Session 10: Macroeconomic Policy and Tax Policy Interactions

Forward Guidance in Tax Policy

(or Fun with Budget Constraints): An Application to Japan's Economic Conditions Clause

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Abstract

The use of forward guidance by central banks since the Great Recession has expanded the monetary policy toolbox beyond changes in the policy rate. Similarly, forward guidance in tax policy can expand the toolbox for tax authorities beyond changes in tax rates. This paper will examine a case where future changes in tax rates, either increases or decreases, are tied to meeting revenue goals. Various scenarios will be examined within a simple two-period consumption tax model. Moreover, this basic framework will be sufficient for a high-level analysis of Japan's 2012 Consumption Tax Law Legislation that contained an economics condition clause that conditioned a future tax increase on economic indicators.

JEL Codes: H31, H71, E61

Keywords: forward guidance, tax policy, discontinuous budget constraint

[1] Views expressed are my own and do not necessarily reflect those of the BIS, the Federal Reserve Bank of New York or the Federal Reserve System. I would like to thank Klaus Adam, Andy Filardo, Irem Guceri, Anastasia Kartasheva, Jonathan Kearns, Richhild Moessner, Jason Seligman and seminar participants at the BIS for very helpful comments and suggestions, and Garry Tang for excellent research assistance.

1. Introduction

This paper examines the application of forward guidance to tax policy.[2] I will analyze the implications of tying future changes in tax rates to the actions of taxpayers. Specifically, future tax rates will depend on whether or not revenue goals are met. For monetary policy, the Bank of Japan is generally recognized as the first major central bank (in 1999) to employ forward guidance about policy rates (Shirai, 2013). More recently, the major central banks have sought to develop new tools to enhance the effectiveness of monetary policy as short-term interest rates, the primary policy instrument for many central banks prior to 2008, approached the zero lower bound. In addition to asset purchases[3], central banks have expanded their toolbox by developing new approaches to forward guidance. These approaches have attempted to reduce uncertainty regarding future central bank actions. For example, the Bank of Canada provided *time contingent* guidance in 2009 whereby the central bank pledged to keep its target overnight rate unchanged until the end of the second quarter of 2010 (Bank of Canada, 2009), and the Bank of England provided *state contingent* guidance in 2013 by stating that it would not raise its target rate until the unemployment rate had fallen to 7% (Bank of England, 2013). The Federal Reserve has even provided forward guidance on its asset purchases (eg Board of Governors, 2014). For more on the impact of forward guidance and more detail on the various guidance provided by the major central banks, see Moessner et al. (2015) and Filardo and Hofmann (2014).

The use of forward guidance in the fiscal side of macroeconomic policy has been more limited. One recent example is the Consumption Tax Law enacted in Japan in August 2012. Under this law, Japan's consumption tax would increase from 5% to 8% in April 2014 and then to 10% in October 2015. The law also included an economic conditions clause whereby the increase to 10% could be postposed depending on the state of various economic indicators such as nominal GDP, real GDP and price trends. If these indicators suggested sufficient economic slack, the clause could be applied and the second increase would be suspended. In fact, the increase to 10% was postponed in late 2014 due to a weaker than expected Q3 GDP report. The increase was postponed for 18 months and the economic conditions clause was removed so that the increase could not be further postponed.

[2] Aside from the baseline case in Section 2, this paper will not focus on forward guidance in which the tax authority announces unconditional changes in future tax rates.

[3] As an example of central bank asset purchases, the Federal Reserve announced its Large-Scale Asset Purchase (LSAP) program in late 2008. Papers such as Gagnon et al. (2011) and Neely (2015) examine the impact of LSAPs on various financial variables.

Previous work has focused on ways to reduce uncertainty regarding fiscal policy (eg Leeper, 2010). And Adam et al. (2015) study the ability of a contingent financial transaction tax to reduce the size and length of boom-bust stock market cycles. They find that a tax contingent on the price/dividend ratio is plagued by equilibrium multiplicity and non-existence. There is also the extensive literature on state-contingent capital taxation (eg, Chari, Christiano and Kehoe (1991), Bohn (1994), and Farhi (2010)) which focuses on minimizing distortions in the face of exogenous shocks.

In this paper, the distortion of taxpayer behavior may be a goal of policymakers and the taxpayer has a role in determining the future tax structure. A simple two-period model will provide basic insights in a consumption-tax framework. In the analysis below, I show that conditioning future tax rates on a revenue threshold can open another dimension to tax policy. For example, one case will show that taxpayer behavior can be impacted without an actual change in tax rates. This framework will also be able to provide a high-level analysis of the economic conditions clause in Japan's Consumption Tax Law legislation. The framework below assumes that the tax authority can credibly commit to any future tax change, so that game-theoretic and time-inconsistency issues will not be considered (Barro and Gordon, 1983).

The remainder of this paper is structured as follows: section 2 presents a simple two-period consumption tax model; section 3 concludes.

