NBER WORKING PAPER SERIES

TRADE REFORMS AND CURRENT ACCOUNT IMBALANCES: WHEN DOES THE GENERAL EQUILIBRIUM EFFECT OVERTURN A PARTIAL EQUILIBRIUM INTUITION?

Jiandong Ju
Kang Shi
Shang-Jin Wei

Working Paper 18653
http://www.nber.org/papers/w18653

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 2012

We thank Jonathan Eaton, Takatoshi Ito, Maurice Obstfeld, Andrew Rose, Stephanie Schmitt-Grohe, Nelson Mark, Vincenzo Quadrini, Michael Song, Martin Uribe and seminar/conference participants at NBER International Trade and Investment Program meeting, NBER East Asia Conference 2010, San Francisco Federal Reserve Pacific Basin Research Conference, Columbia University, IMF, and the World Bank for helpful comments, and Joy Glazener and Nikhil Patel for editorial assistance. All errors are our responsibilities. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

Trade Reforms and Current Account Imbalances: When Does the General Equilibrium Effect Overturn a Partial Equilibrium Intuition?
Jiandong Ju, Kang Shi, and Shang-Jin Wei
NBER Working Paper No. 18653
December 2012
JEL No. F2,F3

ABSTRACT

While a reduction in import barriers in a partial equilibrium may be thought to lead to an increase in imports and a reduction in trade surplus, the general equilibrium effect can go in the opposite direction. We study how trade reforms affect current accounts by embedding a modified Heckscher-Ohlin structure and an endogenous discount factor into an intertemporal model of current account. We show that trade liberalizations in a developing country would generally lead to capital outflow. In contrast, trade liberalizations in a developed country would result in capital inflow. Thus, efficient trade reforms can contribute to global current account imbalances, but these imbalances do not need policy "corrections"

Jiandong Ju
Department of Economics
University of Oklahoma
Norman, OK 73019
jdju@ou.edu

Kang Shi
Department of Economics
Chinese University of Hong Kong
Shatin, New Territories
Hong Kong
kangshi@cuhk.edu.hk

Shang-Jin Wei
Graduate School of Business
Columbia University
Uris Hall 619
3022 Broadway
New York, NY 10027-6902
and NBER
shangjin.wei@columbia.edu

1 Introduction

There are three ways to think of a country's current account. First, it is trade balance plus net international factor payment. Because the last item is small for most countries, current account surplus (deficit) tends to move in tandem with trade surplus (deficit). Second, the current account is also equal to net capital outflows. Third, the current account reflects the difference between a country's national savings and national investment. In this paper, we explore how a general equilibrium approach that integrates the three perspectives alters one's usual (partial equilibrium) intuition about the effect of trade reforms on current account. We show that this approach provides novel insights on the causes (and future evolution) of the so-called global current account imbalances. In particular, a part of the current account imbalances can be an equilibrium response to welfare-improving trade liberalization. While the word "imbalance" often has a negative connotation, a current account imbalance that arises for this reason is efficient in principle and does not need a policy correction.

Global current account imbalances have exhibited a rapid rise since 2002, as represented, for example, by a surge in China's current account surplus from a modest 2% of GDP in 2002 to over 14% in 2007, and a surge in the US current account deficit from about 3% to about 7% during the same period. This has generated anxiety and calls for measures to "correct" the imbalances. At the same time, world trade, measured as the ratio of imports plus exports over GDP, has grown five times in real terms since 1980. In particular, the ratio of imports and exports to GDP in low income countries has increased from about 20% in 1990 to more than 40%, and the average tariff rate in low income countries has declined from about 60% to 15%.[1] Interestingly, both the Chinese surplus and the US deficit started to narrow after 2007. In this paper, we study how trade liberalizations (and factor market reforms) may have played a role both in the initial rise in the current account imbalances and the subsequent fall of the imbalances.

In our theory, both trade liberalization and factor market reforms matter for current account. For concreteness, we first motivate our story using China as an example (though the underlying economic message goes beyond a single country). Figure 1 traces out the

[1] The data are from Jaumotte, Lall, and Papageorgiou (2008).

trajectory of China's trade-weighted average tariff rate and that of its current account balance from 1998 to 2010. The current account balance (as % of GDP) was very mild before 2002, but started to rise noticeably afterwards until 2007 when it began to fall. The average tariff rate was as high as 14% before 2002 (with tariff rates on some individual goods in excess of 50%) but declined rapidly to close to a more modest 5% by 2004 and stayed that low afterwards.

We use a first vertical broken line to denote the time of China's formal accession to the World Trade Organization (which took effect in December of 2001). The accession protocol dictates a long list of trade reforms that China has to implement, many of which have a time table of up to three years. We use a second broken line in 2004 to mark the end of most of the trade reforms required of China. The WTO accession requires more than just reforms in the product market. A slew of factor market reforms, especially in the financial sector, were embedded in the accession protocol as well. Many of the financial sector reforms, such as the opening of the commercial and investment banking business to foreign financial institutions, were supposed to be completed by December 2006. By the end of 2006, the share of lending that was conducted by banks outside the traditional top-4 state-owned banks had gone up substantially. Both venture capital and private equity markets have developed. Overall, access to finance by private firms, while still less than perfect, has improved measurably. We use a third vertical line in 2006 to mark the end of important financial sector reforms required of China as part of its WTO membership. We mark the dates of both the trade reforms and the financial sector reforms because we will argue that both affect the patterns of the current account.

Does China's WTO entrance contribute to the jump in its current account surplus? One's first reaction may be no. The WTO accession requires China to reduce its import barriers without corresponding changes in its trading partners' import barriers. Shouldn't that lead to a rise in China's imports and therefore a fall in China's trade surplus? However, that reaction represents a partial equilibrium intuition. The general equilibrium effect could be very different. It is important to note that China's import competing sectors are likely to be more capital intensive than its export sectors. A reduction in the import barriers on the capital-intensive good tends to reduce the domestic return to capital, all else equal.

This is the intuition one gets from the Stolper-Samuelson theorm in the classic (and static) trade theory. If the pre-liberation return to capital was equal to the world interest rate, the import liberalization upsets the equilibrium. To restore equilibrium, the country must export capital (i.e., run a current account surplus) until the domestic return to capital rises to the pre-liberalization level. This heuristic explanation takes savings as given. Of course, savings would be endogenous in a dynamic model. The first key objective of this paper, therefore, is to develop a dynamic model and clarify when this general equilibrium effect can happen.

It is important to note that trade liberalizations would generally induce an opposite current account response in a high-income (or capital abundant) country. Reductions in trade barriers in a capital-abundant country tend to raise the return to capital by the logic of the Stolper-Samuelson theorem. To restore the equilibrium, the country would attract a capital inflow, i.e., creating a current account deficit.

Factor market frictions could affect the current account response to trade reforms by blocking or slowing down structural transformations. The second key objective of this paper is to study interactions between trade reforms and factor market frictions. We find that with credit constraints, trade reforms in a developing country tend to produce a current account surplus, but with a magnitude that is smaller than without credit constraints. This suggests that trade reforms that are also accompanied by factor market reforms are likely to produce a greater current account response than without factor market reforms.

By coincidence, the quotas on many textile and garment products imposed by the United States and a subset of other high income countries through the Multifibre Agreement (MFA) were phased out by the end of 2004, and Chinese textiles and garment producers turned out to be one of the largest beneficiaries. Over a short space of a single year from 2004 to 2005, Chinese exports of the previously quota-constrained products grew by 119%, substantially faster than the average annual growth rate of 17% during 2000-2004 (Khandelwal, Schott, and Wei, forthcoming). Under our theory, this reduction in barriers to China's labor intensive exports would also lead to a reduction in the domestic return to capital. To restore equilibrium, China would exhibit a surplus in its current account and export its capital. Given China's size, the rest of the world has to have a matching current account deficit.

Moreover, the end of MFA also represents one of the most significant trade liberalizations for the United States (and to a lesser extent, the European Union) in recent years. This, by itself, could generate a current account effect for these countries. If the United States has a more flexible labor market than the European Union, our theory would predict that the effect is stronger for the United States.

The Chinese WTO accession also accelerated financial sector reforms in the country, especially during 2002-2006. According to our theory, this financial sector reform should complement the trade reforms and help produce an even bigger current account surplus than otherwise would have been the case.

This paper is related to several papers on the cause of global current account imbalances. Caballero, Farhi, and Gourinchas (2008) and Mendoza, Quadrini, and Rios-Rull (2009) highlight the role of difference in financial development. Countries with a relatively low financial development (e.g., China) cannot produce enough financial assets at home to absorb all the savings. As a result, they have to export part of their savings to countries with better financial development (e.g., the United States). As a result, countries like China run a current account surplus, and countries like the United States run a deficit. Song, Storesletten and Zilibotti (2011) also feature the role of financial imperfections in China in generating its current account surplus. It stresses the inability of productive domestic private firms to borrow from the formal financial sector as key financial sector frictions. As the share of these firms grows in the economy, so does the country's current account surplus. In both sets of papers, when China's financial market develops (including improvement in access to finance by private firms), the country's current account surplus should decline rather than increase. This appears to be the opposite of what one observes in the data. Our theory in this paper will suggest that factor market reforms such as improvements in the financial market will reinforce the effect of trade liberalization on the current account.

A different theory about the rise of current account imbalances is given by Du and Wei (2010), which suggests that a rise in the relative surplus of men in China since 2002 may have triggered a competitive race to raise household savings by families with a son. As the sex ratio deteriorates progressively, the faster rise of the savings rate than investment rate produces a progressively larger current account surplus since 2002. Wei and Zhang (2011) provide empirical evidence that suggests that higher sex ratios may explain about 50% of the increase in Chinese household savings from 1990 to 2007. While this paper also examines the cause of the Chinese current account surplus (and global current account imbalances in general), the underlying mechanism is very different. Logically, these explanations (financial development, sex ratio imbalance, and trade reforms) can be compatible with each other, and collectively generate the type of current account imbalances that we see in the data. While all these papers suggest that current account imbalances can arise without exchange rate manipulations, they also have somewhat different policy implications. Both financial under-development and sex ratio imbalance can be thought of as distortions that can and should be corrected by targetted policy interventions, trade liberalizations are efficient policy changes per se, and do not require another policy to offset them.

A few papers have examined the empirical relationship between trade reforms and current account such as Ostry and Rose (1992) and Ju, Wu, and Zeng (2010). They generally find that the relationship is ambiguous. Our model provides a natural explanation: the effect of the current account response to trade reforms depends on whether a given change in trade policy leads to a rise or a fall in economywide capital intensity, and also on the nature of domestic factor market frictions. When one mixes different types of trade policy changes in a sample, and disregards factor market features, it is not surprising to find an ambiguous effect.

In terms of modeling methodology, our paper is related to a small but growing literature that considers multiple tradable sectors with different factor intensities in a general equilibrium framework. These papers include Cunat and Maffezzoli (2004), Ju and Wei (2007), Jin (2011), Jin and Li (2011), and Ju, Shi and Wei (2011). None of the existing papers in this literature explicitly studies the effect of trade liberalizations on current account. As a result, existing papers do not link the patterns of global current account imbalances to China's WTO accession, the end of MFA quotas and other trade reforms.

2 Suggestive Empirical Patterns

Before we present a formal model, it is useful to have more stylized facts beyond the China example. To this end, we examine the current account experience of all countries that have experienced a major trade policy change in the last two decades. More precisely, we adopt a two-step procedure. First, we identify episodes of large trade policy changes for all countries since 1990 (for which the relevant data are available). Second, for each country in this sample, we measure changes in the country's capital intensity and examine its relationship with changes in the country's current account.

We define a trade reform episode as one that simultaneously satisfies two criteria: (a) there is a reduction in the country's average tariff rate (either the simple-weighted tariff or the trade-weighted tariff) by 3 percentage points or more in one or two years; and (b) there is an increase in the country's imports-to-GDP ratio by 3 percentage points any time in the first, second or the third year after the tariff reduction relative to the ratio in the year before the tariff change.

