

**The Current Account, Fiscal Policy and Medium Run Income Determination**

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**THE CURRENT ACCOUNT, FISCAL POLICY  
AND MEDIUM RUN INCOME DETERMINATION**

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## **THE CURRENT ACCOUNT, FISCAL POLICY AND MEDIUM RUN INCOME DETERMINATION**

### **Abstract**

*This paper presents a new framework for analysing the simultaneous determination of current account imbalances and the path of national income. Using standard macroeconomic behavioral relationships, it first examines how and why current account deficits matter by investigating links between domestic consumption, government spending, output, saving, investment, interest rates and capital flows. Central to the model is the distinction between aggregate output and expenditure that enables dissection of the effects of discretionary fiscal policy on the current account and national income. The framework yields results relevant to the ‘twin deficits’ hypothesis that are contrary to those of standard models.*

**JEL:** E10, F32

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## 1. Introduction

With greater international integration of goods, services and assets markets, the average size of current account imbalances in emerging and advanced economies has increased over recent decades, a phenomenon which has concerned domestic and international financial markets and policymakers. In deficit countries, including the United States whose external deficit exceeds five per cent of GDP, it has also provided a rationale for advocating protectionist measures to restrict imports, subsidize exports, and tighten fiscal and monetary policies. To minimize the risk of inappropriate market reactions and welfare reducing policy responses, it is obviously important that the macroeconomic significance of current account imbalances be clearly understood.

Unfortunately, existing policy-oriented frameworks of orthodox macroeconomics still fail to model current account outcomes and their role in determining national income explicitly over the medium term. While the basic Keynesian cross and Mundell (1963)–Fleming (1962) approaches to income determination include net exports within total expenditure flows on the aggregate demand side of the economy, a major deficiency of these approaches is that national output only ever adjusts endogenously to aggregate demand pressures. This presumes the economy has substantial underutilized capacity and high unemployment, rather than operating at levels of capacity consistent with normally high employment levels.

The medium term influence of supply side factors on aggregate output, including foreign capital inflows and an evolving capital stock, are not adequately taken into account. In

sum, standard short run models of national income determination (for example as expounded in introductory and advanced macroeconomics textbooks by Taylor 2001 and Romer 2000 respectively) underemphasize that, in the first instance, a production function generates national output by combining available factor inputs.

Meanwhile, neoclassical growth theory (Solow 1956, Swan 1956) recognizes that economic growth is essentially a supply-side phenomenon driven by factor accumulation and productivity, where aggregate output is either consumed or invested and whose path inevitably leads to a long run stationary or steady state. Yet, the continuous time analysis usually employed in growth theory does not explain how national income may fluctuate from period to period and in the medium term with reference to domestic and international factors, including consumption, investment, government spending, the current account balance, world interest rates and capital flows.

To address these deficiencies in orthodox analysis, this paper introduces an alternative framework for examining how national output, spending and the current account interact to determine the path of national income over the medium term. Section 2 provides the foundations of a discrete-time model showing how consumption, investment and the current account can jointly affect successive national income outcomes. Section 3 analyses the effects on the current account and national income of changes in the fiscal stance arising from altered government spending and taxing and their implications for the “twin deficits” hypothesis. Section 4 distinguishes the approach from other international macroeconomic approaches and qualifies the results for developing economies.

## 2. Output, Spending and External Account Determination

Methodologically, this paper departs from recent theory in international macroeconomics founded on microeconomic principles and optimising representative agents (Frenkel and Razin 1987 and Obstfeld and Rogoff 1996). Nonetheless, it is consistent with Krugman's (1995) call for workable guides to answer unresolved questions in open economy macroeconomics and Romer's (2000) and Gandolfo's (2001) defence of conventional *ad hoc* formulations in macroeconomics on the grounds that they are no less realistic than optimising approaches developed from microeconomic foundations. (For instance, Campbell and Mankiw (1989) conclude that the standard consumption function predicts as well as the permanent income model based on optimising behaviour). Accordingly, this paper avoids optimizing foundations, instead invoking familiar, yet substantially modified, devices such as a 45<sup>0</sup> diagram and investment opportunities frontier, as well as a consumption function.