2. Simple Model

The point of departure for the analysis is a simple two-period model of consumption under well-behaved preferences with no discounting. As a baseline case, with income Y, suppose that consumption tax rates in both periods are initially equal ($\tau_1=\tau_2$). The utility-maximizing levels of consumption (C_1, C_2) are represented by point A in Figure 1 at the point of tangency for the budget constraint and indifference curve IC'. Suppose that the tax authority then announces that tax rates in the second period will double (the exact increase is not of primary importance), the budget constraint will then shift downwards as indicated and the new utility-maximizing levels of consumption are represented by point B. Note that the motivation for the tax increase may not necessarily be a desire for more revenue. The proposed tax increase may be an attempt to bring forth future consumption and stimulate aggregate demand to reduce economic slack in the first period.[4] In Figure 1, first period consumption is shown to be higher

[4] Saxonhouse (1998) describes a proposal whereby an announced future increase in consumption taxes in Japan would bring forth consumption and then monetary policy could be used to maintain aggregate demand once higher consumption taxes kick in. As a result, near-term aggregate demand is stimulated not via tax

at point B than at point A, but it is certainly possible for first period consumption to remain unchanged or even decrease.

<Figure 1 here>

Across central banks, forward guidance can be defined in various ways. In the analysis below, forward guidance is threshold based (state contingent) and will be defined as conditioning second period tax rates on a first period revenue threshold so that taxpayer responses will determine whether or not a change in the second period tax rate occurs. This will result in a discontinuous budget constraint reminiscent of the full-time/part-time work decision (Averett and Hotchkiss, 1997). The first case below will involve a tax increase in the second period unless the revenue threshold is met. The second case will involve a tax decrease in the second period if the revenue threshold is met. The last case examined will be for a scenario where a future tax increase will occur unless revenues stay below the threshold. This case will approximate the policy embedded in Japan's 2012 Consumption Tax Law.

2.1 Tax Increase Unless Revenue Threshold Met

In the first case to be discussed, the only change from the baseline case is that the tax authority states that tax rates in the second period will not increase if first period revenues are at least as large as R, some threshold set by the tax authority; if first period revenues do not reach the revenue threshold, then tax rates will double in the second period.[5] Formally, the representative taxpayer has the following maximization problem:

$$\text{Max } U(C_1, C_2) \text{ s.t. } Y=C_1(1+\tau_1) + C_2(1+\tau_2)$$

where initially $\tau_2 = \tau_1$, and then it is announced that

$$\tau_2 = \tau_1 \quad \text{if} \quad \tau_1 C_1 \geq R \quad (\text{or } C_1 \geq R/\tau_1)$$
$$\tau_2 = 2\tau_1 \quad \text{if} \quad \tau_1 C_1 < R$$

In essence, the revenue threshold translates into a minimum level of consumption in the first period in order to avoid the tax increase in the second period. Graphically, there will be a

decreases, as in standard counter-cyclical policy prescriptions, but by higher anticipated future tax rates. Relatedly, Shapiro and Slemrod (1995) show that the propensity to consume can be impacted by a change in withholding without a change in tax rates.

[5] A possible motivation for a given revenue threshold in the first period could be to satisfy credit agency requirements to maintain a given credit rating.

discontinuity (not a kink) in the taxpayer's budget constraint at the level of first period consumption that would meet the revenue threshold (R/τ_1).

The impact on taxpayer behavior will depend primarily on first period consumption relative to R/τ_1. In Figure 2, the dashed vertical line represents the level of first period consumption that will meet the revenue threshold and also represent the point of discontinuity for the taxpayer's budget constraint. The solid portions of the respective budget constraints represent the relevant sections for the taxpayer; the relevant portion for first period consumption to the left of the vertical line is the lower constraint, and the relevant portion to the right of the vertical line is the upper constraint.

<Figure 2 here>

Now suppose that prior to the announcement of the conditional tax increase, C_1 exceeds R/τ_1 so that the revenue threshold will be met without any change in taxpayer behavior. In this case, there is no change in tax rates and Figure 2 shows that there will be no change in consumption in either period (A=B). Next, suppose that prior to the announcement of the conditional tax increase, C_1 is less than R/τ_1 and the taxpayer's optimal consumption is represented by point A in Figure 3. Without any change in behavior, the taxpayer will face an increase in the second period tax rate. However, with the discontinuity in the budget constraint, the taxpayer's new optimizing level of consumption is not the same as in Figure 1. Instead, the taxpayer can achieve a higher utility level by choosing the consumption level represented by the corner solution at point B in Figure 3. First period consumption will increase just enough to meet the revenue threshold and as a result, the second period tax rate does not increase. Correspondingly, overall revenue raised across the two periods is unchanged, but a portion of the overall revenue collected is shifted into the first period.