Some trade reforms may result in a decline in the country's capital intensity in its production, while others may produce an increase in capital intensity. Our theory suggests that the current account consequence of trade reforms may differ in these two cases. We now perform a simple check on whether, following a major trade policy change, the change in a country's current account pattern is systematically related to the change in its capital intensity.

It is relatively straightforward to measure current account (as a percent of GDP) and its change. How do we measure a change in capital intensity? Our approach is to measure the capital intensity of the country's export structure before and after the trade policy change. (Ideally, we would like to measure the capital intensity of the country's entire production structure, but we do not have as good data on the sector-level production as that on sector-level exports.) We do it in two steps. First, we use the 2002 US Standard Make and Use Tables (from the US Bureau of Economic Analysis) to compute capital intensity for each HS 6-digit sector. Second, for a given country in the sample in any given year, we can compute the average capital intensity of its export bundle. Our maintained assumption is that the capital intensity of a sector is a technological feature that does not change across countries. (Actually what we need is a somewhat weaker assumption: the ranking of sectors in terms of capital intensity, rather than the absolute values of capital intensity, is highly correlated across countries.)

There are 38 episodes, involving 31 distinct countries, that satisfy the criteria to qualify as trade reforms. Unfortunately, 8 of the episodes involve missing data on either trade intensity (Bangladesh 2007, Bhutan, Lesotho, Pakistan, Philippines, Syria, Zimbabwe) or current account (Lebanon). Two episodes appear to be obvious outliers (Belize and Guyana) whose changes in trade composition are substantially bigger than other country-episodes. A list of the 38 trade reform episodes is provided in Table 1. A * is affixed to the country episodes if we also have the relevant data on current account and capital intensity that are not obvious outliers. There are 28 country episodes that receive a *.

We present a simple scatter plot in Figure 2 of changes in current account (as a share of GDP) against changes in capital intensity. A negative relationship between the two variables is visible, and is not driven by any obvious outlier. On average, a trade policy change that leads to a reduction in the capital intensity of the economy tends to be followed by an improvement in the current account balance.

We then perform the following simple regression:

$$\Delta(\frac{CA_j}{GDP_j}) \quad = \quad \alpha + \beta \Delta k_j + \theta X_j + \varepsilon_j \tag{2.1}$$

where $\Delta(\frac{CA_j}{GDP_j})$ and Δk_j represent the change in country j's current account to GDP ratio, and the change in the average capital intensity of its export bundle, respectively, while X_j are other control variables such as the change in the real exchange rate. In Column 1 of Table 2, we report the basic regression result. The regression show a negative and statistically significant relationship between the change in capital intensity and change in current account. The coefficient of course simply captures the slope of the fitted line in Figure 2. In other words, in episodes in which a trade policy change has led to a decline in the capital intensity of the country's exports (e.g., China after the WTO accession in 2002-2003), the current account balance tends to go up. Conversely, in episodes in which a trade policy change has led to an increase in capital intensity (such as India during 2005-2008), the current account balance tends to deteriorate.

In Column 2, we add the change in country j's real exchange rate over the same period of the trade policy change as a control variable. Because we do not have information on price level (or inflation) for several countries in the sample, the regression sample is greatly reduced to only 13 countries. In any case, the coefficient on the real exchange rate is negative and statistically significant, suggesting a rise in the real exchange rate tends to be associated with a decline in a country's current account. More importantly, we continue to find a negative coefficient on capital intensity: a rise in a country's capital intensity tends to be associated with a deterioration of its current account.

Because of the small sample size, we are not able to have many control variables. We also do not investigate potential endogeneity of the regressors. We therefore treat the empirical pattern as suggestive rather than definitive. In the rest of the paper, we provide a theory of current account response to trade policy changes that is consistent with this pattern in the data.

3 The Basic Model

Our model, in a nutshell, marries a Heckscher-Ohlin structure (with two tradable sectors of different factor intensities) and a small open-economy intertemporal framework. Importantly, we also incorporate a version of an endogenous discount factor (EDF) following Uzawa (1968), Obstfeld (1982), Mendoza (1991), Uribe (1997), Schmitt-Grohe (1998), and Choi, Mark, and Sul (2008), among others. The EDF has a built-in "keeping-up-with-the jones" feature - an economic agent tends to become more patient when others in the economy are more patient, and vice versa. Philosophically, this strikes us as having captured a realistic feature of the world that is especially relevant when it comes to topics related to savings and consumption.

Conveniently, the notion of an endogenous discount factor also helps us to address an inherent tension between the classic HO trade model and the standard intertemporal framework, which is the problem of interest rate over-determination. In the standard intertemporal model of current account, the interest rate in the steady state is determined by the time discount factor from the demand side. In the HO model, if the economy is within the diversification cone, the interest rate is determined by the zero profit conditions from the supply side (i.e., the interest rate and the wage are completely determined by goods prices). In general, the two interest rates from the two approaches would not be the same except by coincidence. Even assuming the two are the same initially, a permanent shock such as trade liberalization would cause the two implied interest rates to diverge again. This problem was raised by Stiglitz (1970) when he shows that, in a dynamic HO model, unless two countries have identical discount factors one country must specialize. Once we have an endogenous discount factor, the problem of interest rate over-determination disappears. In that case, the interest rate is determined by the zero profit conditions in the HO model. For any given interest rate, through endogenous discount factor, the total consumption in the steady state is then determined.

Note that the usual motivation for an endogenous discount factor in a dynamic open-economy model is either to make the steady state different from initial conditions or to make the current account adjustment more persistent. We assume an endogenous discount factor because we find it both philosophically attractive in capturing a realistic feature of the world and technically useful in addressing the problem of interest rate over-determination.

To complete our framework, we also have to address another technical challenge. In particular, the standard Heckscher-Ohlin model imposes a balanced trade assumption, which rules out capital flows and non-zero current account. To have a meaningful discussion of current account changes, we abandon the (unrealistic) restriction on balanced trade. But this raises a different issue, namely, capital flows and goods trade are perfect substitutes in the absence of any frictions, as was pointed out by Mundell (1957). In other words, the HO structure without the balanced trade assumption has inherently multiple equilibria. (Or the balanced trade assumption is a particular way to select an equilibrium out of infinite many possibilities.) To avoid multiple equilibria, we follow Neumeyer and Perri (2005) and Schmitt-Grohe and Uribe (2003) to assume convex costs of adjusting the international asset position.

Convex adjustment costs for international asset position can also make the steady state independent of initial conditions. In our context, this assumption helps to address the technical challenge of multiplicity of equilibria. With linear costs of trade in goods and/or capital, corner solutions occur: either goods trade or capital flow takes place, but the two do not coexist.[2] Once we assume convex costs of adjusting international asset position, we

[2] For more detailed discussions on this point, readers are guided to Ju and Wei (2007).

can pin down equilibrium capital flows and current account. In an extension of the model when we introduce costs of adjustment of labor and capital across sectors, the multiple equilibria problem is resolved as well.

3.1 Household

The economy is inhabited by a continuum of identical and infinitely lived households that can be aggregated into a representative household. The representative household's preference over consumption flows is summarized by the following time-separable utility function

$$U = \sum_{s=t}^{\infty} \theta_s U(C_s) \tag{3.2}$$

where C_s is the household's consumption of a final good at date s, and θ_s is the discount factor between period 0 and s as given by

$$\theta_{s+1} = \beta(\tilde{C}_s, \widetilde{Y}_s)\theta_s, \;\; s \geq 0 \tag{3.3}$$

where $\theta_0 = 1$ and $\frac{\partial \beta(\tilde{C}_s)}{\partial \tilde{C}_s} < 0$ and $\frac{\partial \beta(\widetilde{Y}_s)}{\partial \widetilde{Y}_s} > 0$. We assume that the endogenous discount factor does not depend on the household's own consumption and income, but rather on the economy-wide average per capita consumption $\tilde{C}_s$ and income $\widetilde{Y}_s$, which the representative household takes as given.[3] The exact functional form of $\beta(\tilde{C}_s, \widetilde{Y}_s)$ will be presented later. The household owns both factors of production, capital K and labor L. For simplicity, we assume a fixed labor supply.

The final good is produced by combining two intermediate goods. Each intermediate good is produced by combining capital and labor. The household supplies labor to both intermediate good sectors through a competitive spot market. In the benchmark model, both labor and capital are assumed to be freely mobile across sectors. Factor market frictions will be discussed later. The household can hold foreign asset B_t to smooth consumption. Following Neumeyer and Perri (2005), we assume that trade in foreign bonds is subject to a small and convex portfolio adjustment costs. If the household holds an amount B_{t+1}, then

[3] This preference specification was pioneered by Uzawa (1968) and applied to the small open economy literature by Obstfeld (1982) and Mendoza (1991).

these portfolio adjustment costs, denominated in units of the final good, are $\frac{\psi_b}{2}(B_{t+1}-\bar{B})^2$,[4] where $\bar{B}$ is an exogenous capacity level of foreign asset management. For simplicity, we assume $\bar{B}=0$.

Therefore, the budget constraint and the capital accumulation equation faced by the representative household are given, respectively, by

$$\begin{aligned} & P_t[C_t+\frac{\psi_b}{2}(B_{t+1}-\bar{B})^2]+B_{t+1}+I_t \\ = \; & w_t L+r_t K_t+(1+r^*)B_t+TR_t \end{aligned} \tag{3.4}$$

$$K_{t+1}=(1-\delta)K_t+I_t-\frac{1}{2}\psi_k(\frac{I_t}{K_t}-\delta)^2 K_t \tag{3.5}$$

where I_t is investment in period t, and w_t and r_t are the wage and the domestic return to capital, while r^* is the world interest rate. δ is the capital appreciation rate and ψ_k is the aggregate capital adjustment cost coefficient. The tariff revenue, TR_t is rebated in a lump sum to the representative consumer, which is taken as exogenous by the consumer.[5]

The first order conditions with respect to C_t, I_t, K_{t+1}, and B_{t+1}, give intertemporal and intra-temporal optimization conditions

$$\frac{U_c'(C_t)}{P_t}=\Omega_t \tag{3.6}$$

$$\Lambda_t(1-\psi_k(\frac{I_t}{K_t}-\delta))=\Omega_t \tag{3.7}$$

$$\Lambda_t=\beta(\tilde{C}_t,\widetilde{Y}_t)\left[\Lambda_{t+1}\left(1-\delta+\frac{\psi_k}{2}(\frac{I_{t+1}}{K_{t+1}}-\delta)(\frac{I_{t+1}}{K_{t+1}}+\delta)\right)+\Omega_{t+1}r_{t+1}\right] \tag{3.8}$$

$$\Omega_t\left[1+\psi_b P_t(B_{t+1}-\bar{B})\right]=\beta(\tilde{C}_t,\widetilde{Y}_t)[\Omega_{t+1}(1+r^*)] \tag{3.9}$$

where Ω_t and Λ_t are Lagrange multipliers for the budget constraint and the law of motion for capital, respectively.

[4] As in Schmitt-Grohé and Uribe (2003), these portfolio adjustment costs eliminate the unit root in the economy's net foreign assets.

[5] See Devereux and Lee (1999) for a similar assumption.

3.2 Production

The production function for the final good is $Y_t = G(D_{1t}, D_{2t})$, where D_{it} is the usage of intermediate good i by the final good producer. The production function for the intermediate good $i(=1,2)$ is $X_{it} = f_i(A_{it}L_{it}, K_{it})$ where A_{it} measures labor productivity. $H_{it} = A_{it}L_{it}$ can be understood as units of *effective labor.* All production functions are assumed to be homogeneous of degree one. D_{it} and X_{it} can differ due to international trade.