The following equations summarize the model and underpin the analytics of Figure 1 to follow. The economy is comprised of four sectors - households, firms, government and the rest of the world – and all variables are expressed in real terms. The initial stock of foreign debt is zero, such that national output and income are equivalent at the outset of the analysis.

$$Y = f(K, L) \quad (1)$$

$$Y^n = Y - r^* Q^* \quad (2)$$

$$C(Y^n - T, c) + I(r, \gamma) + G = E \quad (3)$$

$$S_p = Y^n - T - C \quad (4)$$

$$S_g = T - G \quad (5)$$

$$S = S_p + S_g \quad (6)$$

$$Y - E = S - I = CAB = -KAB = dQ^* \quad (7)$$

$$\gamma = r = r^* \quad (8)$$

where

$Y$  is domestic product, net of capital stock depreciation

$K$  is the capital stock

$L$  is hours worked

$Y^n$  is national income

$r^*$  is the world interest rate

$Q^*$  is the stock of foreign indebtedness

$C$  is household consumption

$c$  is the propensity to consume

$T$  is income taxation

$I$  is net domestic investment

$\gamma$  is the marginal productivity of capital

$G$  is government spending

$E$  is absorption, or domestic demand

$S_p$  is private saving

$S_g$  is public saving

$S$  is national saving

$CAB$  is the current account balance

$KAB$  is the capital account balance

$r$  is the domestic interest rate

The horizontal axis of Figure 1 measures national product, the output of final goods and services, made available for sale at home and abroad, and national income, net of income paid abroad assumed to be in the form of interest only. Real output expands as the capital



stock increases, as suggested by equation (1), assuming a given labor force or, alternatively, assuming national accounting aggregates are expressed in per worker terms.

**FIGURE 1 HERE**

The vertical axis of the figure measures household consumption, autonomous government purchases, private investment, national saving, as defined in equation (6), and the current account balance. Household consumption depends on after-tax income,  $Y^n - T$ , and the proportion of income consumed within the period,  $c$ , which determines the slope of the expenditure function through time. Government spending is assumed autonomous and in the nature of consumption.

From equations (4),(5) and (6), national savings is also the sum of private savings and public savings,

$$S = S_p + S_g = (Y^n - T - C) + (T - G) = Y^n - C - G \quad (9)$$

Hence, if national output produced in initial time period  $t$  is  $Y_t = Y_t^n$ , then national saving in Figure 1 is  $S_t$ , the vertical distance between  $C_t + \bar{G}$  and the  $45^0$  line. For a given value of output determined in period  $t$ , national saving varies as private and public consumption rise or fall.

Private investment, net of capital stock depreciation, in period  $t$  is governed by an investment opportunities frontier. First devised by Irving Fisher (1930) and later applied by authors such as Frenkel and Razin (1996), Obstfeld and Rogoff (1996) and Makin

(2000) to convey how present income may be transformed into longer run future income via saving and investment, the investment opportunities frontier has traditionally specified two periods only, the present and the entire future. Here however, the device is used as in Makin (2002) to convey how additional capital expenditure in one period enlarges national output and income in a sequence of discrete periods, such that

$$Y_{t+1} = Y_t + g(I_t), \quad Y_{t+2} = Y_{t+1} + h(I_{t+1}), \quad Y_{t+3} = Y_{t+2} + j(I_{t+2}) \text{ etc.} \quad (10)$$

Throughout the analysis, the short run is therefore defined as the current period  $t$ , whereas the medium run spans the subsequent multi-period sequence.

In effect, Figure 1 proposes an output-expenditure analogue of the Keynesian-cross diagram that underpins textbook macroeconomic analysis. Note however, that total expenditure or aggregate demand differs from the way it is specified in the cross diagram and the Mundell-Fleming model. There, aggregate demand means absorption plus net exports, whereas here domestic demand is simply defined as absorption, inclusive of imports following Alexander 1952.