The general consensus amongst economists is that taxpayers respond more vigorously to tax changes that are expected to be permanent instead of transitory (Auerbach and Gale, 2009). In this scenario, through threshold-based forward guidance, the tax authority is able to bring forward consumption into the first period without any actual change in the tax rate. And with the tax rate unchanged, first period consumption is unambiguously higher at point B.

<Figure 3 here>

It is perhaps not difficult to see that a revenue threshold that was set too high could result in a situation where the taxpayer will have a higher level of utility with the tax increase instead of moving to the corner solution. This can also occur if the potential tax increase is relatively small. But if the proposed tax increase is draconian enough, the tax authority can

ensure with near certainty that the taxpayer will move to the corner solution and not face the higher tax rate.[6]

2.2 Tax Decrease if Revenue Threshold Met

In the scenario examined in this section, the tax authority announces in the first period that it will implement a reduction in the second period tax rate if the revenue threshold is met. To maximize the comparability with the scenarios in Section 2.1, the only change is in the initial tax structure so that $\tau_2 = 2\tau_1$. Formally, the representative taxpayer has the following maximization problem:

$$\text{Max } U(C_1, C_2) \text{ s.t. } Y=C_1(1+\tau_1) + C_2(1+ \tau_2)$$

where initially $\tau_2 = 2\tau_1$, and then it is announced that

$$\tau_2 = \tau_1 \quad \text{if} \quad \tau_1 C_1 \geq R$$
$$\tau_2 = 2\tau_1 \quad \text{if} \quad \tau_1 C_1 < R$$

The budget constraint here is similar to the constraint in the previous section, however, the implications of this policy are slightly different. The impact on taxpayer behavior will once again depend primarily on first period consumption relative to R/τ_1. First, consider the case where prior to the announcement by the tax authority, C_1 exceeds R/τ_1 so that the revenue threshold is met without any change in behavior (Figure 4). As a result, the second period tax rate will decrease and the budget constraint shifts out. The taxpayer's optimal consumption bundle goes from point A to point B and the taxpayer unambiguously moves to a higher indifference curve.

<Figure 4 here>

In the case where C_1 is below R/τ_1 prior to the announcement of the conditional tax change, the scenario in Figure 5 is one where the taxpayer benefits from increasing first period consumption (point A) to the corner solution (point B) so that the revenue threshold is met and the second period tax rate is reduced. It is certainly possible that the revenue threshold is set so high that the taxpayer would prefer to maintain first period consumption below the threshold

[6] This, of course, assumes that no political unrest (eg the Moscow riots of 1648 due to the imposition of a salt tax) arises from this tax policy.

and not have a lower tax rate in the second period. This is presented in Figure 6 where point A equals point B. This result may be desired by a policymaker who is not actually in favor of a tax reduction; setting a high threshold that will not be met allows the policymaker to be able to still publicly claim to support a tax decrease.[7]

<Figure 5 here>

<Figure 6 here>

2.3 Tax Increase if Revenue Threshold Met

The final scenario examined in this paper will be a case where the tax authority announces a tax increase in the second period unless first period revenue remains *below* a given revenue threshold.[8] This is the analog to the case in Japan where the consumption tax rate was scheduled to increase in 2015 unless the economic situation was deemed to be weak. In contrast to the previous examples, the relevant portion for first period consumption to the left of the vertical line is the upper constraint, and the relevant portion to the right of the vertical line is the lower constraint (Figure 7).

<Figure 7 here>

I will focus on the case where first period consumption is above R/τ_1 prior to the announcement of the conditional tax change. In the situation presented in Figure 7, the taxpayer's optimal consumption bundle moves from point A to the corner solution at point B where first period consumption is lower. As a result, the taxpayer avoids the tax increase. So while imposing a tax increase only under sufficiently strong economic conditions may be proper counter-cyclical policy and may seek to account for any unforeseen adverse shocks that arise after the tax change announcement[9], the incentives in the situation presented here (and essentially the case in Japan) are biased towards weaker first period consumption even without any sort of adverse shock and the result in Japan where weak economic conditions resulted in a delay of the consumption tax increase is not surprising.

[7] This case is an example of how conditional tax policy can provide some cover for political leaders. Leeper (2010) notes that fiscal rules can be useful in this respect.

[8] The scenario where a tax decrease will occur only if the revenue threshold is not exceeded will not be covered, but the analysis is straightforward along the lines of the cases discussed in the other sections.

[9] See International Monetary Fund (2009) for a discussion of the need for fiscal rules to provide for the possibility of rare adverse economic shocks.

3. Conclusion

This paper shows how forward guidance in tax policy, defined as conditioning future tax changes on revenue thresholds, can provide another dimension to tax policy. The simple model presented shows that it is possible to impact taxpayer behavior without an actual change in tax rates. Forward guidance in tax policy can also provide cover for policymakers that may or may not want a given tax change, but are uncomfortable with an outright statement of their preferences. And finally, the model is able to provide an analysis of the economic conditions clause embedded in Japan's 2012 Consumption Tax Law legislation. The results from the model are consistent with the high-level outcome of the legislation.