The unit cost function for X_{it} is $\phi_i(\frac{w_t}{A_{it}}, r_t)$. Let P_i be the domestic price of intermediate good i. We assume that the country's endowment is always within the diversification cone so that both intermediate goods are produced. In each period t, free entry and zero profits in both the intermediate good and the final good markets imply that

$$P_{1t} = \phi_1(\frac{w_t}{A_{1t}}, r_t), P_{2t} = \phi_2(\frac{w_t}{A_{2t}}, r_t) \tag{3.10}$$

$$P_t D_t = P_t G(D_{1t}, D_{2t}) = P_{1t}D_{1t} + P_{2t}D_{2t} \tag{3.11}$$

3.3 Equilibrium

In equilibrium, trade in intermediate goods equalizes (tariff-inclusive) good prices between the home country and the rest of the world in every period. Without loss of generality, we assume that sector 1 is labor intensive while sector 2 is capital intensive. Considering a labor abundant country which exports labor intensive good 1, we have:

$$P_{1t} = P_{1t}^*, \; P_{2t} = (1+\tau)P_{2t}^*, \tag{3.12}$$

where P_{it}^* denotes the world price and is exogenously given, and τ is the import tariff. Following the standard assumptions in the Hecksher-Ohlin model, we assume that production functions (and the unit cost functions) in all countries are the same (although the labor-augmenting productivity can be different). Therefore, in the foreign country we also have:

$$P_1^* = \phi_1(\frac{w^*}{A_1^*}, r^*), \; P_2^* = \phi_2(\frac{w^*}{A_2^*}, r^*) \tag{3.13}$$

For simplicity, we assume that the rest of the world is in steady state so the return to capital, r^*, is a constant. We will leave out the time subscript for all foreign variables from now on. We have the following market clearing conditions in the home country

$$K_t = K_{1t} + K_{2t} \tag{3.14}$$

$$L_t = L_{1t} + L_{2t} \tag{3.15}$$

$$D_t = C_t + \frac{I_t}{P_t} + \frac{\psi_b}{2}(B_{t+1} - \bar{B})^2 \tag{3.16}$$

Equation (3.16) implies that the final good is used not only for consumption and investment, but also for covering the costs of adjusting the international asset position. The current account balance over period t is defined as $CA_t = B_{t+1} - B_t$; thus, noting that $P_{it}X_{it} = w_t L_{it} + r_t K_{it}$ and using equations (3.11) and (3.16)), we can rewrite the budget constraint as

$$CA_t = P^*_{1t}(X_{1t} - D_{1t}) + P^*_{2t}(X_{2t} - D_{2t}) + r^* B_t \tag{3.17}$$

That is, the current account balance is equal to the trade balance (evaluated at the world prices) plus the interest income from the net foreign asset position. For future reference, we define the domestic gross product as $Y_t = \frac{P_1 X_{1t} + P_2 X_{2t}}{P_t}$.

4 Equilibrium Analysis

To study the equilibrium explicitly, we adopt the following standard functional forms for preference and technology. The utility function is $U(C_t) = \frac{{C_t}^{1-\gamma}}{1-\gamma}$, where γ is the inverse of the elasticity of intertemporal substitution. The production function for the final good is $G(D_{1t}, D_{2t}) = \frac{1}{\omega^\omega (1-\omega)^{1-\omega}} D^\omega_{1t} D^{1-\omega}_{2t}$, where ω is the share of intermediate good D_1 in the final good production. The production function for intermediate good i is $f_i(A_{it}L_{it}, K_{it}) = \frac{1}{\alpha_i^{\alpha_i}(1-\alpha_i)^{1-\alpha_i}} K^{\alpha_i}_{it}(A_{it}L_{it})^{1-\alpha_i}$, where a_i is the capital share in producing intermediate good i. We let $\alpha_1 < \alpha_2$ so that sector 1 is labor intensive. The endogenous discount factor takes the following function form:

$$\beta(\tilde{C}_t, \widetilde{Y}_t) = \beta(\frac{\tilde{C}_t}{\bar{C}})^{-\psi_1}(\frac{\widetilde{Y}_t}{\overline{Y}})^{\psi_2} \tag{4.18}$$

where $\psi_1 > 0$ and $\psi_2 > 0$. $\bar{C}$ and $\overline{Y}$ are, respectively, the consumption and output levels in the initial steady state with tariff τ_0. This form is a variant of Choi, Mark and Sul (2008). It implies that in the steady state after tariff reforms, the endogenous discounted factor would deviate from the constant β. To make the model parsimonious, we assume $\psi_1 = \psi_2 = \psi$.

4.1 The Effects of Trade Liberalizations

For simplicity, we assume that $A_1^* = A_2^* = 1$. In equilibrium, given the production functions, from Equation (3.10), we have

$$(\frac{w_t}{A_{1t}})^{1-\alpha_1} r_t^{\alpha_1} = P_1^*,\ (\frac{w_t}{A_{2t}})^{1-\alpha_2} r^{\alpha_2} = (1+\tau) P_2^* \tag{4.19}$$

which give

$$r_t = r^* [(\frac{A_{1t}}{A_{2t}})^{(1-\alpha_1)(1-\alpha_2)} \frac{1}{(1+\tau)^{(1-\alpha_1)}}]^{\frac{1}{\alpha_1-\alpha_2}} \tag{4.20}$$

$$w_t = w^* [\frac{A_{1t}^{(1-\alpha_1)\alpha_2}}{A_{2t}^{\alpha_1(1-\alpha_2)}} \frac{1}{(1+\tau)^{\alpha_1}}]^{\frac{1}{\alpha_2-\alpha_1}} \tag{4.21}$$

Three comparative statics can be immediately seen: (a) $\frac{\partial r_t}{\partial \tau} > 0$, (b) $\frac{\partial r_t}{\partial A_{1t}} < 0$, and (c) $\frac{\partial r_t}{\partial A_{2t}} > 0$. By inequality (a), trade liberalization in a labor abundant country (a reduction in τ) reduces the return to capital. Inequalities (b) and (c) pertain to sector-biased productivity shocks. While a technological progress in the labor intensive sector reduces the return to capital, the same change in the capital intensive sector produces the opposite effect. It can be verified that, as long as there is a faster technology progress in the labor intensive sector relative to the capital intensive sector ($\frac{A_{1t}}{A_{2t}}$ increases), the return to capital declines.

These results (in a dynamic setting) are consistent with the Stolper-Samuelson theorem in a static HO model. That is, an increase in the price of a good will increase the return to the factor used more intensively in that good, and reduce the return to the other factor. A tariff reduction in the capital intensive sector implies a decrease in the price of capital intensive goods, therefore, r_t decreases but w_t increases.

It is worth emphasizing that the discussion points to a natural asymmetry between developed (capital abundant) and developing (labor abundant) countries. Trade liberalizations tend to reduce the domestic return to capital for a developing country, but to raise it for a developed country.

4.1.1 Net Foreign Asset Positions

We consider two cases of the effects on net foreign asset positions, B_t. First, in the transitional dynamics, we assume that the investment adjustment cost ψ_k is zero. Using equations (3.7), (3.8) and (3.9), we obtain:

$$B_{t+1} = \frac{1}{\psi_b P_t} \frac{r^* - r_{t+1} + \delta}{1 + r_{t+1} - \delta} \tag{4.22}$$

The holding of foreign bond B_{t+1} is a function of r_{t+1} and $\frac{\partial B_{t+1}}{\partial r_{t+1}} < 0$. Second, in the steady state, using first order conditions (3.7), (3.8) and (3.9), we obtain:

$$B = \frac{1}{\psi_b P} \frac{r^* - r + \delta}{1 + r - \delta} \tag{4.23}$$

That is, when the return to capital in the country decreases, capital flows out so that the net foreign asset declines in the steady state. Note that the result for net foreign asset positions does not likely depend on the assumption of an endogenous discount factor, $\beta(\tilde{C}_t, \widetilde{Y}_t)$. For any form of discount factor (endogenous or exogenous), the net foreign asset position must decrease if the domestic interest rate declines. We summarize our discussion by the following proposition:

Proposition 1 *A trade liberalization, or a reduction in trade costs, in a labor abundant country leads to a decrease in the return to capital in the country, which results in an increase in foreign asset holding in the steady state. A technological progress in favor of the comparative advantage sector in a labor abundant country also reduces the return to capital and produces an increase in the net foreign asset position. An opposite set of results holds when a trade liberalization, a reduction in trade costs, or a productivity increase in favor of* *the comparative advantage sector, take places in a capital abundant country.*[6]

4.1.2 Steady State

Using the Euler equation in the steady state (3.8) and the function of endogenous discount factor (4.18), we solve for the ratio of consumption to income.

$$c_y = \frac{\overline{C}}{\overline{Y}}[\beta(1+r-\delta)]^{\frac{1}{\psi}} \tag{4.24}$$

where $c_y = \frac{C}{Y}$ and $\overline{C}$ and $\overline{Y}$ are the consumption and income level in the initial steady state, respectively. Clearly, $\frac{\partial c_y}{\partial r} > 0$. Note that the interest rate is determined by the production side (along the demand curve of capital). A decrease in the interest rate implies that the combined size of capital stock and foreign asset holding in the new steady state is larger, which requires that the household becomes more patient and consumes less relative to income.

The return to factors (r, w) and the holding of foreign asset (B) are given by equations (4.21), (4.20) and (4.23). Given that, we can solve for the demand for the final good, D, consumption, C, investment I and Gross Domestic Product, Y and sectoral outputs X_1 and X_2 from the set of equations listed in Appendix 7.1. We can write the sectoral outputs as below

$$P_1X_1 = \frac{wL-(1-\alpha_2)(1+\tau)(\zeta PD - r^*B)}{(1-\alpha_1)-(1+\tau)(1-\alpha_2)} \tag{4.25}$$

$$P_2X_2 = \frac{(1-\alpha_1)(1+\tau)(\zeta PD - r^*B)-(1+\tau)wL}{(1-\alpha_1)-(1+\tau)(1-\alpha_2)} \tag{4.26}$$

where $\zeta = \omega + \omega/(1+\tau)$. The optimization conditions for the final good producer yield

[6] Let t_c be the iceberg trade cost, we will have: $P_{1t} = \frac{P_1^*}{1+t_c}$ and $P_{2t} = (1+t_c+\tau)P_2^*$. It is immediately seen that a reduction in trade cost will increase the price of the labor intensive good, P_{1t}, but reduce P_{2t}. Similar to the analysis of the tariff reduction, a reduction in trade cost will result in a decrease in r. On the other hand, if the home country were a capital abundant country and exporting good 2, we would have $P_{2t} = \frac{P_2^*}{1+t_c}$ and $P_{1t} = (1+t_c+\tau)P_1^*$. Now a reduction in tariff or trade cost would reduce the price of the labor intensive good, P_{1t}, but increase P_{2t}, which would increase r.

$P_1D_1 = \omega PD$. Thus the exports of intermediate good 1 are given by

$$NX_1 = P_1(X_1 - D_1) = P_1X_1 - \omega PD \tag{4.27}$$

Finally, the factor usages and capital intensities in sector i are given by

$$K_i = \alpha_i \frac{P_iX_i}{r},\ L_i = (1-\alpha_i)\frac{P_iX_i}{w},\ \text{and} \tag{4.28}$$

$$\frac{K_i}{L_i} = \frac{\alpha_i}{1-\alpha_i}\frac{w}{r} \tag{4.29}$$

A tariff cut in the capital intensive sector will lead to an expansion of the labor intensive sector, and a contraction of the capital intensive sector. As a result, labor and capital flow from the capital intensive sector to the labor intensive sector, and both exports and imports go up.

4.2 Calibrations in the Basic Model

To calibrate the basic model, we follow the standard approach (as in Backus, Kehoe, and Kydland, 1992, 1994; and Kehoe and Peri, 2002) as much as possible. The parameter values are summarized in Table 2. We set the inverse of the elasticity of intertemporal substitution $\gamma = 2$, the steady state discount factor $\beta = 0.99$, which implies a 4 percent annual world interest rate. We assume an equal share of the intermediate goods in the final good production, so $\omega = 0.5$. We choose $\alpha_1 = 0.33$ and $\alpha_2 = 0.7$ so that both the average labor share and the average dispersion of the labor shares in the model economy are the same as those estimated from China's input-output Table in 2002. We set capital adjustment cost $\psi_k = 4$ so the elasticity of Tobin's Q with respect to the investment capital ratio is 0.1, which is within the range reported in the literature. We set the annual depreciation rate of capital at 10%, which implies $\delta = 0.025$. Following Schmitt-Grohe and Uribe (2003), the coefficient for bond adjustment costs, ψ_b, is set to be 0.0007. We set $\psi = 0.1$, which is close to the value chosen by Choi, Mark and Sul (2008). A summary of the parameter choices is presented in the following table.