That is, total spending in the short run (period  $t$ ) is the vertical sum of  $C_t + G_t + I_t$  representing all spending on domestic and imported goods and services by resident entities. At the same time, aggregate supply is defined as the total quantity of goods and services provided for sale at home and abroad, recognising that part of output satisfies export demand. Accordingly, the current account balance and associated external

borrowing requirement can be identified explicitly for any output level determined within the period through the production process.

The expenditure schedule intersects the  $45^0$  line directly above  $Y_t$ , the value of GDP produced in period  $t$ , in the special case of a fully closed economy. Alternatively, it intersects the  $45^0$  line directly above  $Y_t$ , when the current account happens to be balanced at  $Y_t$ , such that the portion of output produced for sale abroad and recorded as exports of goods and services exactly equals imports, the spending by resident entities on goods and services produced abroad. When domestic demand equals aggregate supply in this model, the economy neither incrementally borrows nor lends internationally.

Figure 1 also shows how a current account deficit,  $CAD_t$ , may initially be determined by the excess of the economy's total expenditure over national output and income of  $Y_t$ , as implied by equation (7). Equivalently,  $CAD_t$  is the excess of investment,  $I_t$ , over national saving,  $S_t$ , at that same income level, assuming the pre-existing stock of foreign debt is zero.

Domestic investment, inclusive of that part funded by foreign saving, rises to the point where the marginal product of capital, reflected in the slope of the dashed portion of the investment opportunities frontier in Figure 1, equals the prevailing world interest rate, as earlier specified in equation (8), at the point of tangency. This effectively assumes real interest parity and perfect international capital mobility, as also assumed in the Mundell-

Fleming and intertemporal current account models. The perfect capital mobility assumption can be relaxed. However, this would overly complicate the analysis without affecting the main results.

Assuming static exchange rate expectations and abstracting from other risk factors that limit capital mobility, the exogenous world interest rate then sets the equilibrium domestic interest rate,  $r$ , and level of investment,  $I_t$ , through the investment opportunities frontier. Presuming the net demand for foreign currency to fund  $CAD_t$  continually matches the net supply of foreign currency accompanying  $KAB_t$  also implies an invariant exchange rate throughout, thereby avoiding the complications of competitiveness effects.

Output in period  $t+1$  exceeds output in period  $t$  due to additional investment which depends positively on the productivity of additional capital, reflected in the slope of the investment opportunities frontier, and negatively on the world interest rate. However, from equation (2), national income,  $Y_{t+1}^n$  is less than  $Y_{t+1}$  since the capital inflow in period  $t$  must be serviced at the world interest rate. In the figure,  $Y_{t+1} - Y_{t+1}^n = r^* CAD_t$ , is equivalent to distance  $y^*$ , by geometry. The current account deficit is sustainable when the increased output in  $t+1$  that flows from excess investment over national saving exceeds the value of  $y^*$ .

This relationship between national output and income suggests that the investment opportunities frontier can be modified to derive a new frontier showing how capital inflow in one period directly increases national income to its next period equilibrium value. Such a frontier, hereafter referred to as the *FF* frontier, is geometrically derived as a curve whose slope at any point represents the difference between the marginal product of foreign-financed investment, obtained from the dashed investment opportunities curve and given world interest rate.

In Figure 1 the tangency point on the investment opportunities frontier yields equilibrium national income of  $Y_{t+1}^n$ . Directly above  $Y_{t+1}^n$  the *FF* frontier must therefore be vertical as  $\gamma - r^* = 0$ . At this point, capital inflow to fund excess investment over national saving no longer contributes positively to national income. Beyond this point the *FF* frontier bends backward as the exogenous interest rate would then exceed the marginal product of capital, reducing national income. Improvements in expected capital productivity would shift the investment opportunities and *FF* curves outwards, increasing the size of  $CAD_t$  and national income in subsequent periods, other things equal.