There are many directions for future work. For example, the model could be extended to multiple periods. Indeed, the Japanese legislation contained an initial increase in consumption tax rates followed by a second increase that was subject to the economic conditions clause. Multiple periods would enable an analysis that more closely matches the actual legislation. Forward guidance as a means of counter-cyclical policy can also be studied in a multi-period framework. However, it is not clear what a proper threshold would be in such a case. A nominal GDP threshold would need to be periodically re-calibrated and an unemployment rate threshold may give a mis-leading view of the strength of the economy if the rate falls due to an increase in individuals actively looking for work and not from a reduction in the number of unemployed individuals.

Expanding the analysis to include a distribution of taxpayers would allow more complex dynamics to be analyzed. For example, after forward guidance is announced of a future tax decrease if a revenue threshold is met, some taxpayers may choose not to change their consumption and try to free-ride off of taxpayers who do change their consumption. A move away from a representative taxpayer framework would also allow a clearer illustration of the link between individual taxpayer behavior and whether or not the aggregate revenue threshold is met.

And finally, the model presented here does not take into account game-theoretic considerations or issues regarding the credibility of the tax authority in implementing the proposed tax changes. A Nash equilibrium could have an outcome very different from the conclusions drawn from the simple model presented here.

REFERENCES

Adam, Klaus, Albert Marcet, Sebastian Merkel and Johannes Beutel. (2015) "Can a Financial Transaction Tax Prevent Stock Price Booms?" mimeo, July.

Auerbach, Alan J. and William G. Gale (2009) "Activist Fiscal Policy to Stabilize Economic Activity," in Federal Reserve Bank of Kansas City, Financial Stability and Macroeconomic Policy: 327-74.

Averett, Susan L. and Julie L. Hotchkiss. (1997) "Female labor supply with a discontinuous, nonconvex budget constraint: incorporation of a part-time/full-time wage differential," *The Review of Economics and Statistics*, vol. 79, no. 3: 461-70.

Bank of Canada. (2009) Monetary Policy Statement, April 21.

Bank of England. (2013) News Release – Bank of England Provides Explicit Guidance Regarding the Future Conduct of Monetary Policy, August 7.

Barro, Robert and David Gordon. (1983) "A Positive Theory of Monetary Policy in a Natural-Rate Model," *Journal of Political Economy*, Vol. 91, No. 4: 589-610.

Board of Governors of the Federal Reserve System. (2014) Federal Reserve issues FOMC statement, March 19.

Bohn, Henning. (1994) "Optimal state-contingent capital taxation: When is there an indeterminancy?" *Journal of Monetary Economics*, vol. 34: 125-37.

Chari, V.V., Lawrence Christiano and Patrick Kehoe. (1991) "Optimal Fiscal and Monetary Policy: Some Recent Results," *Journal of Money, Credit and Banking*, vol. 23, No.3 (August): 519-39.

Farhi, Emmanuel. (2010) "Capital Taxation and Ownership when Markets are Incomplete," *Journal of Political Economy*, vol. 118, no. 5 (October): 908-48.

Filardo, Andrew and Boris Hofmann. (2014) "Forward guidance at the zero lower bound," *BIS Quarterly Review* (March): 37-53.

Gagnon, Joseph, Matthew Raskin, Julie Remache and Brian Sack. (2011) "Large-Scale Asset Purchases by the Federal Reserve: did they work?" Federal Reserve Bank of New York *Economic Policy Review*, vol. 17, no. 1 (May): 41-59.

International Monetary Fund. (2009) Fiscal Rules—Anchoring Expectations for Sustainable Public Finances. Fiscal Affairs Department (December).

Leeper, Eric M. (2010) "Monetary Science, Fiscal Alchemy," *NBER Working Paper Series*, no. 16510.

Moessner, Richhild, David-Jan Jansen and Jakob de Hann. (2015) "Communication about future policy rates in theory and practice: a survey" *DNB Working Paper* No. 475.

Neely, Christopher J. (2015) "Unconventional monetary policy had large international effects," *Journal of Banking and Finance*, vol. 52 (March): 101-11.

Saxonhouse, Gary. (1998) "Recovery through Taxation: Expectations and Japanese Economic Performance," *Asian Economic Journal*, Vol. 12, No. 4: 343-351.

Shapiro, Matthew D. and Joel Slemrod. (1995) "Consumer Response to the Timing of Income: Evidence from a Change in Tax Withholding," *American Economic Review*, Vol. 85, No. 1 (March): 274-83.

Shirai, S. (2013) "Monetary Policy and Forward Guidance in Japan," Speech at the International Monetary Fund (September 19).