Table 3: Parameter Values in the Calibrations

β	discount factor in steady state	0.99
γ	inverse of the elasticity of intertemporal substitution	2
α_1	capital share in sector 1	0.33
α_2	capital share in sector 2	0.7
ω	share of goods 1 in final good	0.5
ψ_b	coefficient for convex bond adjustment costs	0.0007
δ	capital depreciation rate	0.025
ψ	parameter of endogenous discount factor	0.1
ψ_k	coefficient of capital adjustment cost	4
A_1	productivity in sector 1	0.8
A_2	productivity in sector 2	0.50207

In the initial steady state, the economy is assumed to impose a 15% tariff on imports of the capital intensive good, while the rest of the world has no tariff. We further choose the values of the productivity parameters to make $r = r^*$ so that $B = 0$, and the domestic wage is lower than that in the rest of the world. We cannot use the Euler equation to determine the level of aggregate consumption $\bar{C}$ and output $\overline{Y}$ as there are multiple equilibria. As long as the country's capital-labor ratio K/L is between $\frac{K_1}{L_1}$ and $\frac{K_2}{L_2}$, any level of capital stock K could be an equilibrium. A smaller K simply implies that the country would export more labor intensive good and import more capital intensive good. We use the country's export share, therefore, to select the equilibrium in the initial steady state. The mathematical derivations are relegated to Appendix 7.2.

For the initial productivity, we set $A_1 = 0.8$ and $A_2 = 0.50207$ so that in the initial steady state, given the tariff level, the returns to capital across countries are equalized and the wage in the domestic economy is lower than that in the rest of the world.

We consider two policy experiments of reducing the import tariff by 5 and 10 percentage points, respectively. In columns 2, 3 and 4 of Table 4, we report the values for both the initial steady state (when the tariff=15%) and the new steady states (when the tariff = 10% and 5%, respectively). The numerical results confirm Proposition 1. In particular, the return to capital declines while the wage rate rises; the labor intensive sector expands while the capital intensive sector shrinks; and the labor intensive sector exports more while the capital intensive sector imports more. Most interestingly, capital flows out of the country. A relatively moderate tariff reduction (from 15% to 10%) results in a significant capital outflow, so that the increase in the foreign asset holding is on the order of 29% of the country's GDP. A tariff reduction by 10 percentage points (from 15% to 5%) leads to an even greater increase in foreign asset holding to 56% of GDP.

There are also interesting byproducts of the trade reforms. In particular, the domestic capital stock, K, increases; the consumption to GDP ratio declines while the investment to GDP ratio increases. These are consistent with theoretical results discussed in equation (4.24).

We have explained the current account response to a tariff cut in terms of the Stolper-Samuelson logic. It may be useful to further consider the responses of savings and investment (as a share of GDP), respectively. After a tariff cut but before the completion of the adjustment of foreign asset holding, the domestic return of capital declines. Because the representative household has an endogenous discount factor, this must imply that the household becomes more patient and that its savings rate becomes higher. [In popular policy discussions, a decline in consumption as a share of GDP in China in recent years is commonly regarded as a symptom of distortions that require a policy correction. Instead, in our case, a decline in consumption share arises naturally as a byproduct of a *reduction of distortions*. Specifically, it occurs as a response to China's WTO accession, which hardly needs to be undone by another policy.]

Interestingly, the domestic investment (as a share of GDP) can go either up or down, depending on the parameter values. However, due to the Stolper-Samuelson logic, the response of the current account, or the savings minus the investment, is unambiguous.

In Figure 3, we report the dynamic paths of the economy from the initial to the new steady state after a 5 percentage points cut in the tariff (from 15% to 10%). We assume that the trade liberalization starts to hit the economy in period 1. We find that the structural adjustment takes place immediately. In particular, sector 1 (the labor intensive sector) expands immediately with an increase in K_1, L_1, and X_1, while sector 2 contracts immediately, with a decline in K_2, L_2, and X_2. As a result, both the export share sx and import share sm increase immediately. The consumption response is somewhat non-standard. There is a decline in the first several periods; after that, consumption rises gradually. (As noted earlier, the consumption in the new steady state is still lower than in the initial steady state.) Due to a sharp rise in output, we can find that the ratio of consumption to output declines, which implies a higher saving rate after a tariff reduction. This is because the return to domestic capital declines, which implies that the domestic capital stock is larger. Also, the household sends some of the savings abroad. Both of these require the household to consume less (as a proportion of income).

In Figure 4, we report the dynamic paths for some key balance-of-payments items for the same trade reform experiment. We observe that the trade volume (the sum of exports and imports as a share of GDP), trade surplus and current account surplus all jump immediately. While the current account stays positive throughout the transition and approaches zero in the long run, the net foreign asset position B/GDP increases gradually to the new steady state level (of 29% of GDP). In response to the trade liberalization, the economy runs a persistent trade surplus, initially on the order of 5 percent of GDP. In the long run (after 20 quarters), however, the economy will run a trade deficit, which is balanced out by the interest payment of the foreign asset.

We now perform some sensitivity analysis. First, we investigate transitional dynamics when we vary the aggregate capital adjustment cost $\psi_k = 4$, 8, and 12. The results are presented in the top row of Figure 5. Although the steady state is not affected by changes in ψ_k, the trade volume, the current account and the foreign asset position in the transition dynamics become (moderately) larger when ψ_k becomes smaller. The overall dynamics of the balance of payments does not appear to be very sensitive to perturbations in the value of aggregate capital adjustment costs.

Second, we investigate the BOP dynamics at different bond adjustment costs. As equation (4.23) indicates, the change in the foreign asset position from the initial to the new steady state is affected by the bond adjustment cost, ψ_b. In the second row of Figure 5, we report the transitional dynamics under the assumption of two new values of ψ_b, 0.0005 and 0.0010, in addition to the benchmark value of 0.0007. In all cases, the country still runs a current account surplus after a tariff cut with each of the two alternative bond adjustment costs. The quantitative effect, however, varies. As expected, a smaller bond adjustment cost results in a larger current account surplus in transitional dynamics, and larger trade volume and net foreign asset position in both transitional dynamics and the steady state. In Schmitt-Grohe and Uribe (2003), the parameter of bond adjustment cost is chosen to match the standard deviation of the current account/GDP ratio for Canada (which is 0.015). From the corresponding annual data for China during 1982-2010, after detrending with an HP filter, we calculate that the standard deviation of the CA/GDP ratio is 0.019, which is close to the Canadian number. Separately, in calibrating a RBC model to explain the business cycles in the Chinese economy, Curtis and Mark (2010) also choose $\psi_b = 0.0007$ as the value for the bond adjustment cost. Therefore, we regard $\psi_b = 0.0007$ as the "right" benchmark value.

5 Factor Market Frictions

We now investigate how factor market reforms can interact with trade reforms to affect a country's current account. For the current account to respond to trade reforms, a key intermediary step is the structural adjustment of the domestic economy - the contraction of the capital intensive sector and the expansion of the labor intensive sector - leads to a mismatch between the aggregate saving and the new domestic absorption of capital. This produces a current account response. Logically, factor market frictions that block and reduce the extent of the domestic structural adjustment can also reduce the current account response to trade reforms. We start with financial frictions in the form of credit constraints.

5.1 Financial Frictions

Following Antras and Caballero (2009), we make the simplifying assumption that financial frictions are asymmetric in the two sectors: while firms in the importing sector can employ any desired amount of capital at the equilibrium interest rate, firms in the exporting sector face credit constraints. Note that with a tariff cut on the capital intensive good, only the (labor-intensive) export sector would expand. Therefore, we essentially assume that credit constraints are more binding in the sector that needs expansion.

Credit constraints are introduced through the following (admittedly artificial) setting.

Each capitalist owns one unit of capital so that the capital stock K is owned by a total K of capitalists. A proportion ξ of K are endowed with "entrepreneurial ability" and labelled "entrepreneurs". Only the "entrepreneurs" know how to operate in the exporting sector. However, each entrepreneur can borrow only up to θ amount of her own capital. Thus the total amount of capital employed in the exporting sector is given by,

$$K_{1t} \leqslant (1+\theta)\xi K_t = \mu_k K_t \tag{5.30}$$

where $\mu_k = (1+\theta)\xi$. We focus on the case in which financial frictions are binding (or μ is sufficiently small) so that $\mu_k K$ is less than the desired amount of capital that exporting firms would like to employ in the absence of financial frictions.

Let r_i be the return to capital in sector i. The financial frictions cause a wedge between the returns to capital in the two sectors, $r_{1t} > r_{2t}$. The budget constraint (3.4) now is changed to

$$\begin{aligned} & P_t[C_t + \frac{\psi_b}{2}(B_{t+1} - \bar{B})^2] + B_{t+1} + I_t \\ = \; & w_t L + \sum_{i=1}^{2} r_{it} K_{it} + (1+r^*)B_t + TR_t \end{aligned} \tag{5.31}$$

In addition to the capital accumulation equation, the representative household also faces the credit constraint (5.30) and capital market clearing condition, $K_{1t} + K_{2t} = K_t$. When the credit constraint (5.30) is binding, we have $K_{1t} = \mu_k K_t$ and $K_{2t} = (1-\mu_k) K_t$. Using these results, the budget constraint (3.4) now becomes:

$$\begin{aligned} & P_t[C_t + \frac{\psi_b}{2}(B_{t+1} - \bar{B})^2] + B_{t+1} + I_t \\ = \; & w_t L + [\mu_k r_{1t} + (1-\mu_k) r_{2t}] K_t + (1+r^*)B_t + TR_t \end{aligned} \tag{5.32}$$

Therefore, the first order conditions with respect to C_t, K_{t+1}, B_{t+1}, and L_{it} in the consumer's maximization problem now remain the same as conditions (3.6), (3.8), and (3.9) except that we now replace r_{t+1} by

$$r^C_{t+1} = \mu_k r_{1,t+1} + (1-\mu_k) r_{2,t+1} \tag{5.33}$$

5.1.1 The Steady State Equilibrium

The steady state equilibrium in the case of financial frictions is represented by 15 equations with 15 variables, and is summarized in Appendix 7.3. Similar to equation (4.23), in the steady state we have

$$B = \frac{1}{\psi_b P} \frac{r^* - r^C + \delta}{1 + r^C - \delta} \tag{5.34}$$

Thus, $r^C = \mu_k r_1 + (1 - \mu_k) r_2$, is a key variable in determining the country's net foreign asset holding B.

Because we are not able to obtain an analytic solution, we will resort to numerical results. Here we offer some intuition for the numerical results to come. When financial frictions become tighter (μ_k declines), the capital usage in sector 1 declines. As a result, the marginal product of capital in the exporting sector, r_1, increases, but the marginal product of labor, w_1, declines. Since the wage rates are equalized in the two sectors in the steady state, $w_1 = w_2 = w$, using the zero profit condition in the import-competing sector, $P_2 = \phi_2(\frac{w_2}{A_2}, r_2)$, we infer that the marginal product of capital in the import-competing sector, r_2 must rise. Since both r_1 and r_2 are larger, therefore, r^C becomes larger as financial frictions becomes tighter. Using (5.34), that results in a smaller B. That is, a lower level of financial development (a tighter credit constraint) results in a smaller net foreign asset holding. To summarize, because financial frictions impede the expansion of the exporting sector, a given trade reform produces a smaller capital outflow.