This alternative framework is useful for several reasons. It graphically illustrates how current account balances at any time are determined simultaneously by total spending-production *and* saving-investment imbalances. Additionally, as conveyed in Figure 2, it reveals how external deficits facilitate faster economic growth of national output and national income than otherwise, provided the return on foreign-funded capital exceeds the external debt servicing cost. To highlight this result, Figure 2 shows the lower level of

equilibrium national income,  $Y_{t+1}^c$ , that would result if capital controls prohibited external finance. As household consumption increases with income through time, it is also apparent that external deficits enable living standards to be higher compared to autarky.

**FIGURE 2 HERE**

### **3. Fiscal Policy, the External Accounts and National Income**

This model may now be used to analyze the short to medium run impact of fiscal policy on national saving, the current account balance and national income. In Figure 3, reduced public consumption spending raises national saving, derived earlier as  $S = Y^n - C - G$ . This lowers the expenditure schedule, and equivalently diminishes  $CAD_t$  within the period that the fiscal stance changes. This implies national income will be higher in successive intervals following the fiscal contraction because national saving is higher and, for given investment opportunities, less external debt requires servicing.

Moreover, the framework shows a direct theoretical link between the government's budget ( $G - T$ ) and  $CAD_t$ , consistent with the 'twin deficits hypothesis' that implies budget and external deficits are linked. Usually, it is presumed that the deficits linkage is dollar for dollar, irrespective of whether spending or tax changes alter the budget deficit.

**FIGURE 3 HERE**

In sum, Figure 3 shows that fiscal contraction (expansion) can raise (lower) income in the medium term, contrary to standard closed economy Keynesian results about the impact of fiscal policy on national income. This result also contradicts the predictions of Mundell-Fleming analysis about the impact of fiscal policy under either fixed or floating exchange rates.

The analysis of the economy-wide impact of discretionary income tax changes is less straightforward than public spending changes however. If household consumption is a simple linear function of current disposable income, defined as  $Y^n - T$ , then

$$C = \alpha + c(Y^n - T) \quad (11)$$

Substituting into the national saving expression from equation (9),

$$S = S_p + S_g = [Y^n - T - \alpha - c(Y^n - T)] + [T - G] \quad (12)$$

From this expression,  $\frac{dS}{dT} = c$ . Hence it follows that for each dollar rise in income taxes that reduces the budget deficit by a dollar, national saving rises by only  $c \times 100$  cents in the dollar, as  $0 \leq c \leq 1$ .

Accordingly, the current account deficit would also narrow by less than the total reduction in the budget deficit induced by a discretionary income tax rise, other things

equal. This provides an important qualification to the twin deficits proposition as it breaks the dollar for dollar link between public account and external account deficits. Moreover, for subsequent national income gains would be less than those obtained from the spending cuts option.

The deficits link would be further complicated if residents perceive income tax changes as temporary rather than permanent influences on their disposable income. For instance, if an income tax rise that lowered the budget deficit was seen as temporary and households maintained pre tax rise consumption levels, lower private saving would fully offset higher public saving. From equation (13), if households ignored the tax rise, national saving and hence  $CAD_t$  would remain unchanged in the presence of a budget deficit as the overall relationship between national saving and investment is unaffected. Additionally, there are supply-side complications associated with income tax changes. These stem from possible work incentive effects affecting production which may offset their impact on income through the national saving channel.

Moreover, Ricardian effects are possible in the wake of fiscal expansions of any kind. In the extreme, though empirically unsupported case, a one for one offset of private consumption by households mindful of future tax obligations would obviate any link arising between the budget and external deficits in the first instance. Fiscal consolidation involving reduced public investment in the nature of productive infrastructure rather than public consumption would also reduce the current account deficit, but to the extent that



this reduced the output-generating capacity of the economy, such cuts could lower subsequent income below potential.

In brief, this analysis shows how fiscal consolidation can be expansionary if it contracts public consumption expenditure in open economies experiencing high current account deficits and significant levels of foreign debt. By lowering expenditure relative to output, reduced public consumption, easily the largest component of total public spending in most economies, raises domestic savings relative to domestic investment, and lowers an economy's external borrowing requirement and hence raises national income.