Figure 1

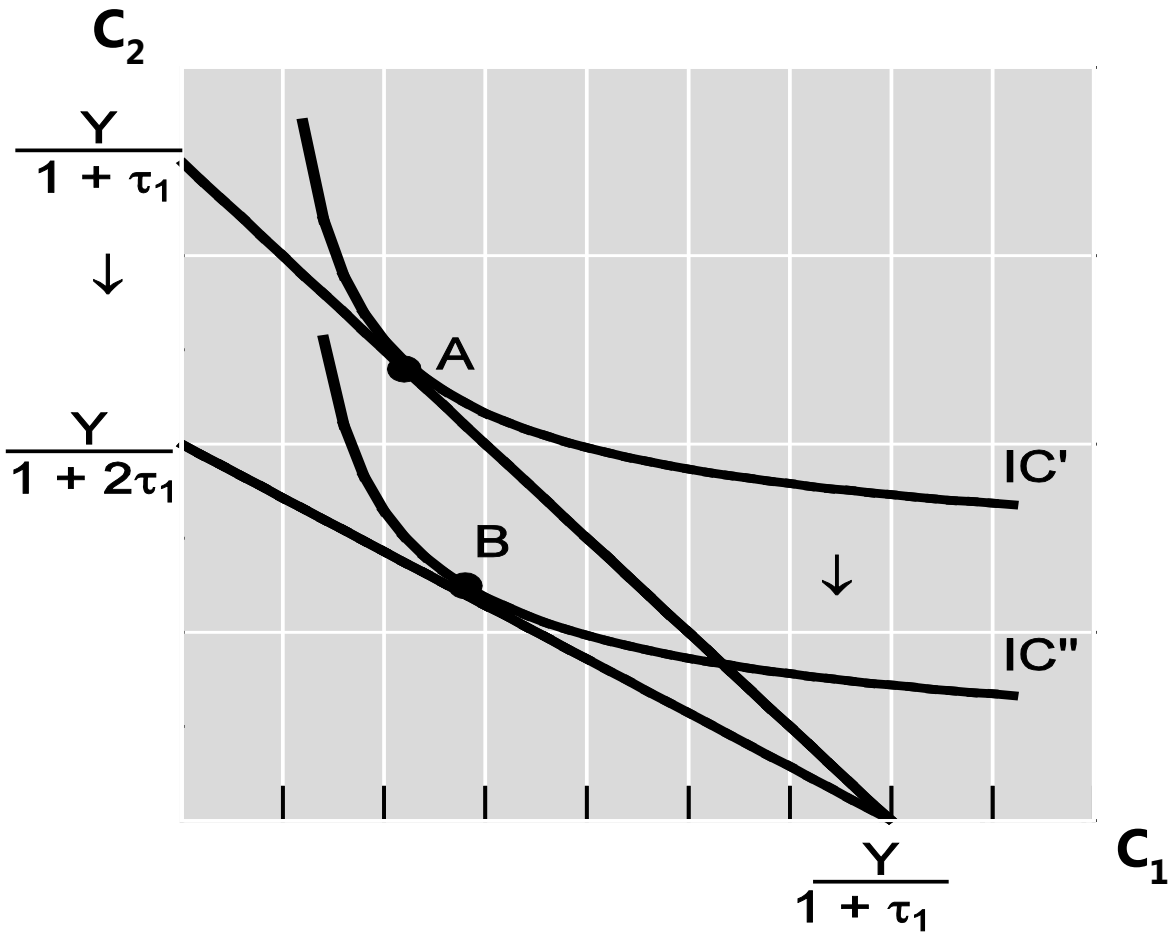

Figure 2

