

# Neoclassical Growth in an Interdependent World

Based on BFI Working Paper No. 2023-153 “[Neoclassical Growth in an Interdependent World](#)” by Benny Kleinman, University of Chicago; Ernest Liu, Princeton; Stephen J. Redding, Princeton; and Motohiro Yogo, Princeton

A new growth model of the global economy that features frictional and imperfectly-substitutable flows of goods and capital between countries allows researchers to study the dynamic responses of countries around the world to changes in trade and investment frictions and can be applied to the economic “decoupling” between China and the United States.

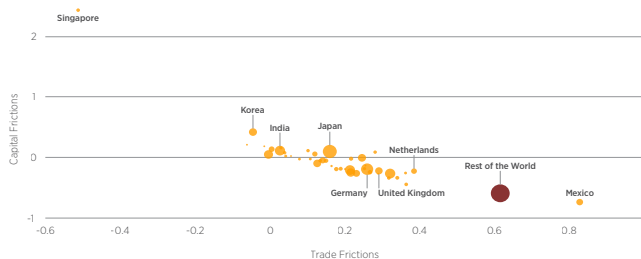
Growth models are theoretical frameworks that economists use to predict how economies will expand and develop over time. Multi-country growth models allow researchers to compare growth trajectories across countries and to analyze

how changes in the fundamentals in one country or in the economic relationships between a group of countries would affect growth around the world.

Traditionally, multi-country growth models have imposed strong assumptions about the nature of interdependency across countries. At one extreme, the **closed-economy neoclassical growth model** (CNGM) assumes no trade and capital flows between countries. At the other extreme, open economy neoclassical growth models typically assume that trade is completely free and/or that global capital markets are frictionless and feature perfect substitutability across potential investment destinations.

In this paper, the authors adapt the neoclassical growth model to include frictional trade and capital flows with **imperfect substitutability** in both goods and capital markets. These features allow

**Figure 1 • Countries’ Welfare Exposure to Changes in US-China Capital and Trade Market Frictions**



Note: This figure illustrates how the authors’ model can be used to measure the welfare changes associated with changing trade and capital investment frictions between two countries. The figure plots welfare changes across countries following a 50% increase in trade frictions between China and the United States (horizontal axis) and 50% increase in capital frictions between China and the United States (vertical axis). See [webpage](#) for interactive figure.

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The **closed-economy neoclassical growth model** is an economic theory explaining how a country’s economic growth is driven by factors like capital, labor, and technology, without any external trade influences.

**Imperfect substitutability** refers to the idea that goods and capital from different countries are not perfect replacements for each other. Due to factors like quality, characteristics, or regulatory differences, a good or capital from one country cannot seamlessly substitute for that from another in international trade and investment.

them to replicate key features of real-world data on trade and capital holdings, including strong home-bias in both goods and capital markets; variation in returns on investment across countries; and a “gravity-structure” for bilateral trade flows and capital holdings, according to which both flows are declining with distance.

In addition to matching these empirical regularities, the model also yields new insights for traditional questions in international economics, including how countries respond to productivity shocks and how quickly they converge to their **steady-state** level of income per capita. In the model, **productivity shocks lead to both domestic capital accumulation** as in closed-economy models; **and to initial capital reallocation across countries** as in models with free global capital markets. As such, the response of capital and income per capita to productivity shocks is in between these two extremes.

The speed of this adjustment of capital and income per capita to shocks, also known as the “speed of convergence,” **depends on the degree of openness in both goods and capital markets**. Opening both goods and capital markets results in slower convergence of the global economy to steady-state relative to the extreme cases of a closed economy or of either completely free trade or completely free capital flows. This result stems from

the equalization of the real return to investment across countries when goods and capital are highly mobile, which leads initial differences in wealth to persist for very long periods.

The authors apply their framework to study the effects of a hypothetical “decoupling” between the United States and China. The new model is particularly well-suited to study this question, because unlike traditional models, it allows them to consider higher **bilateral frictions** in both trade and capital markets, starting from an initial equilibrium with realistic degree of openness in both markets. The authors show that such **decoupling harms the United States and China, with the United States suffering relatively more in the short run and China suffering relatively more in the long run**. The authors also show that other countries might gain or lose from rising frictions between China and the United States, **depending on their positioning in the global trade and capital allocation networks**.

More generally, the new framework developed here is useful for questions that study the dynamics of the global economy in an environment with realistic trade and capital networks. It is also particularly well-suited for evaluating other policies that affect bilateral trade and capital frictions, such as the global effects of economic sanctions or the consequences of Brexit.

**Steady-state** refers to a condition where key economic variables (like output, capital, and consumption) remain constant over time. In this state, an economy experiences no new net growth or decline, as investment equals depreciation, and the economy has reached a stable equilibrium.

**Bilateral frictions** describes the challenges, barriers, or inefficiencies that occur in trade, negotiation, or cooperation between two countries, such as tariffs, regulatory differences, or cultural misunderstandings. These frictions can affect the flow of goods, services, capital, and labor between the two entities.

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