Figure 3 can also be used to demonstrate that, for given investment opportunities, a rise in national saving due to a fall in autonomous consumption,  $\alpha$ , shifts the expenditure schedule down. An increased household saving rate thereby reduces the current account deficit and raises national income in the medium term, consistent with the predictions of orthodox growth theory. Contrariwise, if household consumption rises, national saving falls which implies national income is subsequently less than otherwise due to higher servicing costs on a larger stock of borrowed funds.

Importantly however, the rise in the current account deficit still allows net investment and subsequent national income to be higher than it would be in autarky, provided national saving remains positive. This of course presumes there are no problems intermediating both domestic and international funds through the economy's banking and financial system, an assumption further discussed in the concluding section.

#### 4. Summary and Qualifications

The above discrete time framework provides an international macroeconomic rendition of the familiar Keynesian cross diagram. Employing standard macroeconomic tools and relations, it yields results contrary to standard interpretations of current account deficits and the impact of fiscal activism on national income over the short and medium terms. Contrary to closed economy Keynesian theory, fiscal contraction can raise national income in the medium term. For instance, reduced public consumption narrows a budget deficit and increases national saving relative to investment, with subsequent national income gains.

Moreover, the model yields results at odds with the Mundell-Fleming approach in which output remains aggregate demand driven and where fiscal deficits are either counter-cyclical or ineffective, depending on the exchange rate regime. Budget deficits arising from increased public consumption are never contractionary in Keynesian demand-oriented models, as they are shown to be above. As an intertemporal approach, there are key points of difference with the two-period Fisherian approach to the open economy, based on utility and profit maximizing saving and investment behavior (Sachs 1981, 1982, Frenkel and Razin 1996, Obstfeld and Rogoff 1996, Razin 1995 and Makin 2003).

Unlike the conventional intertemporal paradigm, this framework invokes standard behavioral relations with the output-expenditure gap at the centre of the explanation of medium term income variation. Moreover, contrary to the two-period Fisherian approach

to the open economy, the above framework shows the medium run effects of internal and external shocks on the current account and national income over a sequence of discrete time intervals. While some results are consistent with precepts of long run growth theory, it differs from that theory through its emphasis on open economy variables and medium term income determination.

The above approach has important implications for macroeconomic and trade policy for it demonstrates that external imbalances can be growth and welfare enhancing to the extent that they permit higher levels of national income and household consumption than otherwise. However, this model avoids economy-wide problems that can arise in the presence of financial markets and institutions intermediating between foreign investors and ultimate domestic borrowers. The above results therefore need qualifying, especially for emerging economies that have liberalized their capital accounts over the past two decades yet have retained relatively fragile domestic financial systems.

For example, many economies in Latin America and East Asia have recorded relatively large current account deficits and associated external debt levels, but have also experienced severe capital flow reversals, financial crises and recessions. Empirical studies (see, for instance, Lane and Milesi-Ferretti 2001, Edison, Klein, Ricci and Slok 2002, Patillo, Poirson and Ricci 2002 and a thorough survey of this issue by Prasad, Rogoff, Wei and Kose 2003) therefore suggest there is no strong evidence of linkages between capital market integration and economic growth for developing economies.

These empirical results undoubtedly reflect weak financial systems in developing economies that have sparked financial crises and sporadically disrupted economic growth. Underlying problems contributing to financial crises, from which the above model abstracts, are adverse selection, where too many bad credit risks acquire bank-intermediated foreign funds, and moral hazard, where domestic borrowers use foreign funds to engage in imprudent or excessively risky activities. Expectations about the likely profitability of new investment projects also at times prove too optimistic and international monetary conditions unexpectedly change, with adverse implications for national income in borrower countries. Incorporating such factors into theoretical international macroeconomic models remains a challenge for future research.

Nonetheless, the above framework helps us understand why large current account deficits experienced over recent decades by advanced economies such as Australia, the United States and New Zealand were easily sustained and co-incided with periods of strong economic growth and very low saving in those economies. Foreign investors evidently concluded period by period, that the excess national expenditure they funded over output, as reflected in historically high current account deficits, was sufficiently productive.