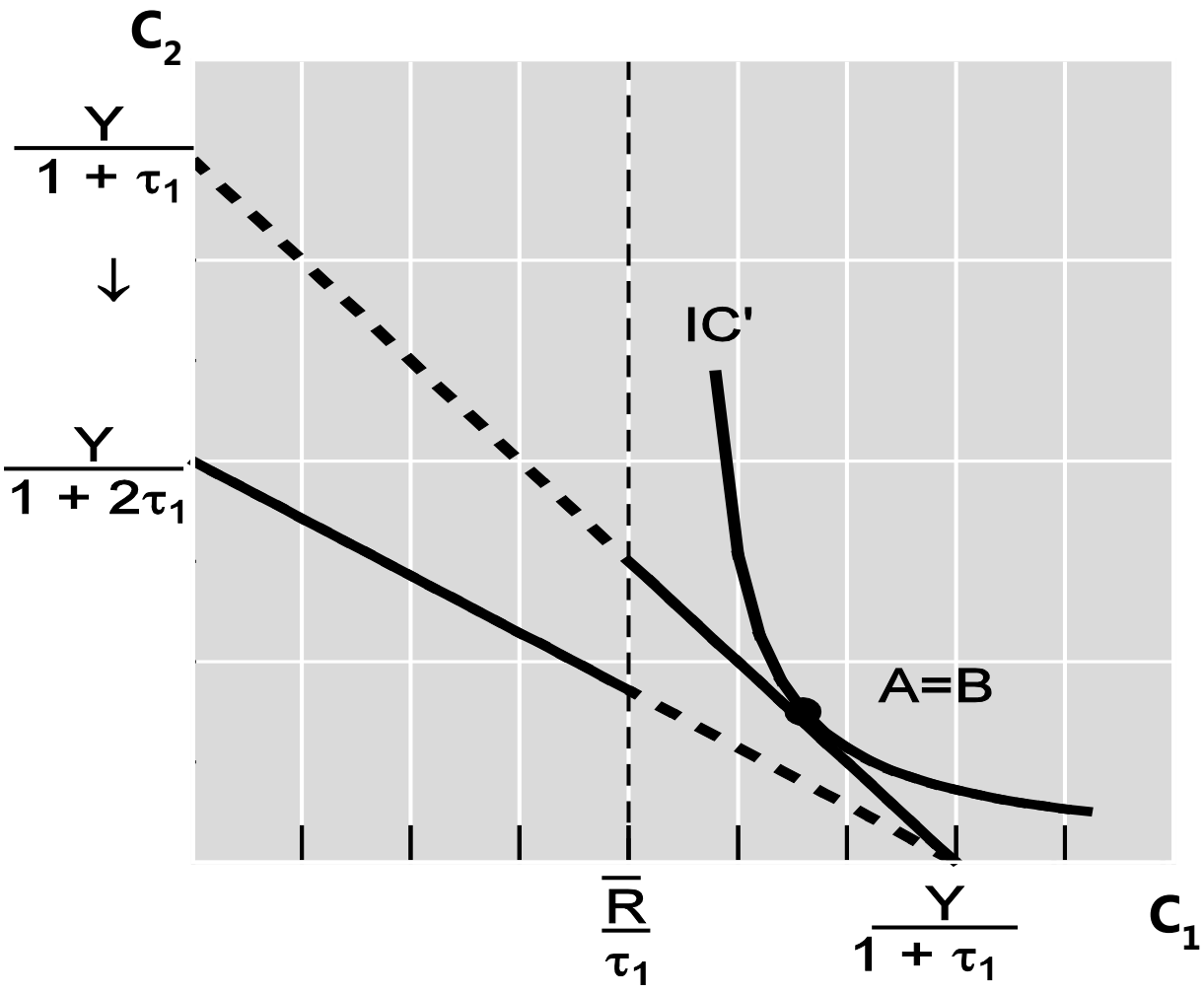

Figure 3

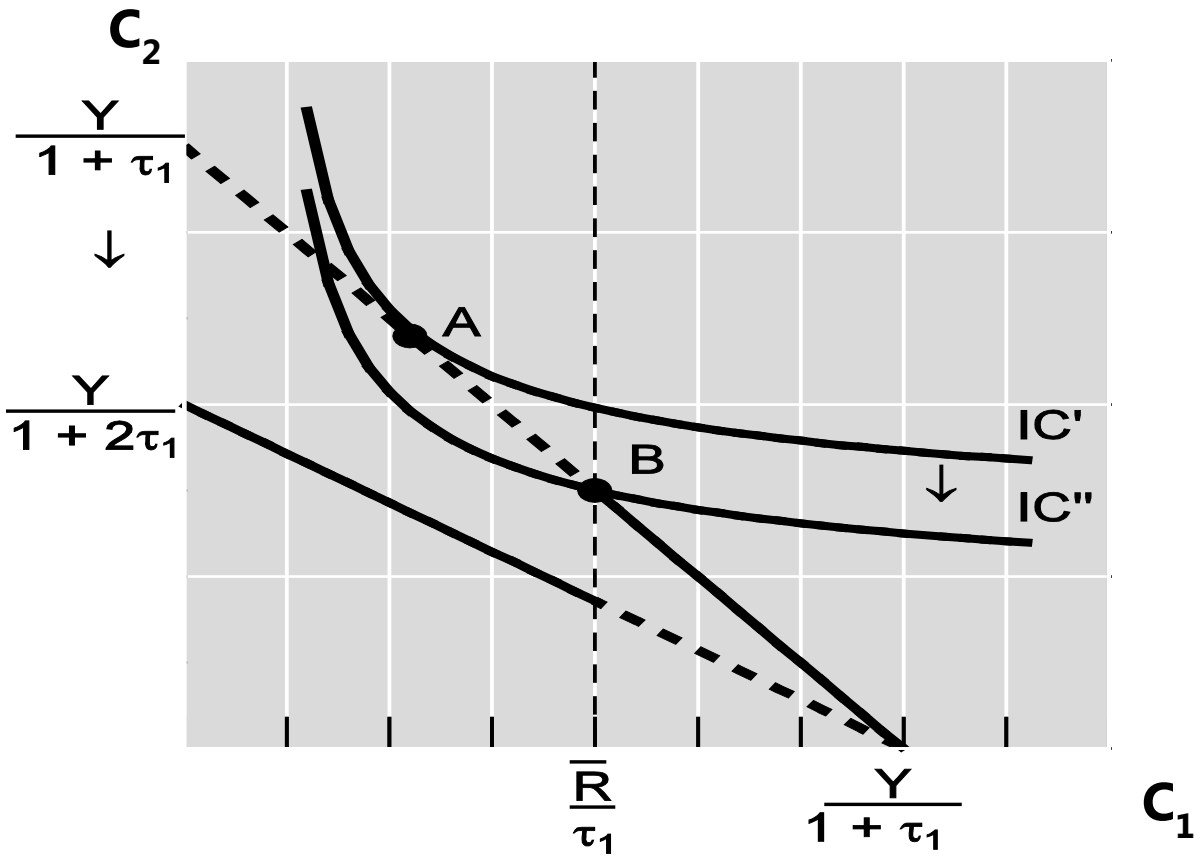

