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The Economics of an Import Tariff in the Keynesian Model: An Intermediate Macroeconomics Treatment

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Abstract: The standard textbook treatment of expansionary fiscal policy at intermediate macroeconomics level, *e.g.*, Blanchard (2024), Burda and Wyplosz (2023), only consider taxes affecting the economy through the consumption function, by increasing the level of disposable income. Motivated by recent events - the import tariffs introduced in the US by Trump administration - in this paper we introduce such tariffs to explore how they work in the Keynesian cross framework. As expected, an increase in import tariffs stimulates aggregate demand, which is the ”import substitution effect” from the trade literature. There is also a multiplier effect, which we refer to the ”import tariff multiplier effect.” This possible stimulus effect on the domestic (US) economy from an increase in the import tariff rate is of interest to policy-makers, and in developing countries with a public finance model organized around trade taxation, or countries that follow an export-led growth model by discouraging imports

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Introduction and Motivation

The standard textbook treatment of expansionary fiscal policy at intermediate macroeconomics level, *e.g.*, Blanchard (2024), Burda and Wyplosz (2023), only considers tax changes affecting the economy through the consumption function, by changing the level of disposable income. Motivated by recent events - the import tariffs introduced in the US by Trump administration, in this paper we introduce such tariffs to explore how they work in the Keynesian cross framework. As expected, an increase in import tariffs stimulates aggregate demand, which is the “import substitution effect” from the trade literature. There is also a multiplier effect, which we refer to the “import tariff multiplier effect.” This possible stimulus effect on the domestic (US) economy from an increase in the import tariff rate is of interest to policy-makers, and in developing countries with a public finance model organized around trade taxation, or countries that follow an export-led growth model by discouraging imports.

We will focus on the short- to medium run and abstract away from deficits and debt considerations. Thus, in this paper we aim to fill a clear gap in international macroeconomics literature, and at the same time the work could be a good teaching case to students. Importantly, we do not aim to provide empirical estimates (this is left for future research) but rather emphasize the theoretical modelling and working of the mechanism.

The rest of the paper is structured as follows: Next section evaluates the effect of the import tariff under different scenarios and assumptions on the functional forms of the main components of aggregate demand. Finally, the paper concludes with some policy recommendations and suggestions for future research.

Model Setup

This In this section, we present a battery of models, starting from the simplest case, and then extending the setup, one element at a time. The basic setup is a standard open-economy Keynesian model with import tariffs. Hence

$$Y = AE = AD = C + I + G + X - (1 - \tau)M \quad (1)$$

where *Y* denotes output, *AE* is aggregate expenditure, *AD* refers to aggregate demand, *C* is consumption, *I* is investment, *G* is government expenditure. Note that we need to net out import tariff revenue because it is not

part of real expenditure, it goes to the government. That adds to the leakage caused by the spending on imports. In other words, when the tariff rate increases, the effective spending on imports falls.

The consumption function is standard, with 0 < b < 1 denoting the marginal propensity to consume (MPC), and *T* denoting taxes. Next, to simplify the algebra, we model the consumption function without an intercept; the presence of the intercept does not change the main results, as it only adds to the autonomous demand expenditure.

$$C = b(Y - T) \tag{2}$$

The import function is presented below, with 0 < m < 1 denoting the marginal propensity to import (MPI). Again, this function is modelled without an intercept; as with the consumption function, the presence of an intercept does not change the main results.

$$M = m(Y - T) \tag{3}$$

Also note that b > m due to the so called ”home bias” phenomenon - that in data, most of the expenditure is domestic goods and services.

We start by postulating the case with lump-sum taxes, and exogenous I,G, and then endogenize each in turn, and as combination. To simplify the algebra further, we combine all exogenous terms into autonomous components, and call it ED(= I + G + X in this setup)

$$Y = [b - (1 - \tau)m]Y + ED, \tag{4}$$

or

$$Y = \frac{1}{1-[b-(1-\tau)m]} ED. \tag{5}$$

Thus

$$\frac{dY}{d\tau} = \frac{1}{\{1-[b-(1-\tau)m]\}^2} mED > 0, \tag{6}$$

as long as the denominator is positive, *i.e.*, 1−b+(1−τ)m > 0, which is the case, given the parameter restrictions, an increase in the import tariff rate increases aggregate demand (by discouraging spending on foreign products, and substituting towards domestic ones), and thus increases *Y*. In addition, we also obtain a new multiplier - the import tariff multiplier.