Several recent papers (Caballero, Farhi, and Gourinchas, 2008; Mendoza, Quadrini, and Rios-Rull, 2009; Ju and Wei, 2010; and Song, Storesletten, and Zilibotti, 2011) have showed that a low level of financial development in a developing country can produce a financial capital outflow to developed countries. Therefore, a tighter financial friction would lead to more current account surplus in a developing country. Our paper, however, suggests the opposite. When credit constraint is asymmetric across sectors, for example, when there is a credit rationing in one sector but not in another sector, similar to the setup in Antras and Caballero (2009), we show that a tighter credit constraint induces capital inflow (or a smaller current account surplus). The two parts of the literature can be reconciled when one realizes that the first set of papers emphasizes the effect of financial frictions on the supply side of capital (financial frictions reduce the return on savings and generate incentives to move savings out of the country), while the current paper and Antras and Caballero (2009) stress the demand side effect (credit constraints could increase demand for capital by firms in the unconstrained sector). Our model is different from Antras and Caballero (2009) in that trade liberalization always leads to capital outflow (current account surplus) under credit constraints, although the amount of capital outflow could be made smaller by a tighter credit constraint.

5.2 Labor Market Frictions

We can model labor frictions in a similar fashion and obtain qualitatively similar results. Assume that labor employed in the exporting sector requires "exporting skills", and the amount of labor with "exporting skills" does not exceed a certain proportion of the total amount of labor. In other words, when the labor-intensive sector expands, not all labor previously working in the importing sector can successfully function in the exporting sector. As an example, when the textile industry expands but the steel mills are shut down, not all former steel workers can be productive textile workers. Formally, we model the frictions by the following inequality:

$$L_{1t} \leqslant \mu_L L \tag{5.35}$$

Similarly, the budget constraint (3.4) now becomes

$$\begin{aligned} & P_t[C_t + \frac{\psi_b}{2}(B_{t+1} - \bar{B})^2] + B_{t+1} + I_t \\ = \quad & [\mu_L w_{1t} + (1 - \mu_L)\, w_{2t}]\, L + r_t K_t + (1 + r^*) B_t + TR_t \end{aligned} \tag{5.36}$$

and all the analysis in the basic model goes through except that now we replace w_t by $w_t^c = \mu_L w_{1t} + (1 - \mu_L)\, w_{2t}$. Labor market frictions impede the expansion of the exporting sector. Thus a given trade reform produces a smaller response in both the trade volume and the current account.

5.3 Numerical Results

We focus on the case of credit constraints, while assuming no labor market frictions. We choose the same structural parameters as in the benchmark case. For financial frictions, we set the credit constraint parameter in the initial steady state $\mu_k = 0.42$ so that the initial net export share is about 10%.

The case of a tariff reduction from 15% to 10% under financial frictions is presented in Columns 5 and 6 in Table 4. The return to capital in the importing sector, r_2, decreases, but r_1 in the exporting sector increases. The labor intensive sector expands while the capital intensive sector shrinks, and both exports and imports increase. While the qualitative result is the same as the case without financial frictions (Columns 2 and 3 in Table 4), the magnitude of the changes is (much) smaller. Because the (labor-intensive) export sector cannot expand as much as before, the wage rate now declines. The ratio of the trade volume to GDP increases by 3.7 percentage points (from 21.1% to 24.8%), compared to an increase by 6.6 percentage points when there is not credit constraint. The increase in the net foreign asset position, B/GDP, is on the order of 10% of GDP when there is credit constraint, compared to an increase by 29% of GDP in the absence of credit constraints.

If the tariff is cut to 5%, the new steady state (with credit constraint) is presented in Column 7 of Table 4. Again, comparing the change in the country's foreign asset position from Columns 5 to 7, with the change in the same variable from Column 2 to 4, it is clear that credit constraint can substantially reduce the change in a country's foreign asset position for a given trade reform.

We present, in Figure 6, the transitional dynamics of the economy after a tariff cut from 15% to 10% in the case with credit constraints. Compared to Figure 3 (the transitional dynamics after an identical tariff cut but without credit constraint), the adjustments are smaller. We present, in Figure 7, the transitional dynamics of the trade volume, the trade balance, the current account and the net foreign asset position. For ease of comparison, we use thick bold lines to represent the transitional dynamics when there is credit constraint, and thin broken lines to represent the case of no credit constraint. As one can see clearly, the magnitude of the response of the current account and other BOP variables are all significantly smaller under credit constraint.

6 Concluding Discussion

A wave of trade liberalizations take place in both developing and developed countries, including China's trade reforms during 2001-2006 following its WTO accession and the end of import quotas on textiles and garments in the United States and Europe in 2004. At the same time, both China's current account surplus and the US deficit have risen to an unprecedented level. We suggest that the two developments are intimately related. By embedding a modified Heckscher-Ohlin structure and an endogenous discount factor into an intertemporal model of current account, we obtain two key results. First, trade liberalizations in a developing country that reduce its capital intensity would generally lead to capital outflow, while trade liberalizations in a developed country that increase its capital intensity would result in capital inflow. Thus, trade reforms can produce or contribute to global imbalances (even though they do not call for a policy correction). Second, factor market frictions can reduce the current account response to trade reforms by reducing the extent of economic structural change.

This model offers an interesting interpretation of the Chinese experience with trade reforms and current account dynamics (both the rapid rise during 2002-2007 and the fall after 2007). In particular, there are two phases of trade policy changes that appear to be associated with different current account patterns. Before China's accession to the WTO at the end of 2001, while there had been trade reforms, financial sector frictions may have blunted the current account response. In comparison, the WTO accession represents a watershed event in two senses. First, not only the dismantling of tariff and non-tariff barriers on imports was accelerated, there was also a dramatic reduction in trading costs faced by firms in the exporting sector. In particular, Chinese firms that did not enjoy export rights before the WTO accession acquired an automatic right to exports as a result of the accession. (This reduction in trade costs is not even captured by any measured reduction in tariff rates.) If one counts the number of trade reforms China has to undertake, it is more than two standard deviations greater than the median value for an accession country since 1990 (Tang and Wei, 2009). In that sense, China's trade reforms associated with its WTO accession may be called the mother of all trade reforms. Second, the accession protocol also obligates China to engage in a series of financial sector reforms over a five-year transition period after the accession. These reforms have also greatly facilitated the economic adjustment in the direction of expanding China's comparative advantage sectors and reducing its comparative disadvantage sectors.

The difference between the trade reforms in the 1990s and those associated with the WTO accession can be seen from the time series of the import-to-GDP ratio. The tariff cuts before 2001 had led to only a small change in the import/GDP ratio. In comparison, the WTO accession was followed by a large and sustained increase in the imports from 5% of GDP in 2001 to close to 30% of GDP by 2007. Interpreted in light of our model, the combination of trade reforms and factor market reforms brought out by the WTO accession has the effect of producing a large and positive current account response. Because both trade reforms and financial reforms were conducted over a multi-year phase, the current account response gains strength over time in the first few years after the WTO accession before it peters off.

Our theory also sheds new light on the relative decline in China's current account surplus after 2007. A common explanation for the current account contraction is a temporary reaction to the contraction of global trade associated with the global financial crisis. The implication is that the Chinese current account surplus could return to its pre-2007 level once the world economy is out of the recession. However, our model provides an additional explanation. In our model, the current account response to a trade policy shock is temporary (even though it can last for 20 quarters). Therefore, part of the decline of the current account surplus could result from the end of major trade reforms. The change in current account due to this factor is not likely to be reversed.

The end of the import quotas on textiles and garments by the United States and Europe in 2004 represents another important event that reduces trading costs. Since this was a reduction in trade barriers on a labor-intensive product in the United States, our theory would predict that the U.S. responds by running a current account deficit. More importantly, because textiles and garments are an important comparative advantage sector for China, the end of quotas in 2004 represented a big decline in the export costs for Chinese exporting firms. Therefore this event also reinforces the rise of China's current account surplus in recent years. Because Europe is commonly said to have a less flexible labor market, our theory would predict a smaller current account response to the trade policy response, which appears to be consistent with the pattern in the data.

Note, however, that we do not wish to claim that trade reforms are the only factor that matters for the evolution of a country's current account. Rather, it is an important contributing factor that is thus far neglected in the discussion of current account imbalances. Such a neglect could incorrectly color our understanding of the source of current account imbalances and appropriate policy responses. To put it simply, if a portion of the current account imbalances is caused by efficient trade reforms, we do not need to view it as a problem that needs a policy correction.

We will see many more trade policy changes in both developed and developing countries (not always in the direction of reducing trade barriers). We will also see many more changes in factor markets around the world that could either enhance or reduce their flexibility. This paper provides a way to think about the general equilibrium implications of trade reforms for international capital flows.

References

[1] Antras, Pol and Ricardo J. Caballero, (2009), "Trade and Capital Flows: A Financial Frictions Perspective," *Journal of Political Economy,* 117(4), pp. 701-744.

[2] Backus, David K., Patrick J. Kehoe, and Finn E. Kydland, (1992), "International Real Business Cycles," *Journal of Political Economy* 100: 745–775.

[3] Backus, David K., Patrick J. Kehoe, and Finn E. Kydland, (1994), "Dynamics of the Trade Balance and the Terms of Trade: The J-Curve," *American Economic Review* 84:1, 84–103.

[4] Bai, Chong-En Bai, Chang-Tai Hsieh and Yingyi Qian, (2006). "The Return to Capital in China," Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution, vol. 37, pages 61-102.

[5] Caballero, Ricardo J., Emmanuel Farhi, and Pierre-Olivier Gourinchas, (2008), “Financial Crash, Commodity Prices, and Global Imbalances,” *Brookings Papers on Economic Activity*, Fall, 1-68.

[6] Choi, Horag, Nelson C. Mark, and Donggyu Sul, (2008), “Endogenous Discounting, the World Saving Glut and the U.S. Current Account”, *Journal of International Economics*, 75, 30-53.

[7] Cunat, Alejandro and Marco Maffezzoli, (2004), “Heckscher-Ohlin Business Cycles,” *Review of Economic Dynamics,* 555-585.

[8] Curtis, Chadwick and Nelson Mark, (2010), “Business Cycles, Consumption and Risk-Sharing: How Different is China?”, in Yin-Wong Cheung,Vikas Kakkar,and Guonan Ma, eds., The Evolving Role of Asia in Global Finance, forthcoming.

[9] Devereux, Michael and Khang Min Lee, (1999), “Endogenous Trade Policy and the Gains from International Financial Markets," Journal of Monetary Economics, 43, 35-59.

[10] Du, Qingyuan, and Shang-Jin Wei, 2010, "Sex Ratios, Savings Rates and Current Account Imbalances," NBER Working Paper 16000.

[11] Jaumotte, F., S. Lall, and C. Papageorgiou, 2008, “Rising Income Inequality: Technology, or Trade and Financial Globalization?” *IMF Working Paper* 08/185.

[12] Jin, Keyu, (2011), “Industrial Structure and Financial Capital Flows,” *American Economic Review,* Forthcoming.

[13] Jin, Keyu and Nan Li (2011), “Factor Proportions and International Business Cycles,” Working Paper, London School of Economics.

[14] Ju, Jiandong, Kang Shi and Shang-Jin Wei (2011), “On Connections between Intratemporal and Intertemporal Trades,” *NBER Working Paper* 17549.

[15] Ju, Jiandong and Shang-Jin Wei, (2007), “Current Account Adjustment: Some New Theory and Evidence,” NBER Working Paper 13388.

[16] Ju, Jiandong and Shang-Jin Wei, 2010, "Domestic Institutions and the Bypass Effect of Financial Globalization," *American Economic Journal: Economic Policy.*

[17] Ju, Jiandong and Shang-Jin Wei, 2011, "When Is Quality of Financial System a Source of Comparative Advantage?" *Journal of International Economics*, forthcoming.

[18] Ju, Jiandong, Yi Wu and Li Zeng, (2010), "The Impact of Trade Liberalization on the Trade Balance in Developing Countries," IMF Staff Papers, 57(2), 427-449.

[19] Kehoe, P. J. and F.Perri, (2002), "International Business Cycles with Endogenous Incomplete Markets", *Econometrica*, 70, 907-928.

[20] Khandelwal, Amit, Peter Schott, and Shang-Jin Wei, forthcoming, "Trade Liberalization and Embedded Institutional Reform: Evidence from Chinese Exporters," *American Economic Review.*

[21] Mendoza, Enrigue, (1991), "Real Business Cycles in a Small Open Economy," *American Economic Review,* 81, 797-818.