Figure 4

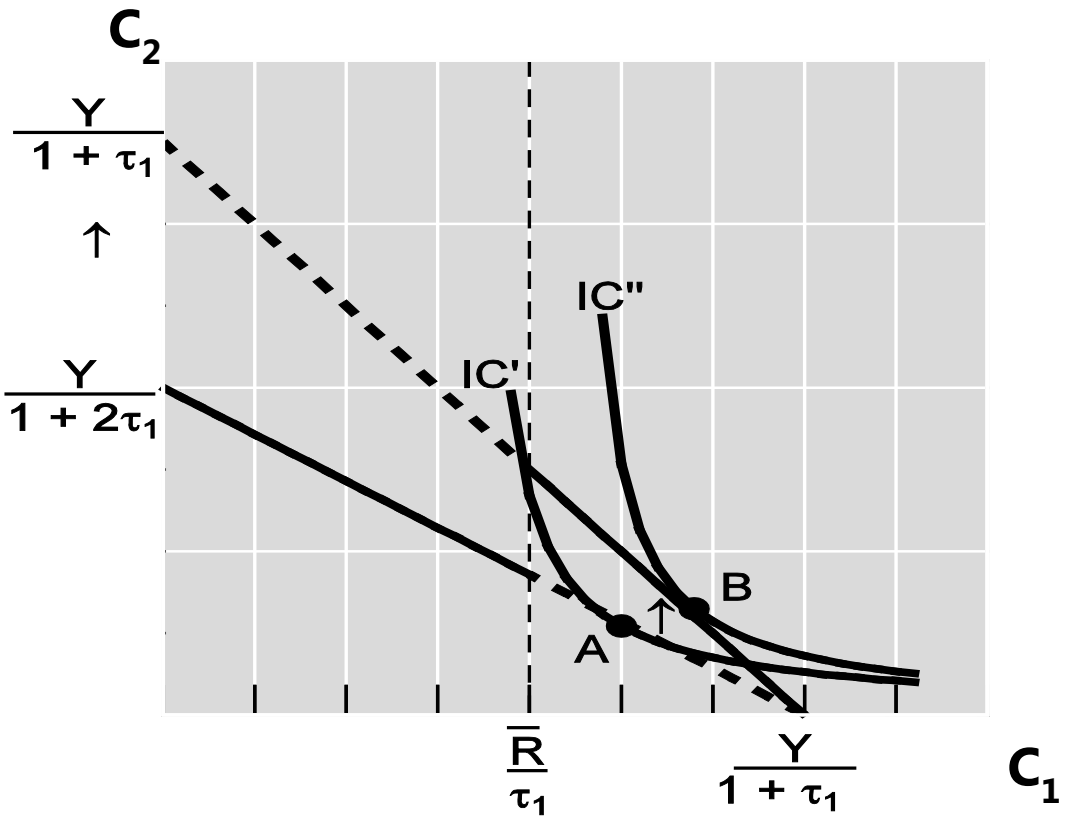

Figure 5

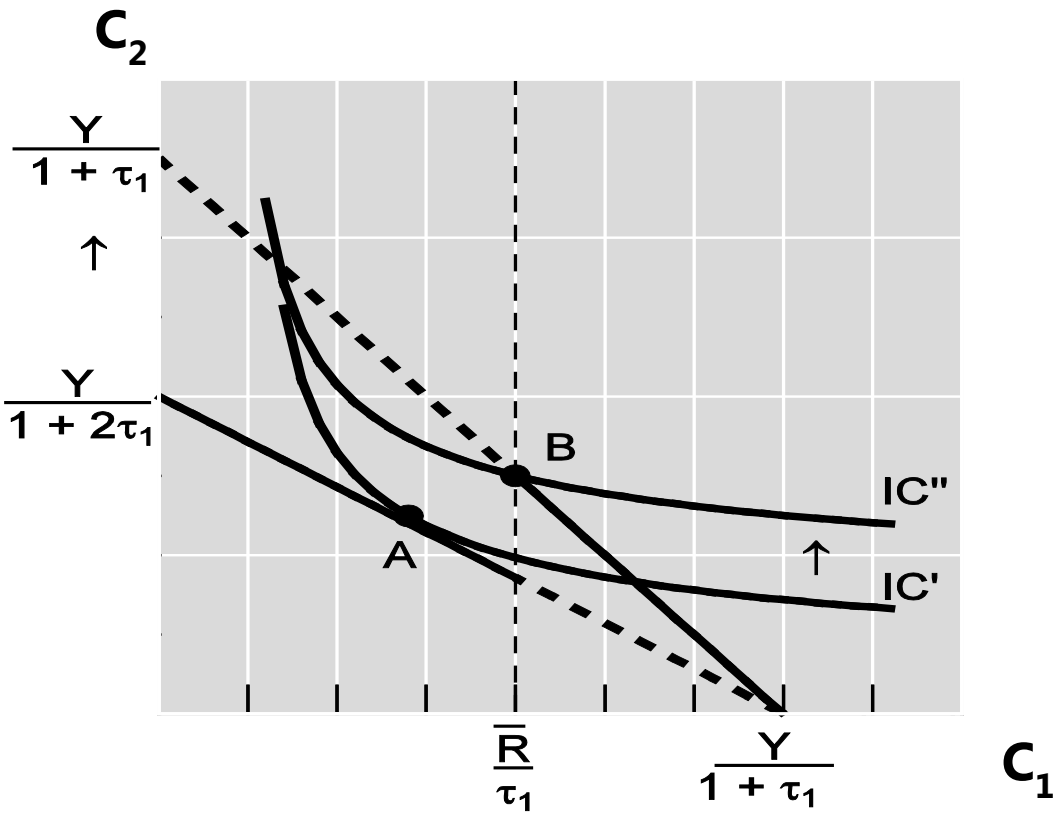