Is this result robust to alternative specifications? In the next scenario we endogenize income taxes, $T = tY$, $0 < t < 1$. Solving for *Y*:

$$Y = [b - (1 - \tau)m](1 - t)Y + ED, \tag{7}$$

or

$$Y = \frac{1}{1-(1-t)[b-(1-\tau)m]} ED. \tag{8}$$

Thus

$$\frac{dY}{d\tau} = \frac{1}{\{1-(1-t)[b-(1-\tau)m]\}^2} (1 - t)mED > 0, \tag{9}$$

as long as the denominator is positive, which tends to be the case. Again, an increase in the import tax rate increases *Y*, and there is a multiplier effect, which is now smaller. (subtract less in the denominator, hence the denominator is larger, or the multiplier is smaller)

Now, as in Blanchard (2024), we endogenous investment. In particular, we focus on the dependence on output/sales, or $I = iY$, $0 < i < 1$. This is referred to as the “augmented investment function” in Blanchard (2024). Again, for the sake of simplicity, we set the autonomous investment component to zero. Solve for output to obtain

$$Y = [b - (1 - \tau)m](1 - t)Y + iY + ED, \tag{10}$$

or

$$Y = \frac{1}{1-i-(1-t)[b-(1-\tau)m]} ED. \tag{11}$$

Thus

$$\frac{dY}{d\tau} = \frac{1}{\{1-i-(1-t)[b-(1-\tau)m]\}^2}(1-t)mED > 0, \quad (12)$$

as long as the denominator is positive. Again, an increase in the import tariff rate increases Y, and there is a multiplier effect, which is now larger (subtract more in the denominator, hence the denominator is now smaller, hence the multiplier is larger.)

Of course, we can also endogenize government purchases (keeping investment exogenous), and make it dependent on output, $G = gY$, $0 < g < 1$. The interpretation is that often the size of the budget is set relative to the size of the economy, and this degree of redistribution should be below 40 percent in many EU countries. Then solving for output yields

$$Y = [b-(1-\tau)m](1-t)Y + gY + ED, \quad (13)$$

or

$$Y = \frac{1}{1-g-(1-t)[b-(1-\tau)m]}ED. \quad (14)$$

Thus

$$\frac{dY}{d\tau} = \frac{1}{\{1-g-(1-t)[b-(1-\tau)m]\}^2}(1-t)mED > 0, \quad (15)$$

as long as the denominator is positive, which tends to be the case. Again, an increase in the import tariff rate increases Y, and there is a multiplier effect, which - depending on how g compares to i, could be now either larger or smaller, when compared to the case with endogenous investment and exogenous government spending.

Finally, if we combine the presence of endogenous investment, endogenous government purchases, and proportional taxes, then

$$Y = [b-(1-\tau)m](1-t)Y + iY + gY + ED, \quad (16)$$

or

$$Y = \frac{1}{1-i-g-(1-t)[b-(1-\tau)m]}ED. \quad (17)$$

Thus

$$\frac{dY}{d\tau} = \frac{1}{\{1-i-g-(1-t)[b-(1-\tau)m]\}^2}(1-t)mED > 0, \quad (18)$$

as long as the denominator is positive, which tends to be the case in data. Again, an increase in the import tariff rate increases Y, and there is a multiplier effect, which is now larger due to the combined effect from income taxes, investment and government purchases all being endogenous.

Conclusions and Policy Recommendations

The standard textbook treatment of expansionary fiscal policy at intermediate macroeconomics level (and specifically implemented via a tax reduction), *e.g.*, Blanchard (2024), Burda and Wyplosz (2023), only considers tax cuts affecting the economy through the consumption function, by increasing the level of disposable income. Motivated by recent events, in this paper we introduce a tariff on imports in the Keynesian cross framework and study the effects of an increase in those taxes. As expected, an increase in the import tariff rate stimulates aggregate demand. There is also a multiplier effect, which we refer to the "import tariff multiplier effect". Our findings are novel in macro-trade literature and could be of interest both to policy makers, as well as economists interested in economic education and teaching.

Still, we suggest the readers take the results with a grain of salt. After all, the model is ad hoc, and the calculations are back-of-an-envelope type. There is definitely a need for more detailed modelling, preferably a micro-founded one, and within a general-equilibrium framework - to consider retaliation by the main trading partner, and or to respond to the Lucas critique, as these simple parameters in the Keynesian models might not be structural, but determined within the model instead. For example, due to the tariffs prices may increase if the economy is importing vital inputs, which cannot be produced domestically (yet), thus decreasing consumption and aggregate demand. Finally, in the presence of tax fraud – like smuggling the imports and thus avoiding the tariff - may undermined further any positive effects on the domestic economy from imposing a tariff on imports.

Credit Authorship Contribution Statement

Aleksandar Vasilev: Conceptualization, Investigation, Methodology, Formal analysis, Writing – original draft, Writing – review and editing

Declaration of Competing Interest

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-assisted Technologies

The author declares that he has not used generative AI and AI-assisted technologies during the preparation of this work.

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