[22] Mendoza, Enrique, Vincenzo Quadrini, and Jose-Victor Rios-Rull. 2009. "Financial Integration, Financial Deepness and Global Imbalances," *Journal of Political Economy*, 117(3), 371-410.

[23] Mundell, Robert A. (1957), "International Trade and Factor Mobility," *American Economic Review, 47,* 321-335.

[24] Markusen, James R., (1983), "Factor movements and commodity trade as complements," *Journal of International Economics*, vol. 14(3-4), 341-356.

[25] Neumeyer, Pablo A., and Fabrizio Perri, 2005, "Business Cycles in Emerging Economies: The Role of Interest Rates," *Journal of Monetary Economics,* 52(2): 345-380.

[26] Obstfeld, M., 1982. Aggregate spending and the terms of trade: Is there a Laursen-Metzler effect? Quarterly Journal of Economics 97, 251-270.

[27] Ostry, Jonathan D. and Andrew K. Rose, (1992), “An Empirical Evaluation of the Macroeconomic Effects of Tariffs,” *Journal of International Money and Finance*, 11: 63-79.

[28] Schmitt-Grohe, Stephanie, 1998, "The International Transmission of Economic Fluctuations: Effects of US Business Cycles on the Canadian Economy," *Journal of International Economics*, 44: 257-287.

[29] Schmitt-Grohe, Stephanie and Martin Uribe, (2003), “Closing Small Open Economy Models," J*ournal of International Economics*, 61:163-185.

[30] Stiglitz, Joseph E, (1970), “Factor Price Equalization in a Dynamic Economy," *Journal of Political Economy*, 78(3):456-88.

[31] Song, Zheng, Kjetil Storesletten, and Fabrizio Zilibotti, (2011), “Growing like China,” *American Economic Review,* 101, pp. 202–241.

[32] Tang, Man-Keung, and Shang-Jin Wei, 2009, "The Value of Making Commitments Externally: Evidence from WTO Accessions," *Journal of International Economics*, 78(2): 216-229.

[33] Uribe, Martin, 1997, “Exchange Rate Based Inflation Stabilization: the Initial Effects of Credible Plans,” *Journal of Monetary Economics* 39: 197-221.

[34] Uzawa, H., (1968), “Time preference, the consumption function, and optimal asset holdings,” in J. N. Wolfe (ed.), Capital and Growth: Papers in Honour of Sir John Hicks, Chicago: Aldine.

[35] Wei, Shang-Jin, and Xiaobo Zhang, 2011, “The Competitive Saving Motive: Evidence from Rising Sex Ratios and Savings Rates in China,” *Journal of Political Economy,* June.

7 Appendices

7.1 Equations for the Steady State

Given the factor prices (w, r) and the holding of foreign asset B, the output Y, consumption C, investment I, aggregate demand D, and sectoral outputs X_1 and X_2 can be determined by the following six equations.

$$\frac{C}{Y} = \frac{\overline{C}}{\overline{Y}}[\beta(1 + r - \delta)]^{\frac{1}{\psi}} \tag{7.1}$$

$$D = C + \frac{I}{P} + \frac{\psi_b}{2}B^2 \tag{7.2}$$

$$PY = P_1X_1 + P_2X_2 \tag{7.3}$$

$$\alpha_1P_1X_1 + \alpha_2P_2X_2 = r\frac{I}{\delta} \tag{7.4}$$

$$(1 - \alpha_1)P_1X_1 + (1 - \alpha_2)P_2X_2 = wL \tag{7.5}$$

$$P_1X_1 + P_2X_2/(1 + \tau) + r^*B = \zeta PD \tag{7.6}$$

where $\zeta = \omega + (1 - \omega)/(1 + \tau)$. Equation (7.6) is derived from the current account equation in the steady state, $P_1^*(X_1 - D_1) + P_2^*(X_2 - D_2) + r^*B = CA = 0$.

7.2 Equilibrium Selection in the Initial Steady State

In the initial steady state, we assume an exogenous export share, sx, and an import share, sm, to select the equilibrium. Let

$$sx = \frac{NX_1}{P_1X_1 + P_2X_2} > 0 \tag{7.7}$$

$$sm = \frac{NX_2}{P_1X_1 + P_2X_2} < 0 \tag{7.8}$$

Since B is initially zero, using expressions of sectoral output, we have

$$P_1X_1 + P_2X_2 = \frac{(\alpha_2 - \alpha_1)(1 + \tau)\zeta PD - \tau wL}{(1 - \alpha_1) - (1 + \tau)(1 - \alpha_2)} \tag{7.9}$$

Using the expressions for X_1 and D_1, we have

$$sx = \frac{wL - PD[(1-\alpha_2)(1+\tau)\zeta + \omega((1-\alpha_1) - (1+\tau)(1-\alpha_2))]}{(\alpha_2 - \alpha_1)(1+\tau)\zeta PD - \tau wL} \tag{7.10}$$

This implies that given the initial share of export sx, we can determine the initial ratio of wage income to final good expenditure as below

$$\frac{wL}{PD} = \frac{sx(\alpha_2 - \alpha_1)(1+\tau)\zeta + (1-\alpha_2)(1+\tau)\zeta + \omega((1-\alpha_1) - (1+\tau)(1-\alpha_2))}{1 + sx\tau} \tag{7.11}$$

Let $\kappa = \frac{wL}{PD}$. We can solve for the initial output $\overline{Y}$ as

$$\overline{Y} = \frac{wL}{P} \frac{(\alpha_2 - \alpha_1)(1+\tau)\zeta\kappa^{-1} - \tau}{(1-\alpha_1) - (1+\tau)(1-\alpha_2)} \tag{7.12}$$

In the initial steady state, the consumption is given by $C = D - \frac{I}{P}$, and the investment is given by $I = \delta K = \frac{\delta}{r}(\alpha_1 P_1 X_1 + \alpha_2 P_2 X_2)$. From the determination of sectoral output, we have

$$I = \frac{\delta}{r} \frac{(1+\tau)(\alpha_2 - \alpha_1)\zeta PD - (1+\tau)(\alpha_2 - \alpha_1)r^* B - (\alpha_2(1+\tau) - \alpha_1)wL}{(1-\alpha_1) - (1-\alpha_2)(1+\tau)} \tag{7.13}$$

For simplicity, we rewrite it as

$$\frac{I}{P} = \phi D + \Phi \tag{7.14}$$

where

$$\phi = \frac{\delta}{r} \frac{(1+\tau)(\alpha_2 - \alpha_1)\zeta}{(1-\alpha_1) - (1-\alpha_2)(1+\tau)} > 0 \tag{7.15}$$

$$\Phi = -\frac{\delta}{rP} \frac{(1+\tau)(\alpha_2 - \alpha_1)r^* B + (\alpha_2(1+\tau) - \alpha_1)wL}{(1-\alpha_1) - (1-\alpha_2)(1+\tau)} \tag{7.16}$$

Note that Φ is an investment component determined by the supply side. Therefore, substituting them into the aggregate demand equation, the initial consumption can be expressed as

$$\overline{C} = D[(1-\phi) - \frac{\Phi}{D}] \tag{7.17}$$

where

$$\frac{\Phi}{D} = -\frac{\delta}{r}\frac{\alpha_2(1+\tau)-\alpha_1}{(1-\alpha_1)-(1-\alpha_2)(1+\tau)}\frac{wL}{PD} \tag{7.18}$$

Finally, we obtain the initial consumption as below:

$$\overline{C} = \frac{wL}{P}[\frac{1-\phi}{\kappa} + \frac{\delta}{r}\frac{\alpha_2(1+\tau)-\alpha_1}{(1-\alpha_1)-(1-\alpha_2)(1+\tau)}] \tag{7.19}$$

7.3 Steady State Equilibrium with Credit Constraint

$$B = \frac{1}{\psi_b P}\frac{r^* - r^C + \delta}{1 + r^C - \delta} \tag{7.20}$$

$$(\frac{w}{A_1})^{1-\alpha_1} r_1^{\alpha_1} = P_1^* \tag{7.21}$$

$$(\frac{w}{A_2})^{1-\alpha_2} r_2^{\alpha_2} = (1+\tau)P_2^* \tag{7.22}$$

$$\frac{K_1}{K_2} = \frac{\mu_k}{1-\mu_k} \tag{7.23}$$

$$L_1 + L_2 = L \tag{7.24}$$

$$r_1 K_1 = \alpha_1 P_1 X_1 \tag{7.25}$$

$$r_2 K_2 = \alpha_2 P_2 X_2 \tag{7.26}$$

$$wL_1 = (1-\alpha_1)P_1 X_1 \tag{7.27}$$

$$wL_2 = (1-\alpha_2)P_2 X_2 \tag{7.28}$$

$$r^C = \mu_k K_1 + (1-\mu_k)K_2 \tag{7.29}$$

$$P_1 D_1 = \omega P D \tag{7.30}$$

$$P_2 D_2 = (1-\omega) P D \tag{7.31}$$

$$D = C + \frac{\delta(K_1 + K_2)}{P} + \frac{\psi_b}{2} B^2 \tag{7.32}$$

$$P_1 X_1 + P_2 X_2/(1+\tau) + r^* B = \zeta P D \tag{7.33}$$

$$\frac{C}{Y} = \frac{\overline{C}}{\overline{Y}} [\beta(1 + r^C - \delta)]^{\frac{1}{\psi}} \tag{7.34}$$

Table 1: Episodes of Trade Reforms (1990-2010)

Country Name	Period	Tariff Change (Simple Average)	Tariff Change (Weighted Average)	Imports Change
Albania*	2001-2002	-3.21	-2.93	8.01
Algeria*	2001-2003	-3.44	-3.19	3.8
Bangladesh*	2003-2005	-4.21	0.86	3.01
Bangladesh	2006-2007	-0.72	-8.62	3.51
Belize	1999-2001	-9.18	-0.48	6.31
Bhutan	2005-2007	-0.24	-5.01	4.27
Brazil*	1989-1993	-30.01	-18.9	3.63
Brazil*	1998-2001	-1.76	-5.52	4.56
Cambodia*	2003-2005	-2.14	-5.54	4.35
Canada*	1995-1997	-3.3	-2.34	3.4
China*	1992-1997	-24.57	-16.35	4.86
China*	2001-2003	-4.52	-7.63	6.88
Georgia*	2002-2004	-3.1	-1.33	4.02
Guyana	1999-2001	-9.73	-3.59	6.14
India*	2004-2008	-16.86	-16.55	4.93
Indonesia*	1989-1990	-3.48	0.36	3.55
Indonesia*	1995-1996	-2.99	-3.16	15.57
Indonesia*	1999-2001	-4.3	-1.74	3.03
Kenya*	2004-2006	-4.11	-3.44	3.1
Kyrgyz Republic*	2002-2003	-3.33	-2.52	7.92
Lebanon	2000-2001	-8.72	-8.69	4.01
Lesotho	2006-2007	0.05	-3.04	5.22
Malawi*	1996-1998	-6.67	-4.37	6.23
Mauritius*	1995-1997	-0.99	-4.91	3.19
Mauritius*	2005-2006	-2.96	-3.5	7.05
Morocco*	2006-2009	-6.13	-4.61	5.19
Nigeria*	2001-2002	3.9	-3.02	8.15
Pakistan	2001-2003	-3.01	-3.43	3.85
Paraguay*	2004-2006	-1.91	-5.21	5.6
Peru*	2006-2008	-4.11	-4.04	7.23
Philippines	1989-1990	-8.68	-7.66	3.02
Seychelles*	2005-2006	-3.64	-0.45	4.13
St Lucia*	2000-2001	-9.76	-4.25	4.16
Syrian Arab Republic	2009-2010	0	-4.03	4.61
Thailand*	1993-1995	-22.66	-21.7	6.39
Thailand*	2003-2005	-3.46	-4.15	6.94
Tunisia*	2002-2008	-12.4	-10.46	3.36
Zimbabwe	1996-2003	-25.1	-22.45	8.67

Note: * denotes countries for which data on current account and capital intensity are also available.