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Figure 1

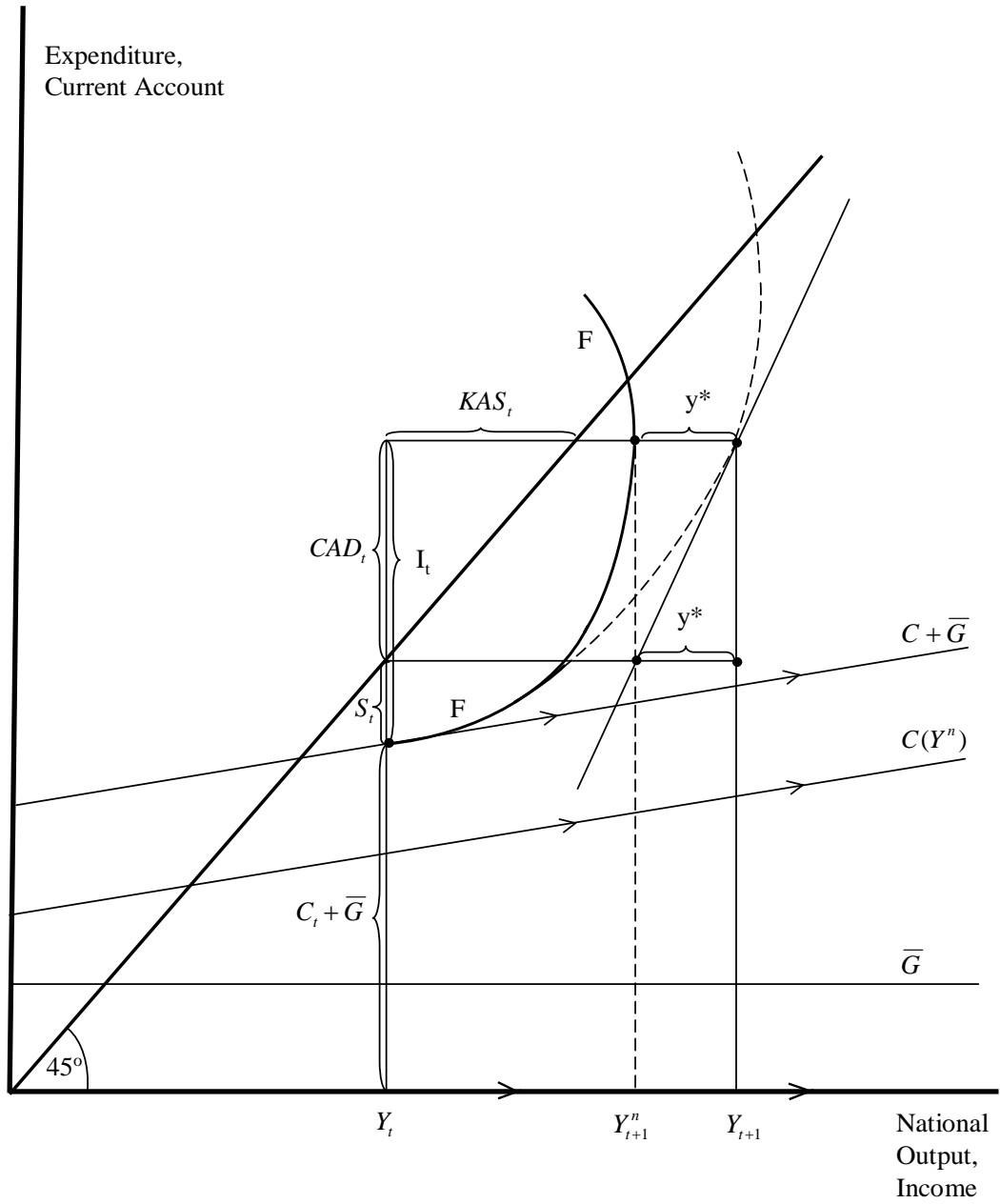