Figure 6

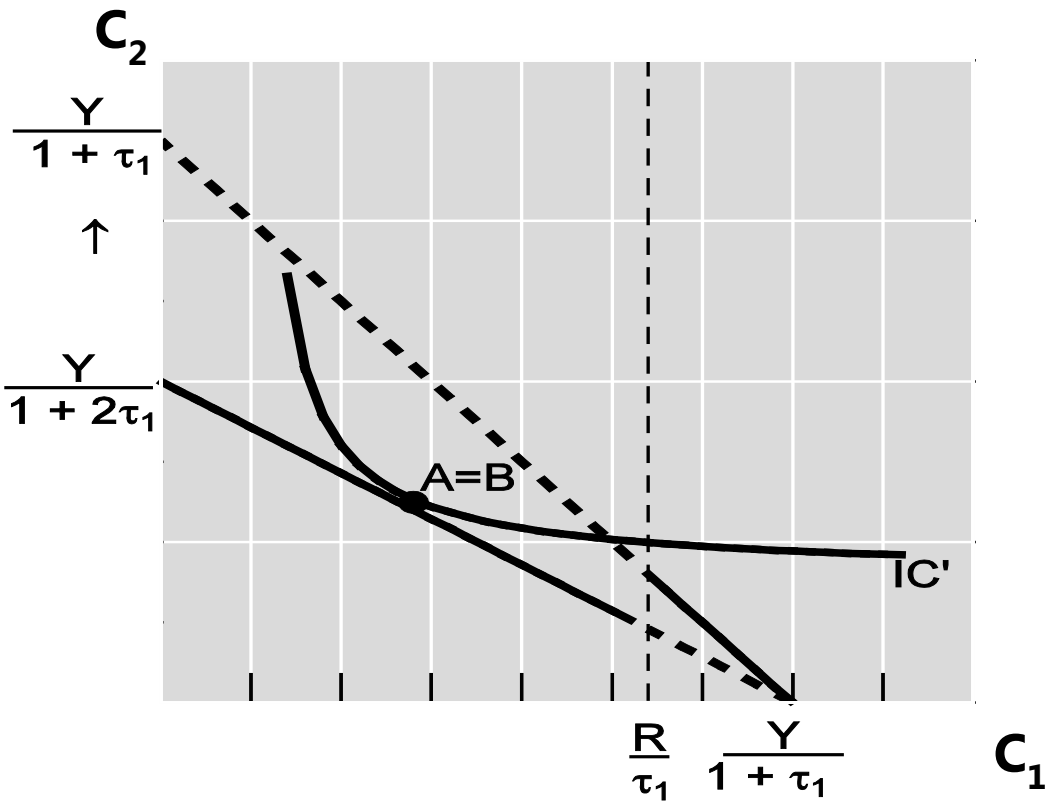

Figure 7