Table 2: Changes in Current Account and Changes in Trade Policy, 1990-2010

Dependent variable = Δ (CA/GDP)

	(1)	(2)
ΔK-Intensity	-61.69*	-139.77*
	(30.26)	(63.12)
ΔRER		-0.08*
		(0.04)
Constant	-0.82*	-1.93**
	(0.43)	(0.77)
# of Observations	28	13

* indicates significant at 10% level, ** 5% level, *** 1% level

Table 3: Summary of Parameters Used in the Calibrations

(In the text)

Table 4: Steady States Before and After a Tariff Reduction

Variable	Benchmark (No Credit Constraint)			With Credit Constraint		
(1)	tariff=0.15 (2)	tariff=0.1 (3)	tariff=0.05 (4)	tariff=0.15 (5)	tariff=0.1 (6)	tariff=0.05 (7)
rc	0.0351	0.0324	0.0298	0.0351	0.0342	0.0336
r1	0.0351	0.0324	0.0298	0.0351	0.0357	0.0370
r2	0.0351	0.0324	0.0298	0.0351	0.0331	0.0312
w1	28.0	29.17	30.41	28.0	27.80	27.31
w2	28.0	29.17	30.41	28.0	27.80	27.31
p1	3.59	3.59	3.59	3.59	3.59	3.59
p2	0.32	0.31	0.29	0.32	0.31	0.29
p	1.07	1.05	1.02	1.07	1.05	1.02
c	8.36	8.46	8.48	8.36	8.29	8.16
d	12.54	13.05	13.41	12.55	12.54	12.37
b	0	3.85	7.58	0.00	1.31	2.081
k	179.32	192.57	201.49	179.81	178.23	172.17
I	4.48	4.81	5.04	4.50	4.46	4.30
k1	75.65	87.89	104.18	75.52	74.86	72.31
k2	103.67	104.68	97.32	104.29	103.38	99.86
l1	0.192	0.198	0.207	0.192	0.195	0.199
l2	0.056	0.050	0.041	0.056	0.053	0.049
x1	2.24	2.40	2.62	2.24	2.26	2.26
x2	16.22	15.80	14.14	16.32	15.93	15.20
d1	1.87	1.91	1.92	1.87	1.83	1.77
d2	20.97	22.33	23.48	21.00	21.45	21.65
nx1	1.32	1.78	2.53	1.30	1.53	1.78
nx2	-1.52	-2.00	-2.73	-1.50	-1.69	-1.89
ca	0	0	0	0	0	0
sx	0.10	0.13	0.19	0.098	0.118	0.141
sm	-0.12	-0.15	-0.20	-0.11	-0.13	-0.15
B/gdp	0.0%	28.6%	56.0%	0.0%	10.1%	16.6%
(sx-sm)/gdp	21.5%	28.1%	38.9%	21.1%	24.8%	29.2%
gdp	12.350	12.841	13.210	12.366	12.379	12.258
c	8.356	8.457	8.476	8.358	8.289	8.164
c/y	67.7%	65.9%	64.2%	67.6%	67.0%	66.6%
i/py	33.8%	35.7%	37.2%	33.9%	34.3%	34.3%

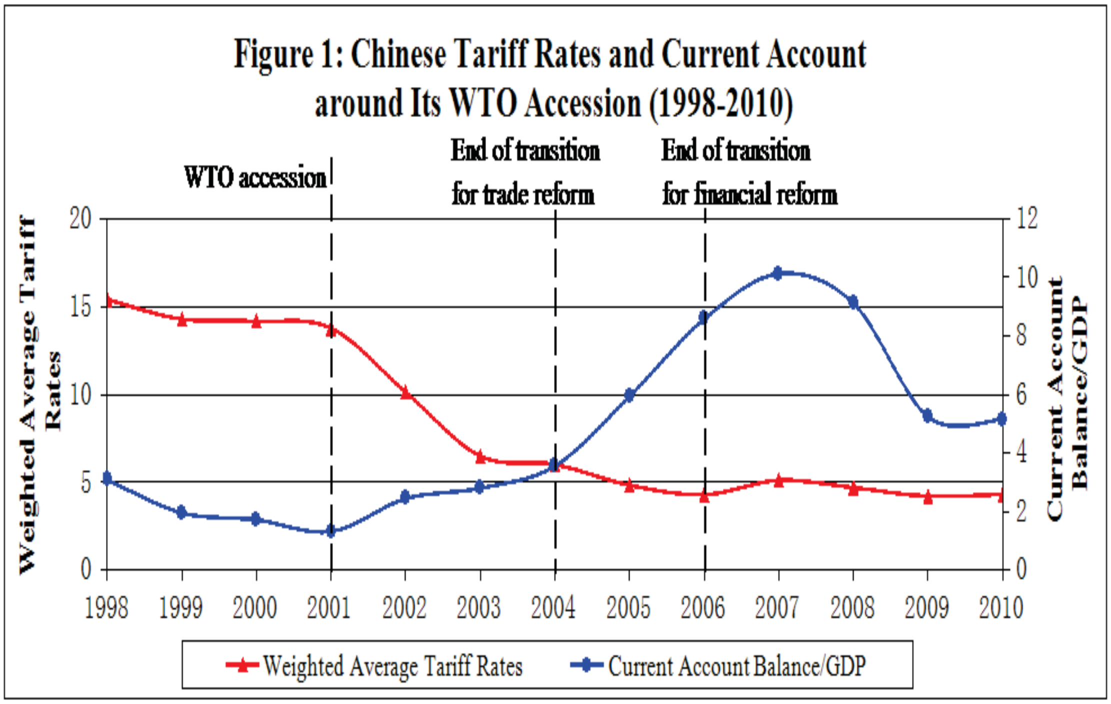

Figure 2: Scatter Plot of Delta CA/GDP vs Delta k-intensity (from t-1 to t+1): Major Trade Policy Changes around the World (1990-2010)

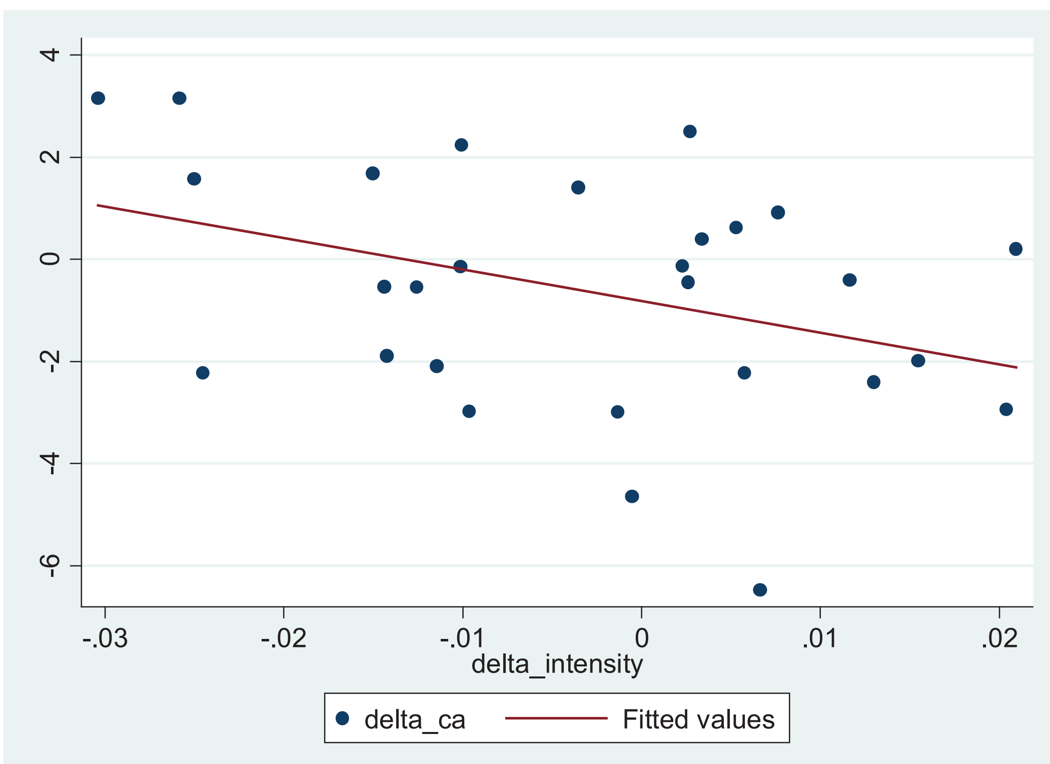

Figure 3: Transition Path of the Economy after a Tariff Reduction by 5 Percentage Points (from 15% to 10%)

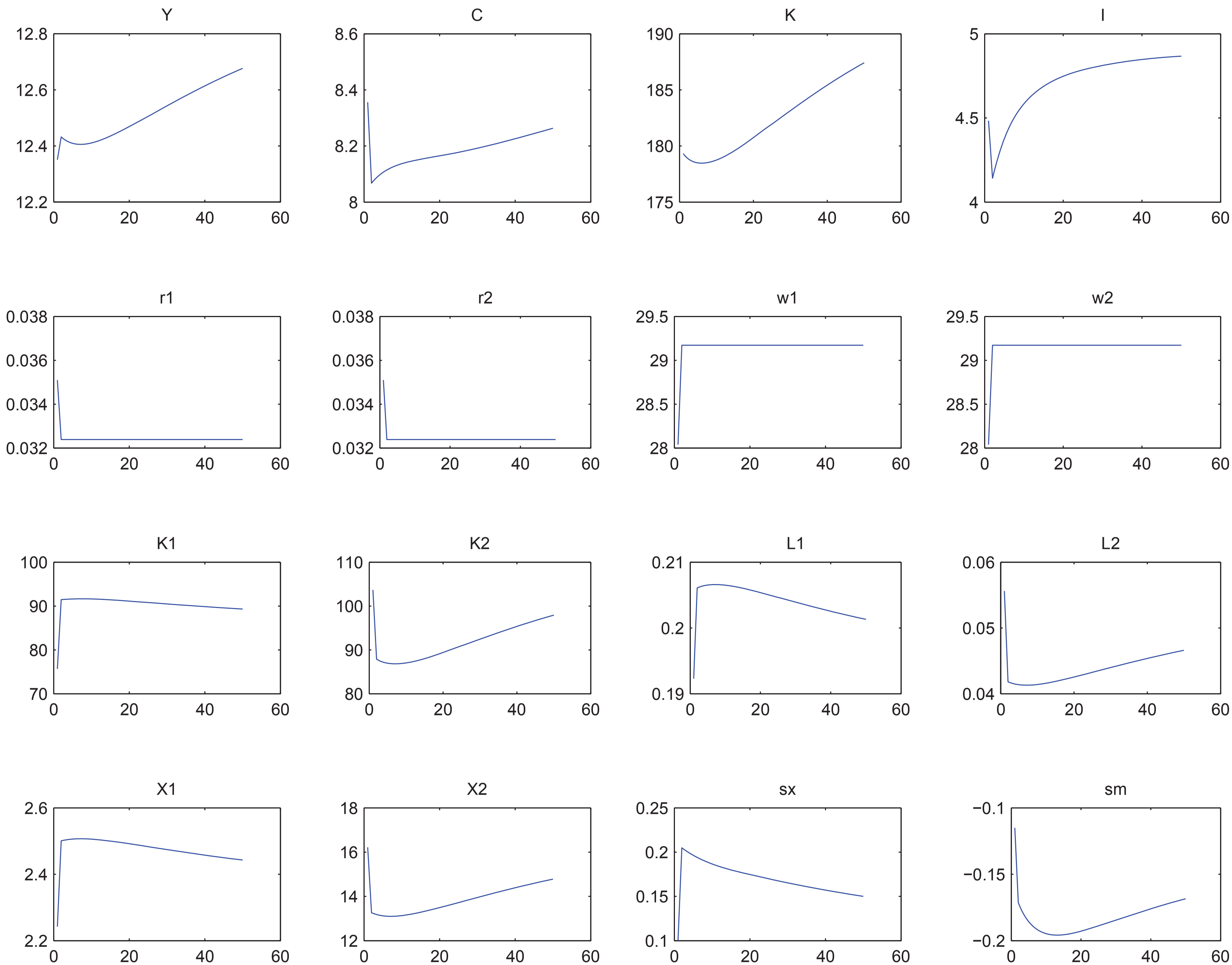

Figure 4: □ynamic Res□onses of Trade □o□ume and □□P □ariab□es to a Tariff Reduction by 5 Percentage Points (from 15% to 10%)