Figure 2

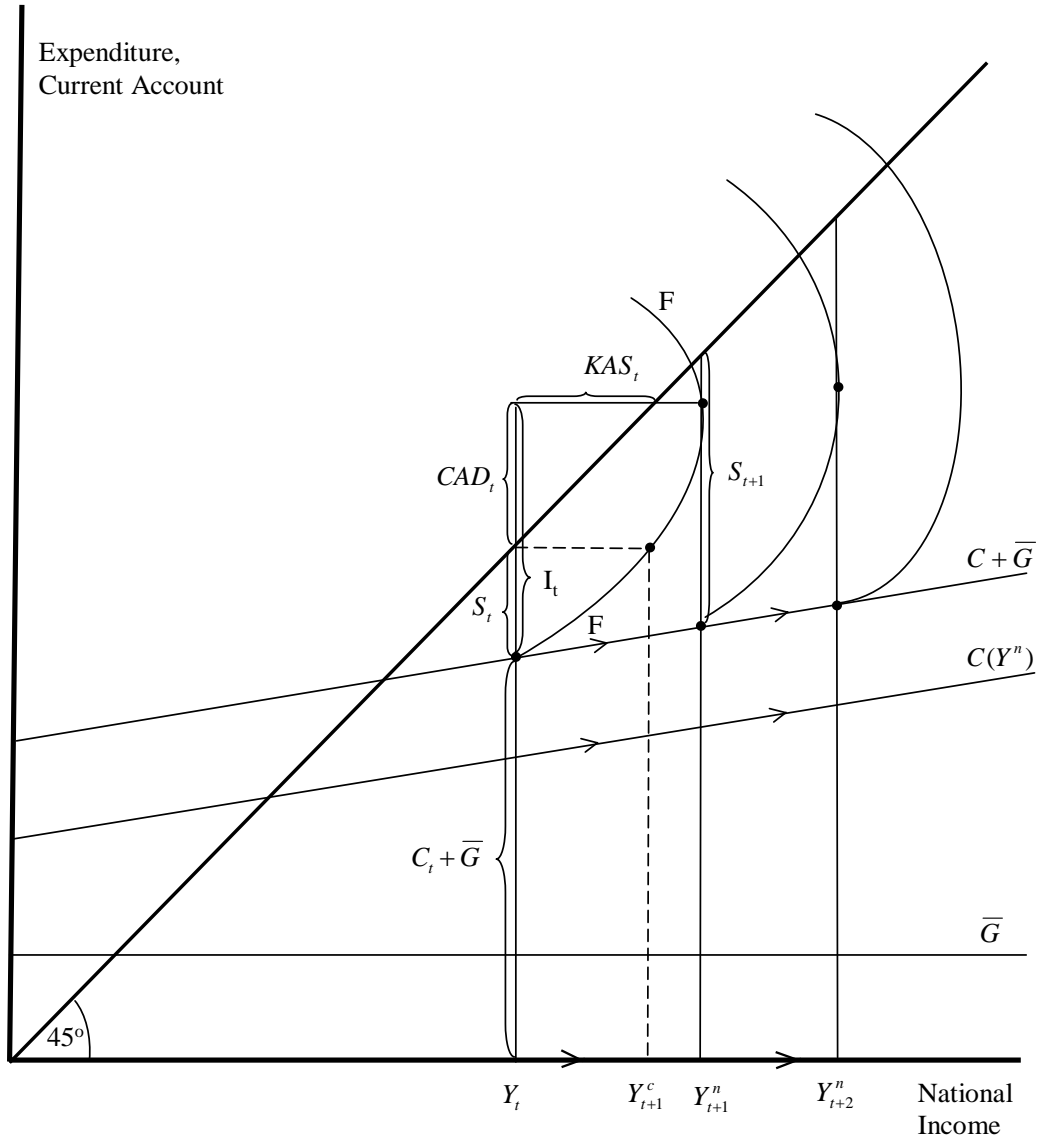


Figure 3

