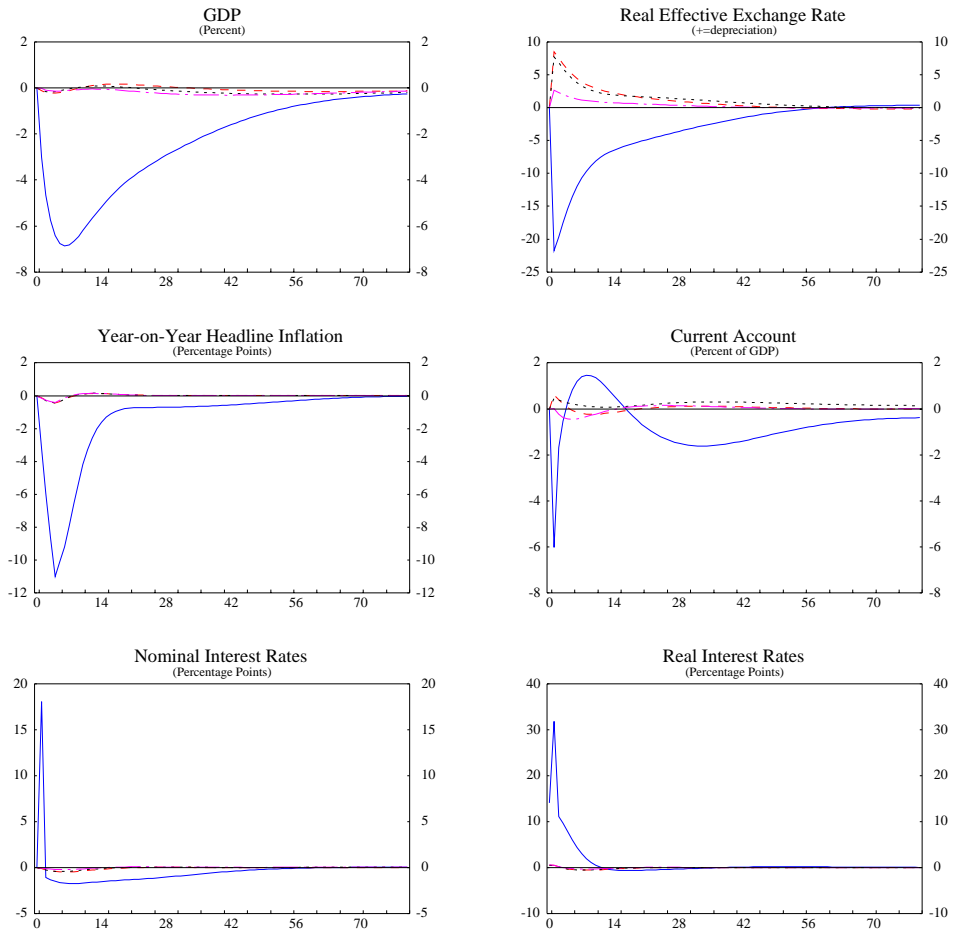


Figure 10: Emerging Asia revalues its nominal exchange rate by 27.5 percent, no change to Emerging Asia's risk premium (Solid Blue= Emerging Asia; Dashed Red= Europe/Japan; Dotted Black= United States; Dotted Dash Magenta= Canada)

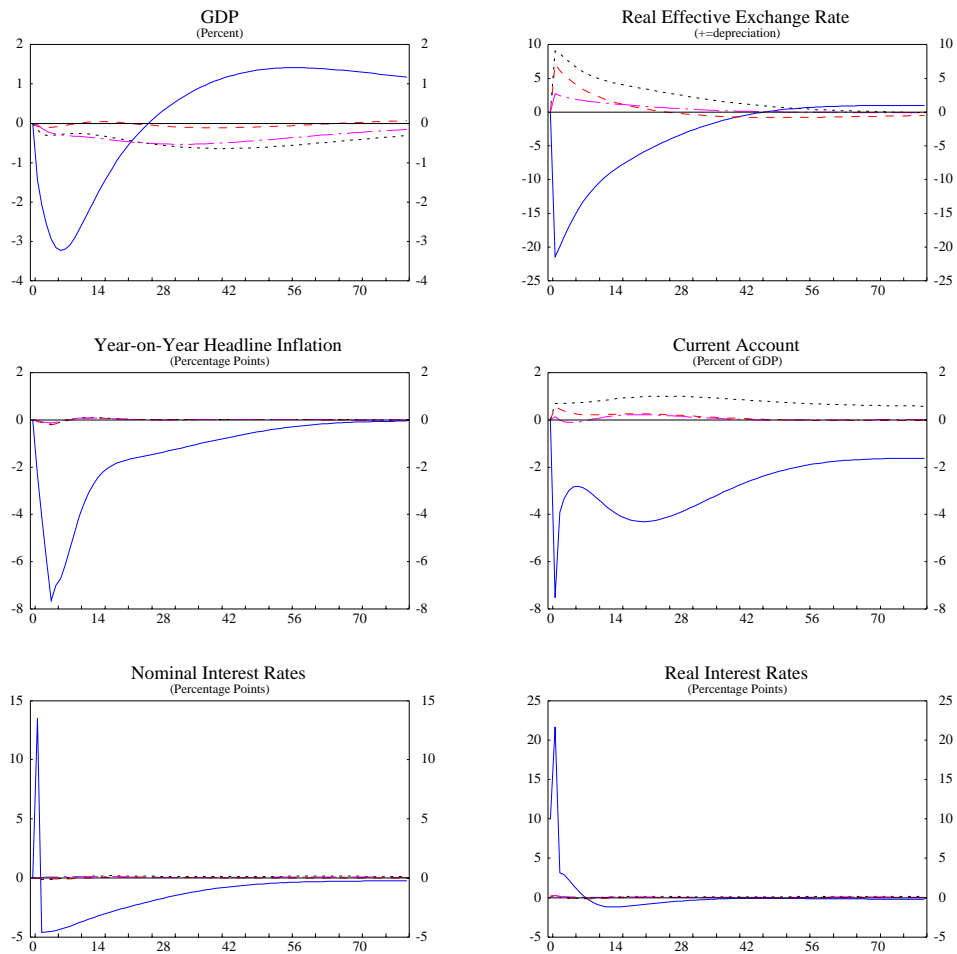


Figure 11: Emerging Asia revalues its nominal exchange rate by 27.5 percent, its risk premium drops by 1 percent (Solid Blue= Emerging Asia; Dashed Red= Europe/Japan; Dotted Black= United States; Dotted Dash Magenta= Canada)

Asia's policymakers assumed that a revaluation by 27.5 percent would lead to a reduction in the risk premium by more – say, 1.5 percent – the decision would be relatively straightforward: despite the initial negative economic shock, the medium- and long-term benefits occurring from the lower risk premium are probably powerful enough to convince policymakers to let Emerging Asia's currency appreciate.

The political reality in Emerging Asia may be more complex than *BoC-GEM*, however. For instance, we have neglected the possible negative consequences of a higher exchange rate for Emerging Asia's financial sector (Prasad et al., 2005; Tatom, 2007). Also, it is not inconceivable that Emerging Asia is afraid that import-competing sectors such as agriculture might get hurt, if the currency was to appreciate. This could be politically unattractive. Hence, we cannot exclude the possibility of ending up in a situation where the United States adopts an import tariff along the lines of scenario 1.

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