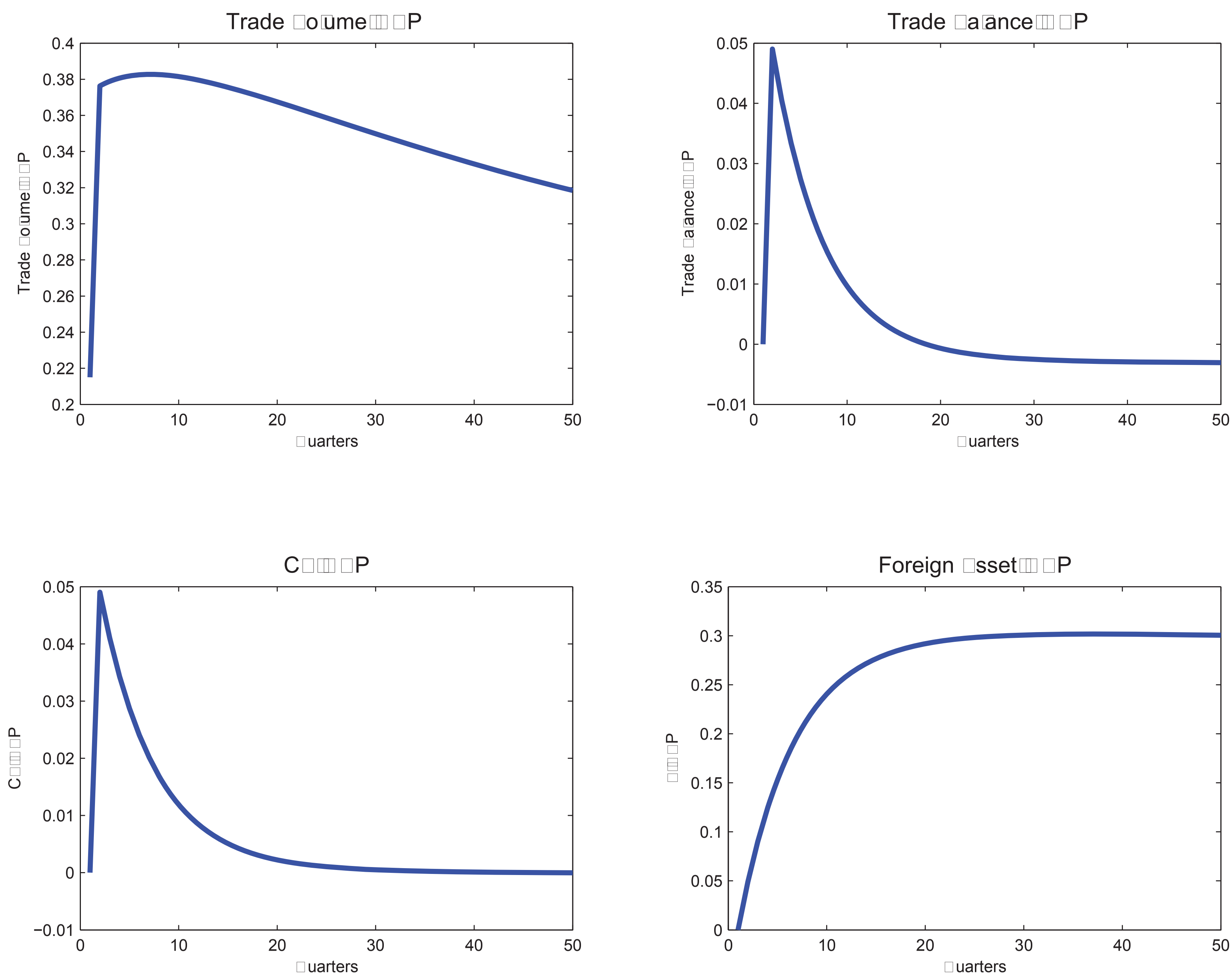

Figure 5: Transition Path for different adjustment costs

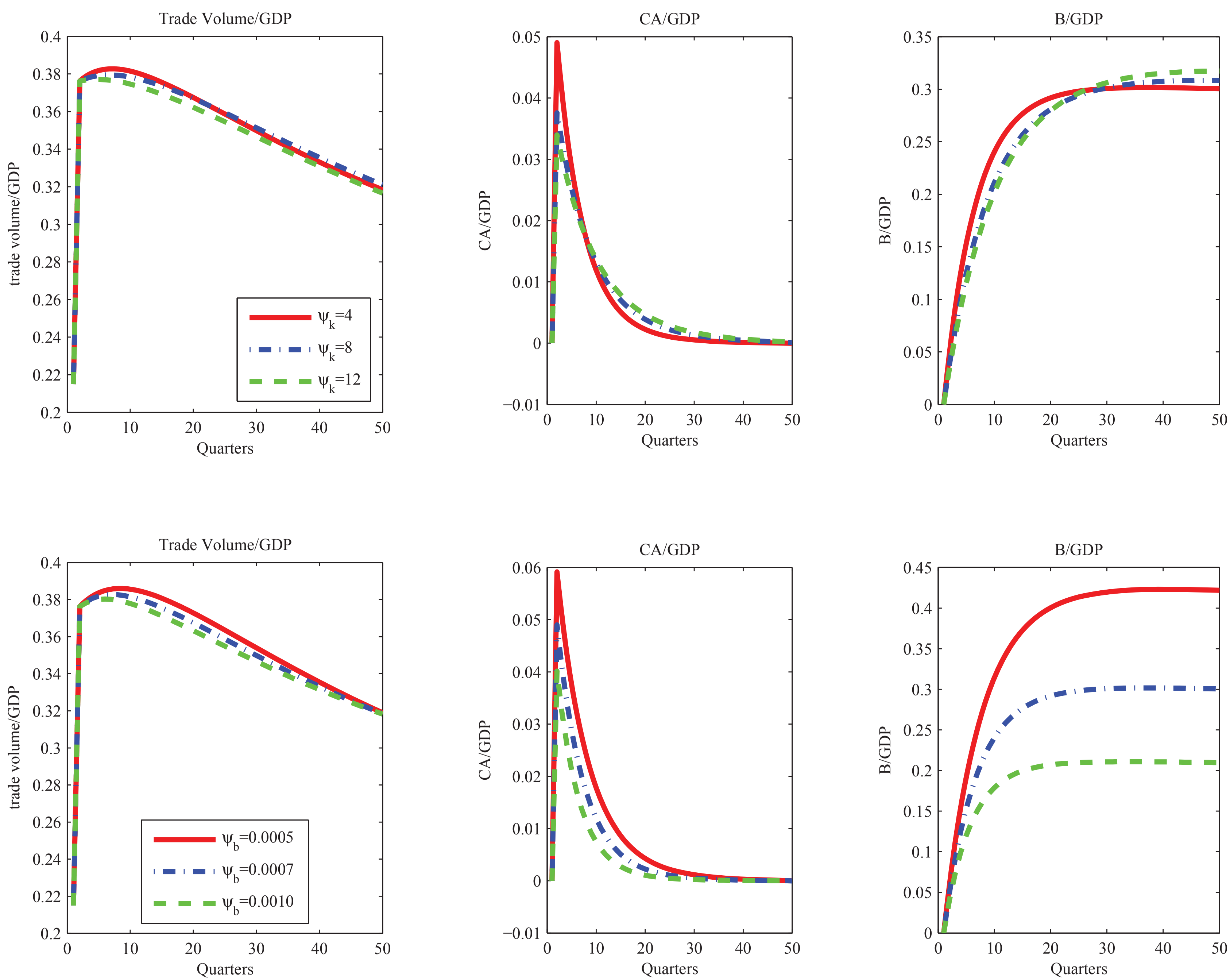

Figure 6: Transition Path under Credit Constraints after a Tariff Cut by 5 Percentage Points (from 15% to 10%)

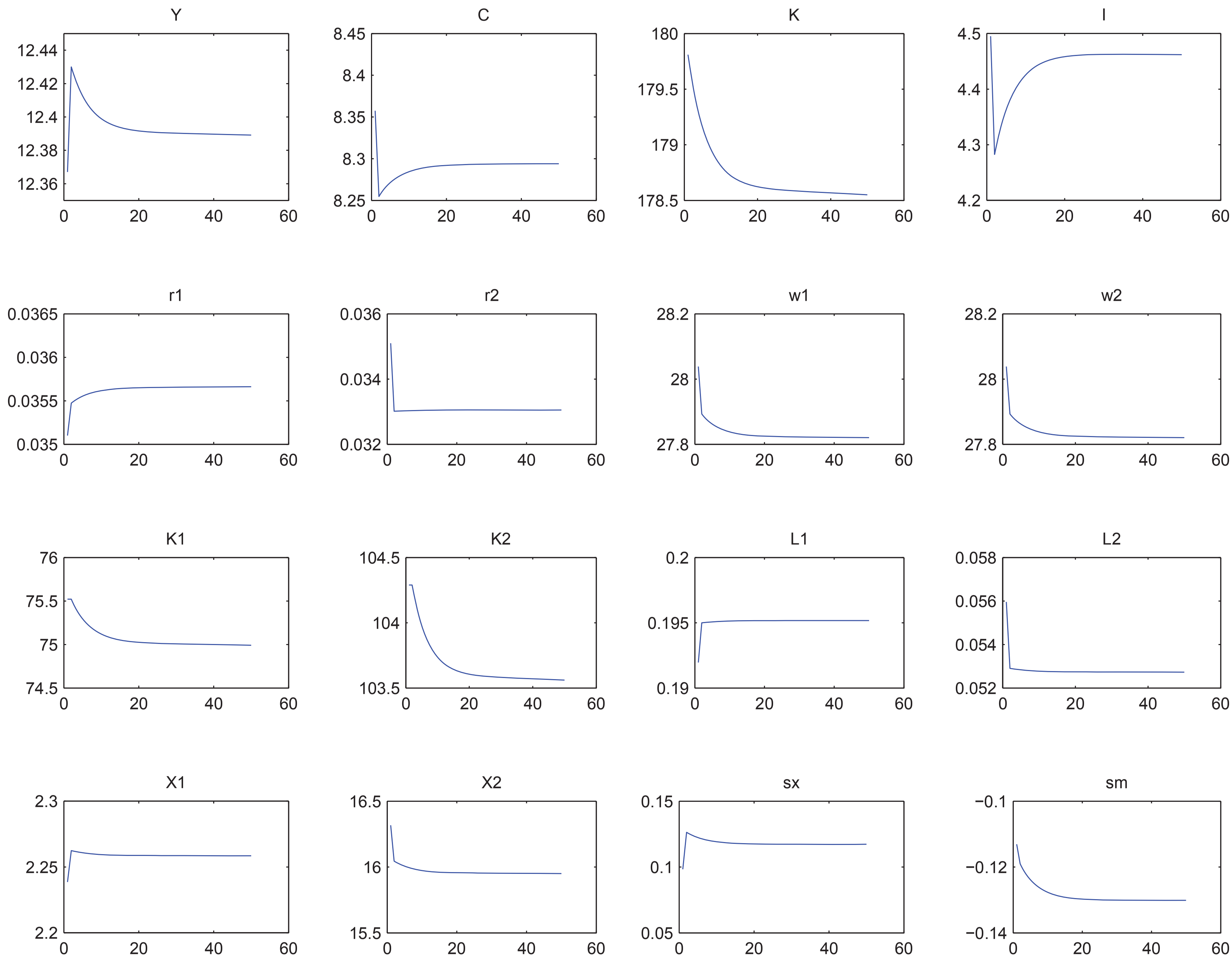

Figure 7: Res□onses of □□P □ariab□es with and without Credit Constraints to a Tariff Cut by 5 Percentage Points (from 15% to 10%)